TRENDS AND DEVELOPMENTS

Alaska

BRISTOL BAY APPROACHES RULED ALASKA TERRITORIAL WATERS:

"The territorial waters of the State of Alaska in Bristol Bay are those waters within a line from Cape Newenham to Cape Menshikof on the Alaska Peninsula," ruled the First Superior Court of Alaska early in September 1962. This decision culminated an involved legal battle over Alaska's right to tax freezerships operating more than three miles offshore within Bristol Bay. Defense attorneys did not dispute the locations where the freezerships purchased salmon but argued that the accepted three-mile territorial limit placed the vessels outside Alaskan waters, therefore, they should not be subject to state taxation.

The Superior Court Judge stated that in his opinion the Federal Government "has asserted a claim to all Bristol Bay waters landward of a line drawn between Cape Newenham and Cape Menshikof as inland waters through interrelated administrative and judicial action" and that in order to control the fisheries of the area "jurisdiction has been, and must be, asserted to that extent."

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RUSSIAN WHALING NEAR KODIAK:

Late in September 1962, a concentration of Russian whale catcher vessels moved into the area immediately south of Kodiak Island off Alaska. Patrol vessels traversing those waters estimated the Russian fleet at approximately 12 killer vessels. Fishing was apparently good as many whales were in evidence throughout the area. This movement appears to be a major shift of Russian whaling effort which was previously centered in the central Aleutian Islands.

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SALMON PACK IN 1962 LARGEST IN TEN YEARS:

The Alaska canned salmon pack as of September 23, 1962, totaled 3,410,000 cases (48 1-lb. cans). This is the largest pack recorded since 1952, when the pack totaled 3,574,000 cases. The large pack this year was the result of the excellent run of pinks in Central Alaska, which accounted for 1,212,000 cases or 35.5 percent of the total Alaska pack of all species.

Gill-net boat in Alaska with a load of red salmon.

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KODIAK AREA SALMON CATCH:

The total catch of salmon in the Kodiak district totaled 15,750,000 fish. Of that total, pinks accounted for 14,098,000, chums 821,000, reds 774,000, cohos 56,000, and kings 1,800

Salmon, clam, and crab cannery in Cordova, Alaska.

fish. The pink salmon catch exceed all previous even years in the history of the Kodiak Island fishery. The 565,770 cases of pinks packed constituted 70 percent of the total pack of 711,000 cases packed for the district.

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SHRIMP CATCH UP IN 1962:

The Kodiak district shrimp catch in the first 9 months of 1962 was greater than the 1961 catch and that for any previous year. The Kodiak catch in 1961 was 11,084,000 pounds. The 1962 catch as of September 30 was 11,219,000 pounds.

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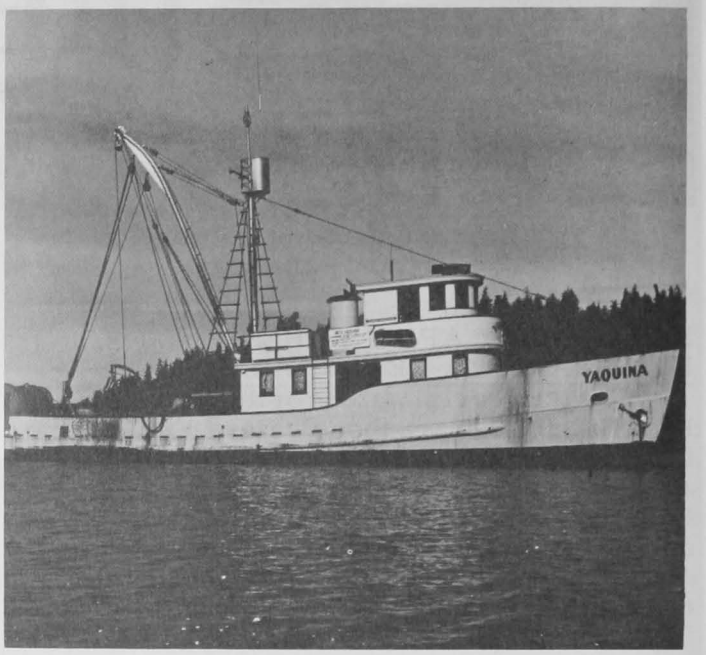
HERRING 1962 SEASON SUCCESSFUL:

The herring reduction fishery in Southeast Alaska ended on September 12, 1962, following a decline in the availability of herring. The single reduction plant in operation experienced a relatively successful season with a total catch of over 13,800 short tons. The catch per unit of effort was better this season than that found in recent years. However, it is believed that the absence of competition among the several plants normally in operation may have contributed more to the success of fishing than did a possibly larger abundance of fish. Nearly 80 percent of the season's catch was four-year-old herring. The oil yield was high throughout the season.

Alaska Fisheries Exploration and Gear Research

CHARTERED TRAWLER BEGINS EXPLORATORY BOTTOM FISHING IN SOUTHEASTERN ALASKA:

Exploratory bottom fishing with the chartered trawler Yaquina was scheduled in the waters of Lynn Canal and Chatham Straits in Southeastern Alaska during October-November 1962, by the Bureau's Exploratory Fishing and Gear Research Base at Juneau. The principal objective is to determine the potential fisheries resources in Alaskan waters. The emphasis is on finding out the availability and abundance of fish and shellfish resources which might expand the commercial fisheries in that area. The principal method to be used is bottom fishing with trawl gear at regular intervals down to depths



Yaquina, Bureau of Commercial Fisheries exploratory fishing vessel.

of over 400 fathoms (2,400 feet). Crab pots and experimental gear for octopus were to be used, as well as trawls.

The results of these surveys and similar studies by the Bureau of Commercial Fisheries may pave the way toward the increased use of valuable resources which are not now completely understood.

The Yaquina was to be used continuously from early July until November 1962 on king crab exploration near Kodiak, shrimp exploration in the Seward area, and bottomfish exploration in Southeastern Alaska. The king crab exploration ended on August 19, and the shrimp exploration was completed on October 4.

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

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STOCKS OF SHRIMP LOCATED NEAR PRINCE WILLIAM SOUND:

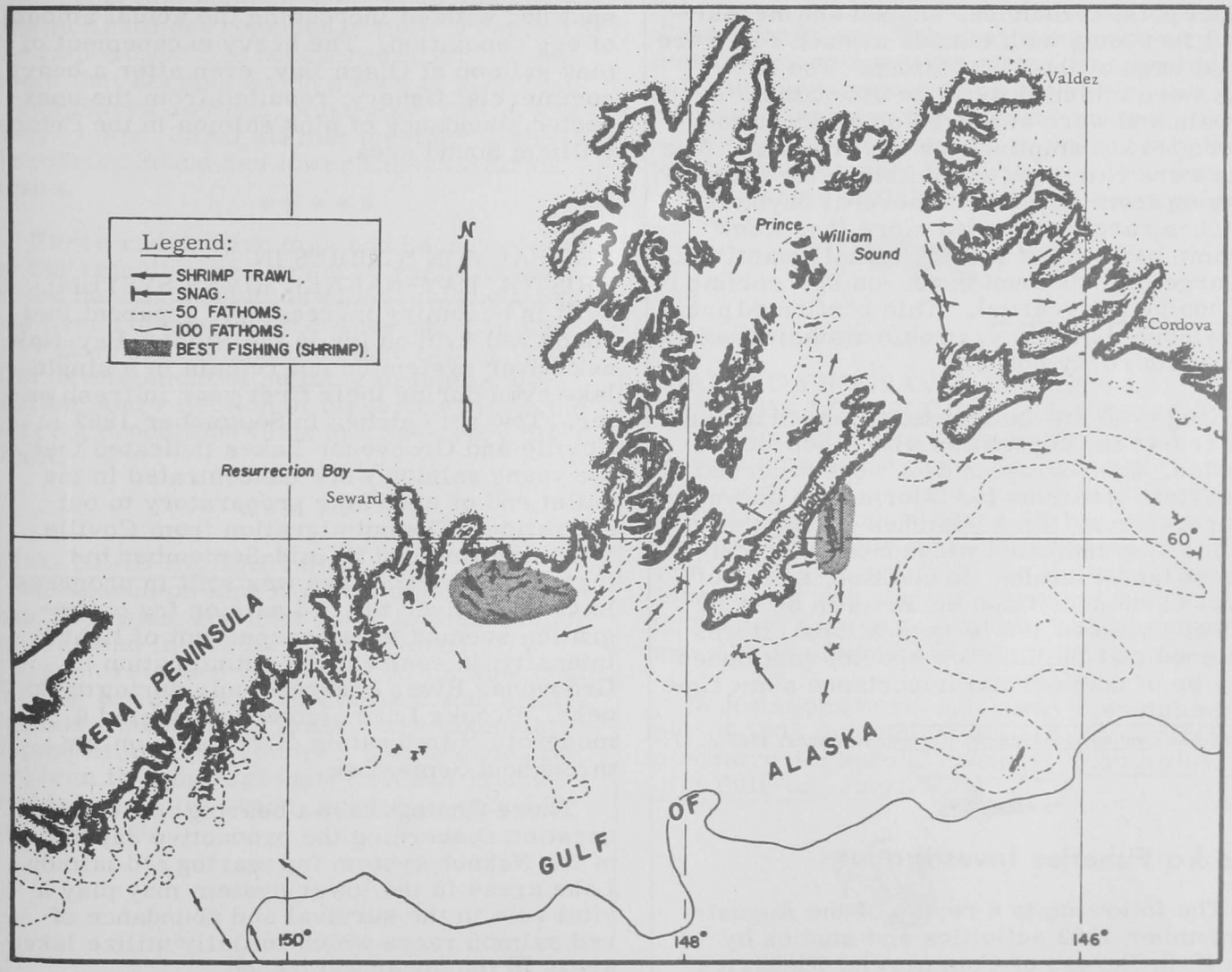
M/V "Yaquina" Cruise 62-2 (August 21-October 4, 1962): To define the availability of shrimp in the waters near the Kenai Peninsula and Prince William Sound was the principal objective of this 6-week exploratory cruise by the U. S. Bureau of Commercial Fisheries chartered vessel Yaquina. Shrimp catches in amounts up to 2,500 pounds

were made per 1-hour trawl drag during the trip.

A semi-balloon shrimp trawl, measuring 70 feet along the footrope, was used in a series of 93 drags lasting about one hour each. Depth intervals from 9 to 200 fathoms were sampled for indications of shrimp. Incidental to trawling, experimental shrimp pots were set at 11 locations.

Shrimp were caught at over 80 percent of the locations fished during the cruise. The dominant species caught was pink shrimp (Pandalus borealis), followed by side-stripe shrimp (Pandalopsis dispar). Other species were also caught in small quantities. Best fishing during the survey was east of Montague Island off Patton Bay. Four 1-hour trawl drags in depths from 45-75 fathoms in that area, yielded a catch of approximately 8,000 pounds of shrimp. Most of that catch was

Stern view of vessel Yaquina showing reel retrieving and stowing trawl net.



Explorations in Alaskan waters by chartered vessel Yaquina Cruise 62-2 (August 21-October 4, 1962).

pink shrimp averaging about 80 individual shrimp (heads-on) to the pound. Commercial vessels fishing for shrimp near Kodiak Island usually maintain catch rates of about 3,000 to 4,000 pounds an hour or more.

Other areas where good signs of shrimp were found included off Johnstone Bay where 1,100 pounds of shrimp were caught during two 1-hour drags. It was of particular significance that over two-thirds of the shrimp caught in that area were the side-stripe variety averaging from 28 to 36 shrimp (heads-on) per pound. Trawl catches in the vicinity of Hinchinbrook Island indicated a fair concentration of shrimp with several catches of over 500 pounds. Most of those were small shrimp not suitable for commercial use.

The results of limited pot-fishing experiments did not indicate that it was a good method of catching shrimp. Fifteen individual pots, cylindrical-shaped and measuring 3 feet long, with tunnels at each end, were set at each of the 11 locations. The baited pots were attached to a line at 5-fathom intervals and were anchored on rocky bottom where trawl sampling was not practical. The pots were retrieved after fishing for periods ranging from 12 hours to several days. Catches rarely exceeded more than a few shrimp per pot but included small quantities of large 6 to 10 count heads-on spot shrimp (Pandalus platyceros). This confirmed prior knowledge that this desirable shrimp species frequents rocky bottom.

King crab and halibut were tagged during the cruise in cooperation with independent studies. Hydrographic data were recorded at certain locations for information on water temperatures. Trawl catches during the cruise also indicated widespread distribution of tanner crabs. In addition, a single trawl catch near Cape St. Elias in 58 to 62 fathoms yielded 300 large scallops. It was believed that the last two species mentioned may be of commercial importance some time in the future.

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

Alaska Fisheries Investigations

The following is a report of the August-September 1962 activities and studies by the U. S. Bureau of Commercial Fisheries Biological Laboratory, Auke Bay, Alaska.

PINK SALMON STUDIES:

Attempts to regulate the even-year stock of pink salmon in Sashin Creek, Alaska, were apparently successful. The purpose of this study is to determine if the run of pink salmon in a particular stream can be re-established naturally. It is not certain whether the pink salmon entering Sashin Creek fish are strays from neighboring watersheds. However, it is concluded that for 1962, substantial straying did not occur. This was one of the questions set forth when the small even-year cycle was controlled at Sashin Creek.

The spawning escapement of pink salmon into the Olsen Bay stream was in excess of 50,000 fish. Studies so far indicate that there is an egg saturation point in the gravel beyond which further spawning would not be beneficial. In the Olsen Bay study area this may mean that the final one-fourth of the run spawned without increasing the actual amount of egg deposition. The heavy escapement of pink salmon at Olsen Bay, even after a heavy commercial fishery, resulted from the unexpected abundance of pink salmon in the Prince William Sound area.

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RED SALMON STUDIES IN BRISTOL BAY-NAKNEK RIVER SYSTEM:

It is becoming increasingly apparent that young red salmon fry in the Bristol Bay-Naknek River system do not remain in a single lake even during their first year in freshwater. Tow net catches in September 1962 in Coville and Grosvenor Lakes indicated that the young salmon were concentrated in the outlet end of each lake preparatory to outmigration. The outmigration from Coville Lake was finished by mid-September but that of Grosvenor Lake was still in progress. In Coville River the red salmon fry outmigration seemed to be independent of light intensity; in contrast the outmigration to Grosvenor River occurred only during darkness. Brooks Lake also demonstrated a moderate outmigration of red salmon fry throughout September.

These findings have a bearing on the basic question concerning the productive capacity of the Naknek system for rearing red salmon. Lake areas in the lower system may play a vital role in the survival and abundance of red salmon races which initially utilize lake areas in the upper watershed.

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YUKON RIVER SALMON RESEARCH:

The chum salmon run in the Rampart Canyon section of the Yukon River continued throughout September 1962. Heavy rains and severe landslides in the canyon area in early September resulted in the loss of one fish wheel and damage to the remaining wheel. Tagging operations were suspended for one week, and the last part of the late August-early September peak of the chum salmon run was missed. The chum salmon run was falling off rapidly at the end of September with a light showing of cohos coming in. Six king salmon were tagged during the week of September 23-29. To that date 7,900 chums, 1,380 kings, and 25 cohos had been tagged.

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HERRING RESEARCH:

Eight additional radioactive herring tags were recovered in the Washington Bay herring reduction plant in September 1962, all of which had been released in 1961. From all the radioactive tags recovered so far it would seem that herring which spawn in such scattered places as Sitka, Auke Bay, Craig, and the Seymour Canal all mix together in the Frederick Sound and lower Chatham Strait areas.

Three radioactive tags had been recovered by the rejection equipment in early August in the herring reduction plant. One of these had been released by the Auke Bay Laboratory staff in 1960 and the other two in 1961. The development of suitable scanning, detection, and rejection of tagged fish from the herring production lines has been very difficult.

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KING CRAB RESEARCH:

Research on king crabs south of the Alaskan Peninsula got under way in the summer of 1962 and in August the chartered M/V Paragon released 2,000 tags on its king crab tagging pattern between Chirikof and Trinity Islands. Most of the crabs were taken at depths around 60 fathoms. The sample area between the Shumagin and Chirikof Islands yielded very few crabs, producing only 142 tag releases.

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MAIDEN VOYAGE OF NEW OCEANOGRAPHIC RESEARCH VESSEL:

The oceanographic research vessel Murre II returned to Juneau, Alaska, the latter part of October 1962 after completing her maiden voyage. The Murre II, is an 86-foot power scow being operated by the Auke Bay Biological Laboratory of the U. S. Bureau of Commercial Fisheries. The Bureau's oceanographer aboard stated the cruise marked the beginning of a program to relate oceanographic conditions to production of fish and shellfish. The trip served as a shakedown and training cruise for the Bureau's oceanographers and three scientists from the Douglas Marine Station of the University of Alaska.

The Murre II visited five stations during the cruise. Physical, chemical, and biological data were collected in Behm Canal, Clarence Strait, Sumner Strait, and in Chatham Strait off Little Port Walter and off Washington Bay. The preliminary survey included measurements of sea temperatures, salinity, oxygen content of the water, and chemical analyses for mineral content. Tows were made at each station to collect zooplankton (minute animals important as food for many species of fish) present in those waters.

American Samoa

TRAINING PROGRAM FOR SAMOANS TO LEARN LONG-LINE TUNA FISHING:

The United States canning firm which operates the tuna cannery in American Samoa in January 1961 began a fishery training program for Samoans to learn the use of long lines in fishing for tuna. The United States firm in 1954 leased from the United States Government and started operating the tuna cannery in American Samoa. The cannery provides employment for about 400 Samoans.

Negotiations were under way in the summer of 1962 for another United States firm to construct a second cannery. (South Pacific Bulletin, July 1962.)

California

MIDWATER TRAWLING FOR SALMON FINGERLINGS CONTINUED:

M/V "Nautilus" Cruise 62-N-9a-Salmon (September 5-8, 1962); 62-N-9b (September 17-21); 62-N-10a (October 1-5): Mid-water trawling in the Carquinez Strait for marked salmon fingerlings on their seaward migration were continued by the California Department of Fish and Game research vessel Nautilus. A nylon midwater trawl with a 25-foot square opening, and a cotton midwater trawl with a 15-foot square opening were used.

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

A total of 150 tows completed in the Strait during the cruises yielded a catch of 48 king salmon (Oncorhynchus tshawytscha), and 15 adult rainbow trout (Salmo gairdneri). Two of the salmon were adults, one of which was marked D-RM. The marked salmon was released in the Sacramento River at Hamilton City in 1959.

Other Species Caught by the Nautilus on Cruises 62-N-9a, 9b, and 62-N-10a

Species	Number
Northern anchovy (Engraulis mordax)	53,900(est.)
American shad (Alosa sapidissima)	2,750
Pacific herring (Clupea pallasi)	2,000(est)
Jacksmelt (Atherinopsis californiensis)	1,000(est)
Striped bass (Roccus saxatilis)	915
Sacramento smelt (Spirinchus thaleichthys)	341
Threadfin shad (Dorosoma petenense)	101
Northern midshipman (Porichthys notatus)	58
King salmon (Oncorhynchus tshawytscha)	48
Rainbow trout (Salmo gairdneri)	15
Surfsmelt (Hypomesus pretiosus)	9
Starry flounder (Platichthys stellatus)	8
Staghorn sculpin (Leptocottus armatus)	3
Walleye surfperch (Hyperprosopon argenteum)	3
Topsmelt (Atherinops affinis affinis)	2
Three-spined stickleback (Gasterosteus aculeatus)	1
Pipefish (Syngnathus griseo-lineatus)	1
Shiner perch (Cymatogaster aggregata)	1
Splittail (Pogonichthys macrolepedotus)	1

These cruises conducted in September-October 1962 conclude a 33-cruise series started on April 10, 1961, by the California Department of Fish and Game. All were reported in previous issues of Commercial Fisheries Review.

Note: See Commercial Fisheries Review, November 1962 p. 21.

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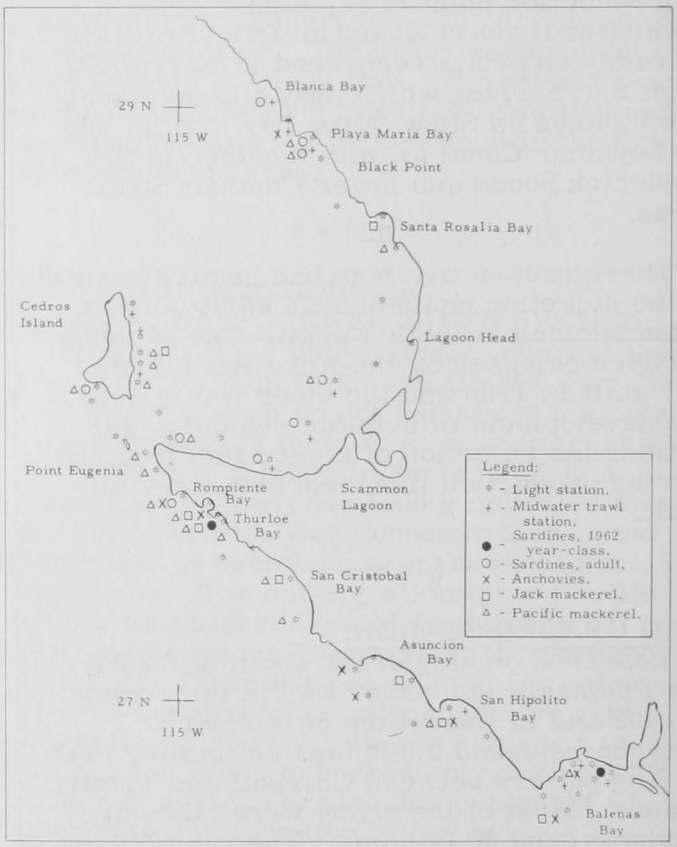
PELAGIC FISH POPULATION SURVEY CONTINUED:

M/V "Alaska" Cruise 62-A-5-Pelagic Fish (September 18-October 7, 1962): The objectives of this cruise were to: (1) survey the sardine population to determine the amount of recruitment from this year's sardine spawning, and to measure the population density of older fish; (2) sample other pelagic species for age, length, and distribution studies; (3) evaluate the midwater trawl as a tool for sampling pelagic species; and (4) collect live sardines for blood genetic and other studies by the U. S. Bureau of Commercial Fisheries Biological Laboratory at La Jolla, Calif. The coastal waters of central Baja California, Mexico, from Ballenas Bay to Blanca Bay were the areas explored by the California Department of Fish and Game research vessel Alaska during this cruise.



M/V Alaska Cruise 62-A-5-Pelagic Fish, explorations in coastal waters of central Baja California, Mexico.

Night Light Stations: A total of 48 night light stations were occupied. Sardines were present at 9 stations, anchovies at 7, Pacific mackerel at 18 and jack mackerel at 8.

Sardines were scarce south of Point San Eugenia and around Cedros Island. Two of

the 4 samples taken in those areas consisted of single fish-of-the-year found in catches of other species. Another sample from Rompiente Bay, was taken from a large school of 1961 year-class sardines mixed with topsmelt and Pacific mackerel. The fourth sample consisted of a few older fish taken with a sample of Pacific mackerel from South Bay, Cedros Island.

Sardines were more abundant in the southern part of Sebastian Vizcaino Bay. Large numbers of sardines were attracted on 4 out of 5 stations in that area. They were adult fish, ranging from 165 to 206 millimeters in standard length. Most of the fish were in an advanced state of maturity, with one ripe female noted in the samples taken.

Adult sardines were also caught in Playa Maria Bay. They ranged from 176 to 204 millimeters standard length, and were not in as an advanced stage of maturity as those from the southern part of Sebastian Vizcaino Bay. A total of about 900 sardines from southern Sebastian Vizcaino Bay, and 400 from Playa Maria Bay were delivered alive to the Bureau of Commercial Fisheries Biological Laboratory at La Jolla for further study.

Midwater Trawl Stations: Thirteen tows were made with the midwater trawl, all either at the surface or within 50 feet of the surface. The first 10 tows were made during the day, the last three were made at night. All tows were made in areas where night light stations were also occupied.

Daytime tows were disappointing as compared with night light stations. The first tow in San Hipolito Bay caught nothing. The next three tows were made in Ballenas Bay, where night light stations showed thread herring to be abundant. Two of those tows again were blank, but the third caught 15 sierra ranging in size from 18 to 28 inches, and one 14-inch bonito.

The next tows were made along the east side of Cedros Island. The first of 3 tows yielded 416 bonito weighing from 1 to 2 pounds each, the second tow was a blank, and the third yielded 5 larger bonito, weighing $3\frac{1}{2}$ to 4 pounds each.

Three daylight tows were made in the southern part of Sebastian Vizcaino Bay, where sardines were known to be abundant from night-light work. No fish were caught in those tows.

The last three tows were made at night, between Playa Maria and Blanca Bays. Sardines had been caught in Playa Maria Bay on a light station the previous night. A trawl tow in that area yielded 450 sardines and 30 squid mixed with a few bat rays, Pacific mackerel, and round herring. The second tow, off False Bay, yielded pompano and a few anchovies, while the last tow, in Blanca Bay, caught 60 sardines and about 500 squid. The sardines caught in those tows were adult fish, and the samples appeared similar in all respects to the night-light sample from Playa Maria Bay. No schools had been sighted visually or with the depth finder during those tows.

It was evident that daylight tows did not produce samples comparable to night-light samples. This may have occurred because the same fish were not available in the same areas during the day, or because the fish were able to see and avoid the net during daylight. But the few night tows that were made indicated good comparability. Whether or not night tows will be comparable under a variety of conditions remains to be tested.

Only 9 schools were sighted during 300 miles of night scouting between stations. Although scouting conditions were often poor, with poor phosphorescence and choppy seas, schools were not evident even when scouting conditions were good.

The weather was fair during most of the cruise, although a tropical storm south of Point Eugenia in the early part of the cruise, and strong westerly winds on the last working day caused a loss of two nights' work.

Sea surface temperatures ranged from 64.2° F. off Black Point to 74.8° F. off Abreojos Point.

Note: See Commercial Fisheries Review, November 1962 p. 18.

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Airplane Spotting Flight 62-9-Pelagic Fish (September 4-6, 1962): To assist in evaluating a midwater trawl as a tool for sampling the pelagic environment by locating fish schools and guiding its research vessel Alaska over them was the objective of this aerial survey by the Twin Beechcraft N5614D of the California Department of Fish and Game. On this flight, the aircraft surveyed the inshore area from Long Beach to

San Diego, and the offshore islands and banks of southern California and northern Baja California, Mexico.

Low clouds and poor visibility limited scouting to the afternoon on each day of the flight when conditions varied from poor to fair.

The coastal area from Long Beach Harbor to the United States-Mexican Border was scouted on the first day but no fish were sighted. There was extensive red water in Long Beach Harbor, and off Newport Beach the organisms responsible for the red water had converged in drifts at oblique angles to the shore. Small patches of red water were sighted off Laguna Beach, Doheny State Park, San Mateo Point and Point Loma.

On the second day of the flight, the area surveyed was from San Diego to the Coronados Islands, then to Sixtymile Bank, Cortes Bank, San Clemente and Santa Catalina Islands. A cloud deck between 500 and 1,000 feet above the ocean covered most of the general area. Because of that, flying was at a lower altitude than the normal 1,500 feet. An unidentified whale and 16 albacore boats were sighted off Sixtymile Bank. Scouting conditions around San Clemente and Santa Catalina Islands were only fair because of some scattered clouds.

The research vessel Alaska was notified of the three Pacific mackerel and two unidentified fish schools sighted off the southeast end of San Clemente Island. A small purse seiner was making a set in that area, and later delivered 10 tons of Pacific mackerel to the cannery. The Alaska made a midwater haul in the general area about 7 hours later and netted 16 jack mackerel, as well as an assortment of small, non-commercial fish species and invertebrates.

A total of 7 deep schools believed to be jack mackerel, were sighted off the southeast end of San Clemente Island on the last day of the flight. They were round, yellowish-brown schools that did not flash. The research vessel was directed over one of the schools and as she went over it, divided it into two separate schools. The depth-finder aboard did not detect any traces of the school. The midwater trawl had not been set. The second school successfully evaded the vessel and the net. The midwater trawl limited the maneuverability of the vessel, which together with the speed of the fish school, prevented catching any fish.

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Airplane Spotting Flight 62-10-Pelagic Fish (September 10-12, 1962): To determine the distribution and abundance of pelagic schools, the inshore area from the United States-Mexican Border to Point Conception was surveyed from the air by the California Department of Fish and Game's Cessna "182" 9042T.

The first day's survey covered the area from Redondo Beach to the United States-Mexican Border. A total of 21 anchovy-schools were observed off Point Loma. The anchovy concentration between Point Loma and the border, present the six months previous to September 1962, was not seen on this flight.

On September 12, the last day of the flight, the area from Redondo Beach to Point Conception was surveyed. Thirteen anchovy schools were sighted south of Goleta Point and 17 off Pitas Point. Both of those school groups were only 200 to 300 feet offshore. That number of schools was small compared to the hundreds usually found in the area.

During the month of August, the anchovy schools observed from Goleta to Ventura were also 200 to 300 feet offshore, instead of 1 to 3 miles offshore as they had been during the previous six months. An influx of bonito may have caused the change in location of the anchovy school groups.

Small patches of red tide were present in many places along the coast. It was impossible to survey the area north of Point Conception on this flight because of cloudy weather.

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

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Airplane Spotting Flight 62-11-Pelagic Fish (October 16-17, 1962): To determine the distribution and abundance of pelagic schools, the inshore area from the United States-Mexican Border to Santa Cruz was surveyed from the air by the California Department of Fish and Game's Cessna "182" 9042T.

The coastal waters from Los Angeles International Airport to Santa Cruz were surveyed on the first day's flight. A total of 13 anchovy schools were counted south of Cape San Martin. Between the Salinas River and Monterey, 46 anchovy schools were counted.

On October 17, the coast from the United States-Mexican Border to the Los Angeles International Airport was surveyed. Three small schools, probably anchovies, were observed off the "Barn," a familiar local landmark between Dana Point and Oceanside. Red tide was prevalent along the coast from Santa Barbara to Oceanside, and also the inshore waters of Monterey Bay. The color of the red tide had faded since the aerial survey conducted in August 1962. The brightest red tide in southern California was in the areas between Gorda Point and Point Hueneme, and from Long Beach to Newport. Both those areas are flat, shallow, and sandy. Red tide was negligible off rocky shores such as Palos Verdes and much of central California.

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

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ABALONE GROWTH STUDIES CONDUCTED FOR COMMERCIAL AND SPORT FISHERY:

M/V "N. B. Scofield" and M/V "Mollusk" First Cruise 62-S-5 and 62-M-1-Abalone (August 15-27, 1962); Second Cruise 62-S-6 and 62-M-2-Abalone (September 5-17, 1962): The objectives of these cruises were to: (1) examine areas of commercial and sport abalone fishing, (2) examine established stations, (3) collect samples for maturity and growth studies, and (4) tag a limited number of abalones for transplanting experiments. The mainland coastal areas of Avila and San Simeon, and the Channel Islands of Santa Catalina, San Clemente, Santa Barbara, San Nicolas, Santa Cruz, Santa Rosa, and Anacapa, were explored by the California Department of Fish and Game research vessels N. B. Scofield and Mollusk during August and September 1962.

Results of the First Cruise by area were:

Avila: No abalones were found on any of the dives. There was no explanation for this since the bottom and general environment appeared suitable for them.

San Simeon: The abalones sampled here had well-developed gonads and appeared to be approaching spawning. Sizes ranged from 153 to 216 millimeters but most were between 190 and 198 millimeters. All but two showed evidence of the previous season's growth. Several had added over 2.5 centimeters of shell. This season's growth appeared to be just starting; most of the sampled abalones had added 1 to 2 millimeters of shell.

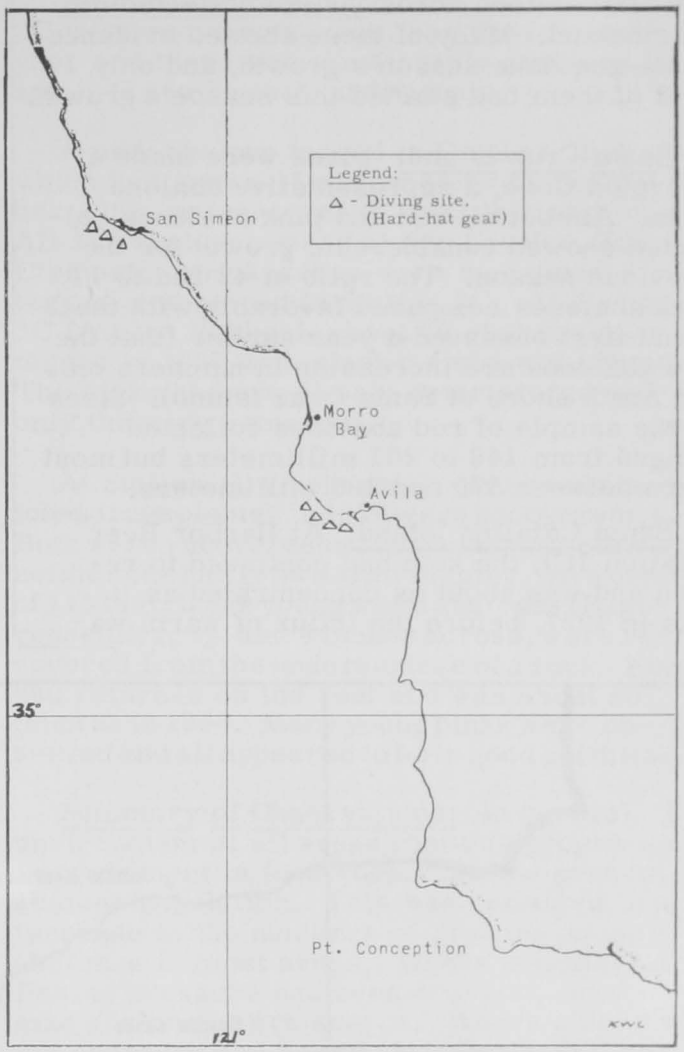


Fig. 1 - Shows diving stations during Cruises 62-S-5 and 62-M-1 by research vessel N. B. Scofield and Mollusk.

Because of rough weather, plans for diving along the mainland coast were changed and operations were shifted to San Miguel and Santa Cruz Islands.

San Miguel Island: At Station ISM, considerable bottom changes had taken place since the previous year. Sand had moved in over large areas, almost completely covering the rocks; most of the kelp was growing through the sand but no abalones were present. At the east end of the station, rocks were almost bare and covered with sea urchins. In the middle area, the kelp growth was so thick it was difficult to get through, but no abalones were found. Abalones were finally located at the extreme west end of the area. Many young were found on the undersides of rocks. Forty abalones, 144 to

220 millimeters across, were collected for Marineland. Many of those showed evidence of the previous season's growth, and only 1 or 2 of them had started this season's growth.

Santa Cruz Island: Dives were made at Scorpion Cove, a representative abalone area. Almost all red and pink abalones collected showed considerable growth for the previous season. The ratio of 42 red to 17 pink abalones compared favorably with the trend first observed a year earlier (that the red abalones are increasing in numbers on the north shore of Santa Cruz Island). Sizes in the sample of red abalones collected ranged from 148 to 201 millimeters but most were between 175 and 190 millimeters.

Santa Catalina Island: At Harbor Reef (Station 1C), the kelp had continued to return and was about as concentrated as it was in 1957, before the influx of warm water. Many young pink abalones, all of which were in good condition, were observed feeding. Most showed new shell growth but not an exceptional amount.

Results of the Second Cruise by area were:

Santa Rosa Island: An effort was made to inspect black abalones tagged in 1961 at Station ISR, but rough weather prevented sampling them.

Anacapa Island: Diving was delayed because both divers working on this project had mild respiratory infections. First dives were made on the north side where bottom conditions appeared good, but abalones were scarce. Skin and SCUBA divers frequent this area and as a result it is heavily fished, which may account for the scarcity of abalones. At Anacapa Station IA, on the south side, few

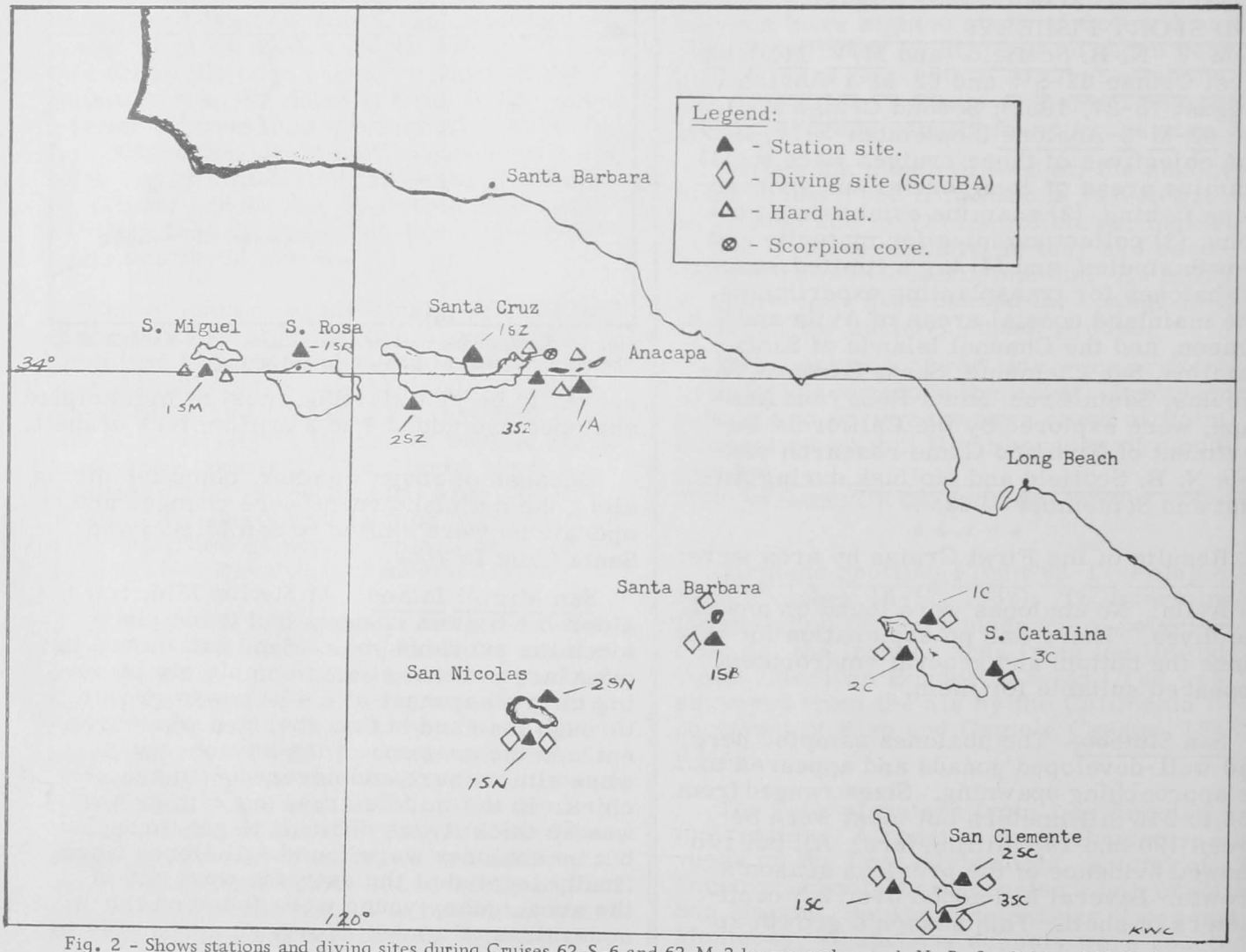


Fig. 2 - Shows stations and diving sites during Cruises 62-S-6 and 62-M-2 by research vessels N. B. Scofield and Mollusk.

abalones were observed. Kelp continues to return, but bottom conditions unfavorable to abalones (increases in sand and sea urchins) appeared to be spreading.

Santa Barbara Island: At Station ISB, kelp was not as dense as a year earlier. Many abalones were close to shore and on the undersides of rocks, and there was no evidence of unusual growth. Spot dives on the north side of the main island in the thick growth of Postelsia palmaeformis revealed only an occasional abalone, but on the edge of kelp beds, great concentrations of sea urchins were observed.

San Nicolas Island: A sample of 40 red and 11 pink abalones was taken from Station ISN. Reds ranged from 65 to 230 millimeters across, with 25 of them between 200 and 230 millimeters. Considerable growth of the previous year was evident on almost all shells, and only a small amount for the current season.

Pink abalones showed recent growth of from 2 to 4 millimeters. Both the red and pink species had well developed gonads, approaching spawning condition. The greatest abalone concentrations were found in 50- to 60-foot depths.

San Clemente Island: Abalones appeared to be less numerous at Station ISC than the year earlier. The previous season's growth ranged between 3 to 5 millimeters, and little or no growth for this season was observed for pinks. Growth on green abalones was highly irregular, ranging from 0 to 2 inches.

At Pyramid Cove (Station 2SC), pink and green abalones were found in large concentrations. In some areas they were stacked 2 and 3 deep. Abalones were not present in such numbers the previous year in this area. Several of the greens were in spawning condition but the pinks were not.

At China Cove (Station 3SC), commercial divers were working, but dives in connection with this project were made in the immediate area. Legal-size pink abalones were scarce. The commercial divers had been working for several hours and had only a few dozen abalones. This area has been heavily worked by commercial divers during the past year.

Santa Catalina Island: Abalones at Station 2C were more numerous than the previous year and there was a noticeable increase in small (1- to 3- inch) individuals.

A pink abalone tagged in October 1958, which had grown 18 millimeters by September 1962, was recovered from this station. All 145 abalones taken at San Nicolas, San Clemente, and Anacapa were measured, tagged, and placed in Station 2C. At Station 3C (Avalon Harbor), about 30 pink abalones tagged in 1957 with plastic disks were found. The disks had completely deteriorated and only the wire remained.

At Station IC, empty shells of two red abalones transplanted in 1956 were recovered. Both were recovered in 100 feet of water and neither one had grown after tagging. At a depth of 115 feet, three young white abalones (H. sorenseni), $\frac{3}{4}$, $1\frac{1}{2}$, and 4 inches across, were recovered from the undersurface of a rock. Kelp had returned on the reef and was about as thick as in 1956. Many young pinks were observed and all appeared to be in good condition.

Summary of Observations: In general, the environment of all areas showed a progressive improvement in food supply for the present abalone population. This was reflected in an increase in the numbers of growing young abalones in most areas. Where commercial fishing pressure had been heaviest, legal-size abalones were scarce. Where skin-diving pressure had been heavy (Anacapa), abalones of all sizes were scarce. Most of the abalones showed considerable growth for the previous season. This season's growth was just beginning.

Gonad examinations indicated that spawning had not yet occurred, although most were approaching ripeness. The over-all condition of the abalone resource is encouraging from a biological standpoint. If present conditions prevail, it should remain so for the balance of the season.

Cans--Shipments for Fishery Products

JANUARY-AUGUST 1962:

The amount of steel and aluminum consumed to make cans shipped to fish and shellfish canning plants during January-Au-

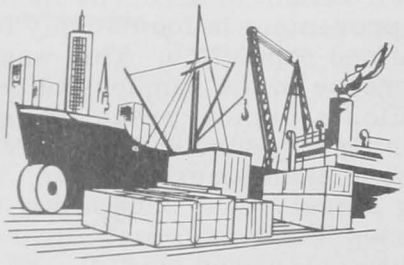
gust 1962 was 7.5 percent above that used during the same period in 1961. Prior to 1962, the figures covered only tinplate cans, but beginning with January 1962 aluminum cans are included. It is believed that only a small amount of aluminum is being used in cans for fishery products at present.

A total of 2,247,559 base boxes of steel (tinplate) and aluminum were used in the manufacture of cans shipped to fishery plants during the first eight months of 1962, whereas in the same period of 1961 (when only tinplate was reported) 2,056,663 base boxes of steel were consumed. The increase was mainly due to larger packs of Maine sardines, shrimp, salmon, mackerel, and tuna during 1962.

* * * * *

BY AREAS, JANUARY-JUNE 1962 AND 1961:

A total of 1,510,280 base boxes of steel and aluminum were used in the manufacture of cans shipped to fishery firms during the first half of 1962. Of the total, 73.9 percent was used in cans for shipments to the Pacific Area or West (including Alaska and Hawaii). The bulk of the fish-canning facilities are located in the Pacific Area. The Pacific Area was followed by the Eastern Area with 23.0 percent. The Southern Area and the Central Area combined used only 3.1 percent.

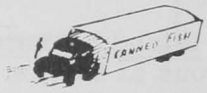


The over-all total in the first half of 1962 was up 4.0 percent from that for the same period of 1961. An increase of 6.9 percent in the amount of metal used in cans for shipment to the Pacific Area was partly offset by a drop of 3.5 percent in the total amount used for the Eastern, Southern, and North Central Areas. The increase in the Pacific Area was due to a greater pack of tuna.

The average wholesale price index for tinplate cans during January-May 1962 showed an increase of 2.7 percent over the average in 1961 and an increase of 5 percent over the average in 1957-59. The average wholesale price index for tinplate cans in January-May 1962 was 80.4 percent above the average in 1947.

Notes: (1) Statistics cover all commercial and captive plants known to be producing cans. The data for 1961 cover only shipments of steel (tinplate) cans, but the data for 1962 cover shipments of steel and aluminum cans. It is believed that only a small amount of aluminum is being used in cans for fishery products at present. A "base box" is an area 31,360 square inches, equivalent to 112 sheets 14" x 20" size. The tonnage equivalent figure for 1961 data is derived by use of the factor 23.0 base boxes per short ton of steel. The tonnage equivalent figure for 1962 data is derived by use of the factor 21.8 base boxes per short ton of steel.

(2) See Commercial Fisheries Review, August 1962 p. 17.



Central Pacific Fisheries Investigations

TUNA STUDIES IN SOUTH PACIFIC CONTINUED:

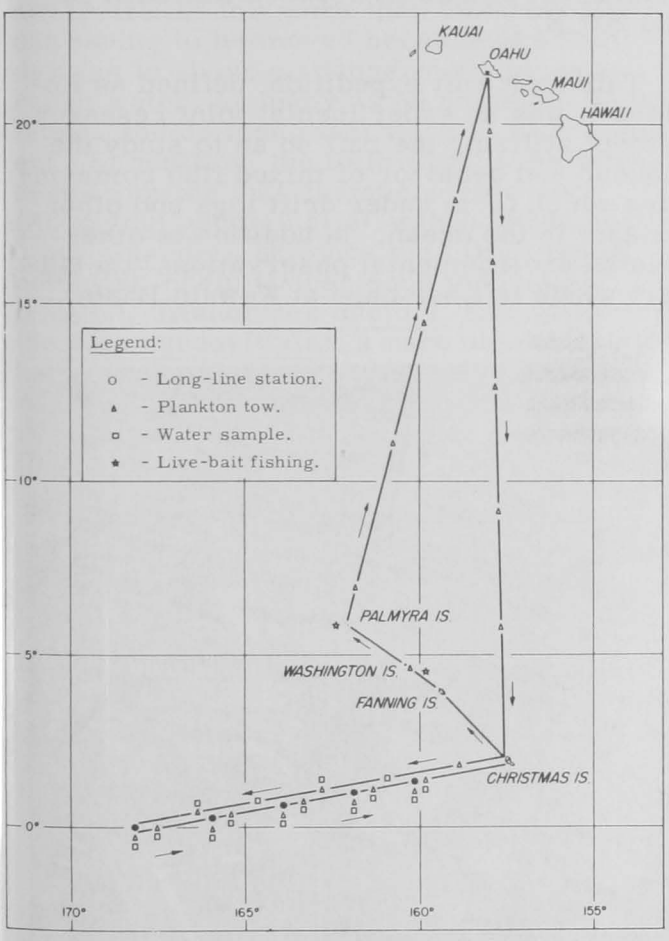
M/V "Charles H. Gilbert" Cruise 59 (July 23-August 15, 1962): One of the objectives of the cruise was to conduct long-line

U. S. Domestic Shipments of Metal Cans for Fishery Products, First and Second Quarters, 1961 and 1962
(Base Boxes of Metal Consumed in the Manufacture of Cans for Fishery Products)

Receiving Area	First Quarter		Second Quarter		Jan.-June	
	1962	1961	1962	1961	1962	1961
East2/	158,531	2/	189,556	2/	348,087	2/
Southern	13,403	2/	32,668	2/	46,071	2/
North Central	63	2/	29	2/	92	2/
Total2/	171,997	193,223	222,253	215,510	394,250	408,733
West3/	414,199	335,133	701,831	708,423	1,116,030	1,043,556
Total all areas	586,196	528,356	924,084	923,933	1,510,280	1,452,289

1/Includes Puerto Rico.
2/The grouping of States by geographic areas for reporting purposes was changed in 1962 so only total shipments in 1961 to the East, Southern, and North Central areas are shown.
3/Includes Alaska and Hawaii.

fishing for tuna and other climax predators so as to provide specimens for studies by the University of Washington. The Line Islands and waters southwest of Christmas Island were the areas where the U. S. Bureau of Commercial Fisheries research vessel Charles H. Gilbert operated during this cruise. The vessel, which departed Honolulu, Hawaii, on July 23, 1962, made bathythermograph casts, collected surface salinity samples, dropped drift cards, and made plankton tows on the initial leg of the cruise to Christmas Island, where she arrived on July 29. The vessel departed Christmas Island on that same day and conducted long-line fishing, plankton tows, Nansen bottle casts, and serological collecting in waters



Track Chart of Charles H. Gilbert Cruise 59 (July 23-August 15, 1962).

southwest of Christmas Island, returning there on August 6. During August 8-10, live-bait fishing was conducted along the Line Islands. Following departure from Palmyra Island on August 11 (the day after arrival there) bathythermograph casts were made, surface salinity samples collected, plankton tows were made, and drift cards dropped, on the return trip to Honolulu, where the vessel arrived on August 15.

Five long-line stations were occupied at various locations. Sixty baskets of 6-hook, 210-fathom main-line gear with 16-fathom droppers were fished at each station. The catch rate of tuna (number per 100 hooks) ranged from 0.6 at Station 11 to 4.2 at Station 27. A total of 23 yellowfin, 9 big-eyed, 4 shipjack, 1 albacore tuna, 4 marlin, 1 sailfish, 1 wahoo, and 5 sharks were caught at the 5 long-line stations.

Tissues were taken from long line-caught fish and frozen for further study by the University of Washington. Those tissues were: samples of eyes: 7 yellowfin; samples of livers and muscle: 23 yellowfin, 9 big-eyed, 4 skipjack, 1 albacore, 4 sharks, 4 marlins, 1 sailfish, 1 wahoo. In addition, samples of eyes, muscle, liver, and vertebrae were collected from 3 yellowfin taken by live-bait fishing near Palmyra Island, and 1 yellowfin caught trolling near Fanning Island.

Another objective was to collect plankton using 1-meter open nets as follows:

1. Eight 30-minute surface plankton tows and 30-minute tows at a depth of approximately 50 meters (164 feet) were made using 1-meter open nets in the waters southwest of Christmas Island. Displacement volumes ranged from 73 to 255 ml. after large organisms were removed.

2. On runs between Honolulu and the Line Islands, a 30-minute surface plankton tow was made each evening at 9 p.m. with a 1-meter open net. Those samples were to be turned over to the University of Washington after pontellid copepods were removed.

The third objective was to collect water samples to a depth of 300 meters (984 feet) using Nansen bottle casts. Five Nansen bottle casts (without reversing thermometers) were made at each long-line position to obtain water samples above and below the thermocline. Four Nansen bottles were positioned above the thermocline and 4 bottles below the thermocline. Samples from each group of 4 bottles were pooled together. In addition, a 5-gallon surface water sample was obtained at each cast and at several other locations.

Collecting blood samples from tuna and marlins for serological studies was the fourth objective, as follows:

1. From up to 300 skipjack caught by live-bait fishing methods, blood was collected from 1. In addition, blood samples were obtained from 30 yellowfin obtained by live-bait fishing outside Palmyra Island, and from 1 yellowfin caught by trolling.

2. From all tuna and marlins caught by long-line fishing, blood samples were collected from the following long line-caught fish: 23 yellowfin, 9 big-eyed, 4 skipjack, 1 albacore, 1 wahoo, 4 marlin, and 1 sailfish.

3. Total blood samples collected: 54 yellowfin, 9 big-eyed, 5 skipjack, 1 albacore, 4 marlin, 1 sailfish, 1 wahoo.

Other details of the cruise were:

1. Bathythermograph casts and collections of surface salinity samples were made every 30 miles on runs between Honolulu and Christmas Island, between Palmyra Island and Honolulu, and also at long-line fishing locations.

2. Stomach contents of 25 long-line caught tuna and marlins were presented for studies at the U. S. Bureau of Commercial Fisheries Biological Laboratory, Honolulu. Skeletons of 3 big-eyed tuna were retained for studies at the Bureau's Honolulu Laboratory.

3. The thermograph was operated continuously throughout the cruise.

4. Eight skipjack, 8 yellowfin, and 37 unidentified fish schools were sighted during the cruise.

5. One skipjack, 1 yellowfin, and 1 rainbow runner (Elagatis bipinnulatus) were caught by surface trolling.

6. Drops of drift cards (20 cards per drop) were made every hour for the first 6 hours after departure, and thereafter every 3 hours until 15° N. On the return trip, one group of drift cards were dropped every hour commencing 4 hours from Honolulu.

Note: See Commercial Fisheries Review, September 1962 p. 16.

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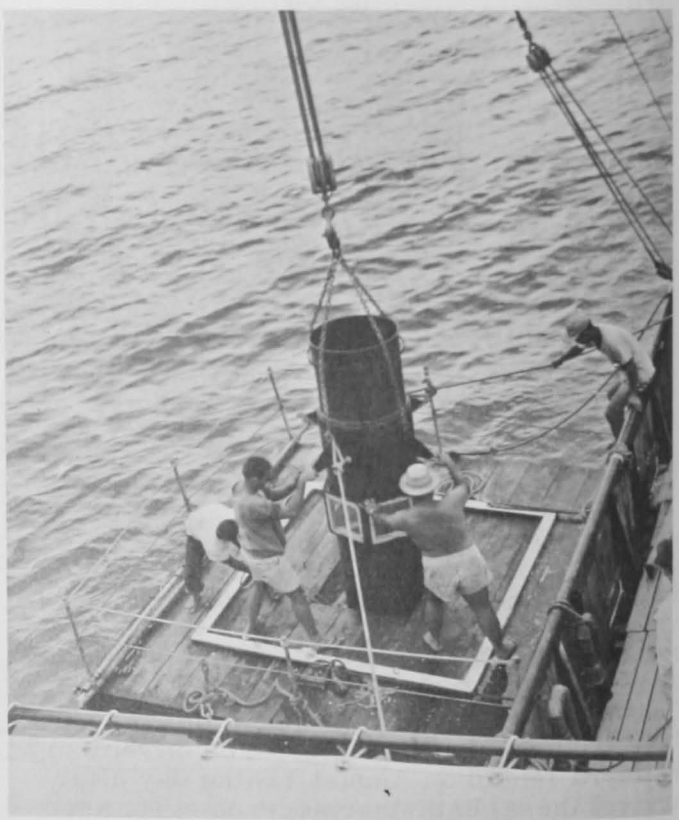
FISH BEHAVIOR NEAR FLOATING OBJECTS STUDIED:

M/V "Charles H. Gilbert" Cruise 60 - Koalana I (September 26-October 12, 1962): Observations during this cruise on the ecology and behavior of animal life in the vicinity of a floating object at sea were made jointly by the research vessel Charles H. Gilbert and the raft Nenue, both operated by the U. S. Bureau of Commercial Fisheries Biological Laboratory at Honolulu. The area covered was in waters ranging up to 10 miles off the Kona coast of Hawaii between latitudes 19° and 20° N.

This first raft expedition, defined as Koalana I, was an experimental joint research project utilizing the raft so as to study the makeup and behavior of mixed fish communities which form under drift logs and other flotsam in the ocean. In addition to other related environmental observations the Gilbert which left her base at Kewalo Basin,



The underwater caisson being lowered on to the Nenue I from the mothership, Charles H. Gilbert.

Honolulu, on September 26 with the Nenue aboard acted as support vessel to the raft which drifted within 11 miles off the Kona coast during the cruise period.

A total of 106 man-hours of direct observation was made from the underwater ports of the raft, and 10 man-hours of direct observation from the underwater ports in the bow chamber of the Charles H. Gilbert while the vessel took samples and scouted for fish around the raft at distances of 1 and 2 miles.

The most common members of the fish community which formed under the raft were the nomeid (Psenes cyanophrys), the balistid (Canthidermis maculatus), and mahimahi (Coryphaena hippurus). Although the raft never drifted for more than 50 hours without having to be moved because of either drifting to shore or dangerously close to rough water, as many as 60 nomeids, 33 balistids, and 33 mahimahi were at times present. In addition, the following fishes were seen from the raft chamber: maomao (Abudefduf abdominalis), wahoo (Acanthocybium solandri), skipjack tuna (Euthynnus pelamis), opelu (Decapterus pinnulatus), pilotfish (Naucrates ductor), Kahala opio (Seriola aureovittata), a rare omaka (Caranx kalla), kaku (Sphyraena barracuda), whitetip shark (Carcharhinus longimanus), mobulids, istrophorids, mullids, and many unidentified fish.

Porpoises were also observed during this period. Behavior observations were made on as many of those species as possible. The permanence of a species' association to the raft was noted, and rates of accumulation for each species were recorded. Stomach samples and fish specimens were preserved whenever possible. A total of 1,600 feet of 16 millimeter film and 88 still pictures were taken from the raft's viewing ports, and of the general operation.

Depth casts and weather observations were made every 6 hours after the raft was in the water. A total of 44 fish schools were seen from the Charles H. Gilbert, and only one-half of those schools were accompanied by birds. Location and movement of fish schools relative to the raft's position were measured whenever possible.

Plankton was collected during the cruise for use in rearing tuna larvae. A total of 23 surface plankton hauls were made with the 1-meter net at 2 a.m. and 2 p.m. Very few fish eggs were taken in night hauls. Although more fish eggs were taken in day hauls, the bulk of the catch consisted of crustacean eggs. Larvae were hatched from eggs of several fish species, but only a few of them were reared past the yolk sac stage. No tuna eggs were identified on this cruise. A total of 9 night-light fishing stations were also worked in order to catch young tuna for rearing in a shipboard aquarium. Only one tuna-like fish (Auxis sp.) was taken, and it died a few days later when the water circulating pump had to be turned off.

A total of 289 drift cards was released. These were released 10 at a time at each bathythermograph cast.

Note: See Commercial Fisheries Review, November 1962 p. 22.

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FISH BEHAVIOR STUDIED ON FIRST RAFT EXPEDITION:

A unique and quite unusual type of research craft, the raft Nenue, was brought back to Honolulu on October 12, 1962, after two weeks of scientifically productive drifting off the Kona coast of Hawaii. The expedition, designated Koalana I, was the first attempt in Hawaiian waters to make direct observations of the communities of fish and other marine animals which congregate under objects floating in the ocean.

Four scientists of the Bureau of Commercial Fisheries Biological Laboratory at Honolulu who were on the Nenue while she was drifting, were enthusiastic about the opportunities which the raft afforded for sustained study of the behavior and interactions of a variety of fish species. But they admitted that over 100 hours in the cramped observation capsule under the raft, concentrating on the circling fish while the 12-by-12 foot Nenue bobbed on the swells, had been a severe test of their stomachs' devotion to science.

The Laboratory's research vessel Charles H. Gilbert launched the Nenue about 10 miles off Kealakekua Bay on September 27 and stood by within sight and walkie-talkie range of the raft at all times. The Nenue drifted north along the Kona coast unexpectedly fast, sometimes at 4 miles an hours. This resulted in the Charles H. Gilbert having to pick the raft up four times to keep it from drifting ashore or out into rough channel waters. A fish behavior specialist on the

expedition reported that each time the Nenue was placed in the sea, small fish began to be attracted to it within 5 or 10 minutes. The first fish arrivals were generally rudderfish,

The Nenue I adrift off the Kona Coast of the Island of Hawaii.

similar to the species nenue for which the raft was named. At times there were as many as 60 of that species under and around the raft. Small triggerfish (closely related to the familiar humuhumunukunukuapuaa) were also numerous and regular members of the fish groups following the raft.

Mahimahi (dolphin) were often about the raft, sometimes as many as 30 at a time. Those colorful, fast-swimming fish would come in under the Nenue and rub their sides against its oil-drum floats, then range out to the far periphery of the drifting fish community where, the scientists guessed they may have been picking off stragglers or intercepting new recruits attracted by the raft. The mahimahi mingled harmoniously with the triggerfish, but they voraciously harried a stray jack, similar to the akule, keeping it holed up under the raft for several hours. The jack finally escaped by joining the pilotfish escort of a passing whitetip shark.

From the windows of their observation capsule in the raft, the biologists also saw porpoise, marlin, manta rays, barracuda, opelu, wahoo (ono), and skipjack tuna (aku). With the exception of the wahoo, those fish gave no indication that their behavior was affected by the presence of the raft and remained in its vicinity only briefly. When the Nenue was moored to the anchored Charles H. Gilbert, with a strong current running by, it failed to attract even the rudderfish and triggerfish which were its almost constant companions when it was drifting free.

Preliminary consideration of the results of the expedition Koalana I points to several areas of possible scientific and commercial fisheries application. The raft Nenue's observers were aware of the regular use of rafts in the dolphin fishery of Japan, but they were unprepared for the rapidity with which considerable numbers of mahimahi gathered around their raft, particularly since it has commonly been thought that drift logs and other flotsam do not affectively attract large fish until they have been drifting long enough to accumulate a growth of seaweeds and a population of small invertebrate animals. The unexpectedly wide variety of fish species and large numbers of individuals seen from the Nenue offer some promise that floating observation posts could provide an additional and useful technique for estimating the abundance and composition of the fish resources of an area. There were some indications on expedition Koalana I of rather definite changes in the make-up of the raft's following as it drifted into different locations at varying distances from shore. If further observations show those changes to be regular ones, they should give new insights into the relations between some commercially-important fish and their environment.

Many of the observations made by the scientific raftsmen were recorded in still and moving pictures, and numerous specimens were collected for identification, and for examination of their stomach contents. Detailed analysis of the data collected, and of similar observations made from the underwater viewing chambers of the accompanying vessel Charles H. Gilbert at various distances from the raft will furnish a basis for more sharply focused experimental work on future voyages to be made by an improved raft.

Note: See Commercial Fisheries Review, November 1962 p. 22.

Fish Protein Concentrate

NATIONAL ACADEMY OF SCIENCES SPURS INTERIOR DEPARTMENT RESEARCH:

Conclusions by a National Academy of Sciences panel that "a wholesome, safe and nutritious product can be made from whole fish" has given the U. S. Department of the Interior a "green light for accelerated research into manufacture of fish protein concentrate (FPC), a new source of food for the world's hungry," Secretary of the Interior Stewart L. Udall reported on November 8, 1962.

Fish protein concentrate is made by reducing fish to a fine white powder or a liquid by chemical, enzymatic, or other means. The resulting product can be added to any foods. By utilizing the unharvested catch of fish in United States waters alone, a sufficient quantity of animal protein could be produced to supplement deficient diets of one billion people for 300 days at a cost of less than one-half cent per person per day, Secretary Udall reported. Most of those fish today are not commercially marketed.

On the request of Secretary Udall, the National Academy of Sciences appointed a seven-man panel to study the safety, wholesomeness, and nutritional features of fish protein concentrate as well as other questions related to its potential.

The report, sent to Secretary Udall by Dr. Frederick Seitz, Academy president, stated in part:

"The committee concluded that a wholesome, safe, and nutritious product can be made from whole fish. The committee accepted the definition of a 'wholesome product' to be a product which is healthful and promotes physical well-being. It stressed the necessity of maintaining high standards in the preparation of the concentrate."

While stating that there is no immediate nutritional need for such a product in the United States, the committee held that it would be of "great value in meeting food problems presented in times of emergency or by expanding world population."

Commending the Academy for its carefully considered opinions on a matter of highest importance to meeting the nutritional problems of the world, Secretary Udall said:

"The United States, through research conducted by the Bureau of Commercial Fisheries, has assumed leadership in providing this lifeline of the future to the world's undernourished. It is estimated that in the United States coastal waters alone, fishermen could harvest for fish protein concentrate purposes over 7 billion pounds of fish annually without disturbing the brood stock necessary to assure continued harvests. Many of these fish today have little or no commercial value."

The "desperate need" for a low-cost source of animal protein is evidenced, Secretary Udall said, in the fact that studies show "approximately two billion of the world's population now suffer from protein lack."

"FPC, which keeps indefinitely and is easily transportable to the most remote areas, can meet this need and at the same time provide limitless economic benefits to the commercial fishing industry," he added.

Secretary Udall said that he would give "the highest priority" to a program of accelerated research on FPC. Legislation providing about $500,000 for such a program was lost when the supplemental appropriations bill was not enacted.

The National Academy of Sciences panel conducting the survey included: W. H. Sebrell, Jr., M.D., Institute of Nutrition Sciences, Columbia University; James B. Allison, Ph.D., Bureau of Biological Research, Rutgers University; Grace A. Goldsmith, M.D., School of Medicine, Tulane University; Harold Humphrey, B.S., Consultant in Food Technology, UNICEF; H. S. Olcott, Ph.D., Institute of Marine Resources, University of Calif., Berkeley; M. B. Schaefer, Ph.D., Institute of Marine Resources, Scripps Institute of Oceanography, La Jolla; R. E. Shank, M.D., School of Medicine, Washington University.

The report concluded: "Until a suitable and acceptable fish protein concentrate product can be made available commercially, the committee is of the opinion that there should be no consideration of a definition and standard of identity under the Food, Drug, and Cosmetic Act and that the postponement of public hearings in the matter should be continued indefinitely. Unduly restrictive regulations and judgments as to the wholesomeness, safety, and nutritive value should not be made during the period of research on and development of new and possibly valuable food products, such as fish protein concentrates. Such actions constitute a serious handicap tending to discourage research and development initiative.

"The committee recommends that government agencies as well as private industries be encouraged to pursue basic and developmental research with the assurance that new wholesome, safe, and nutritious food products resulting therefrom will be made available to consumers without prejudice:

"The United States is blessed with an abundance of food and, through research, has attained preeminence in food production and technology. In order to maintain leadership, broadly based and continuing research, with the freedom essential thereto, is an absolute necessity. Although there may be no demonstrable nutritional or economic need at the present time by the people of the United States for a fish protein concentrate, the committee reemphasizes its opinion that the public should not be denied the availability of safe and nutritious new products, and American industry should not be deterred from the research necessary to making such products available. The production of good foods economically should be encouraged by all means, and especially the development of procedures for the most complete and effective use of protein resources should be commended."

Fur Seals

FIVE FIRMS SEEK UNITED STATES GOVERNMENT SEALSKIN PROCESSING CONTRACT:

Five firms, one of them in London, England, met the November 1, 1962, deadline for submitting proposals for processing and selling Alaska sealskins for the United States Government, the U. S. Department of the Interior announced on November 5.

The Department stated that no contract will be awarded until the various proposals have been carefully evaluated and that it will be some time in 1963 before negotiation of a new contract can proceed. There are two phases to the evaluation: The first phase relates to the quality of work which the prospective contractor can produce and the second requires proof of his ability to fulfill the requirements of a contract. The U. S. Bureau of Standards will make physical and chemical tests of the sealskins submitted with the pro-

posals. A panel of consultants will also make separate, subjective evaluations. The invitation for proposals to handle the sealskins for the Government follows last winter's announcement that the Department of the Interior was cancelling its contract with the Fouke Fur Company of St. Louis on December 31, 1962. The Fouke Fur Company has processed the skins for many years.

As a basis for a new contract, the Fish and Wildlife Service's Bureau of Commercial Fisheries--the agency charged with managing the Alaska fur seal resource--issued on June 20, 1962, a prospectus for processing and selling these skins. The prospectus listed four steps in the specifications--preliminary processing of the sealskins on the Pribilof Islands, processing the skins from the cured stage to the finished luxury skin, developing the market, and selling the finished skins at public auction. This prospectus was distributed to all interested firms and individuals. Raw skins were supplied to 11 firms and individuals for use in developing an adequate process.

Note: See Commercial Fisheries Review, August 1962 p. 92.

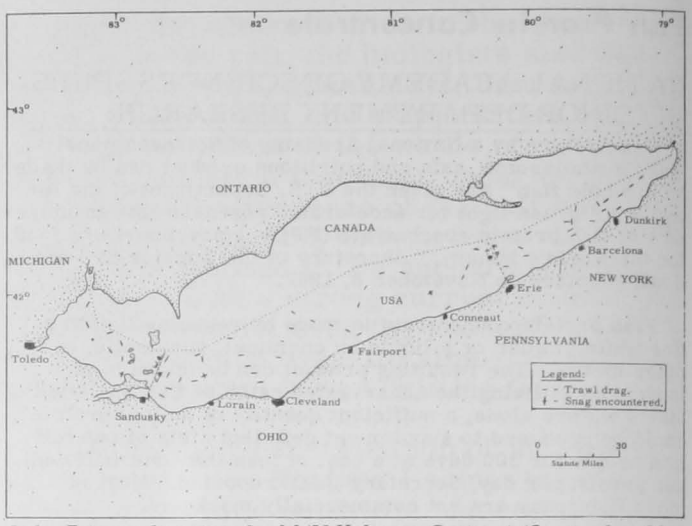
Great Lakes Fisheries

Exploration and Gear Research

TRAWL FISHING INVESTIGATION IN LAKE ERIE:

M/V "Kaho" Cruise 4 (September 23-October 10, 1962): To obtain additional seasonal information concerning the depth and geographic distribution of various fish stocks and their availability to commercial-type bottom trawls were the primary objectives of trawl fishing operations in Lake Erie during this 4-week cruise by the exploratory fishing vessel Kaho of the U. S. Bureau of Commercial Fisheries.

A total of 62 drags was made during this cruise--18, 37, and 7 in the eastern, central, and western basins of Lake Erie. All drags lasted 30 minutes except 2 which snagged on bottom obstructions and 2 that were terminated when sets of trap nets or gill nets were encountered. The two hang-ups caused considerable gear damage. Standard 50-foot (headrope) Gulf of Mexico-type semiballoon trawls equipped with Western-style footrope were used.



Lake Erie explorations by M/V Kaho on Cruise 4 (September 23-October 10, 1962.)

Smelt catches of commercial significance were made only in the eastern basin of Lake Erie at depths greater than 75 feet. Three drags off Dunkirk, N. Y., yielded 200, 380, and 490 pounds each; five drags off Barcelona, N. Y., accounted for 150, 300, 450, 480, and 600 pounds each; and off Erie, Pa., three drags yielded 120, 150, and 1,125 pounds each.

Incidental catches during the cruise consisted of 4 catches (115 to 363 pounds) of large yellow perch from 5 fathoms of water in the western basin, 5 catches (95 to 225 pounds) of carp in the central and western basins, and two night catches of (92 pounds each) sheepshead in the central basin. Although fair showings of alewife and gizzard shad were noted in the central and western basins, concentrations available to the bottom trawl were not considered heavy enough to support a fishery.

Young-of-the-year yellow perch were found in heavy concentrations in depths of 11, 12, and 13 fathoms from Erie, Pa., to Vermilion, Ohio. A small-mesh (1-inch stretched measure) cod-end liner accounted for large catches (52 to 1,020 pounds) made in 10 drags. Changing the mesh size was effective in reducing catches of small fish. Young-of-the-year yellow pike were caught in moderate numbers in 12 drags just east and west of the main island group.

Mesh-size selectivity in relation to yellow perch was studied with the aid of a "trouser leg" cod end (a means of fishing two cod ends with different mesh size simultaneously on one net). Although additional data is needed to verify the findings, cod-end mesh sizes of

Lake Erie Trawl Explorations by M/V Kaho During Cruise 4

Area	Depth Range (Feet)	No of Drags	Catch Rate (Pounds Per Hour) Range	Catch Rate (Pounds Per Hour) Average	Species Composition: Species	Species Composition: Percentage of catch
Western Basin	21 to 30	7	8 to 1,554	914	Yellow perch (over 8")	35
					Yellow perch (4" to 8")	21
					Yellow perch (under 4")	1/Tr.
					Carp	18
					Alewife	12
					Gizzard shad	5
					Sheepshead	5
					Other species2/	4
Central Basin	30 to 49	3/8	100 to 950	377	Yellow perch (over 8")	8
					Yellow perch (4" to 8")	5
					Yellow perch (under 4")	1
					Carp	33
					Gizzard shad	20
					Smelt	18
					White bass	7
					Other species	8
	50 to 74	4/15	66 to 2,116	645	Yellow perch (over 8")	8
					Yellow perch (4" to 8")	5
					Yellow perch (under 4")	70
					Sheepshead	5
					Other species	12
	75 to 84	8	40 to 710	198	Yellow perch (over 8")	31
					Yellow perch (4" to 8")	10
					Yellow perch (under 4")	17
					Sheepshead	31
					Alewife	6
					Other species	5
Eastern Basin	60 to 74	5	52 to 178	94	Yellow perch (over 8")	5
					Yellow perch (4" to 8")	Tr.
					Yellow perch (Under 4")	7
					Smelt	42
					Carp	20
					Yellow pike (walleye)	9
					White bass	7
					Alewife	6
					Other species	4
	75 to 99	4	182 to 1,208	707	Yellow perch (over 8")	1
					Yellow perch (4" to 8")	Tr.
					Yellow perch (under 4")	13
					Smelt	85
					Other species	1
	100 to 124	6	72 to 2,284	946	Yellow perch (all)	1
					Smelt	98
					Other species	1
	125 to 149	3	242 to 602	382	Yellow perch (all)	1
					Smelt	99
					Other species	0

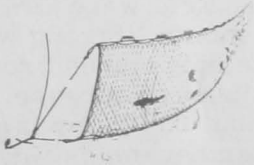
1/"Tr." = Less than 0.5 percent.
2/"Other species" includes those that individually amounted to less than 5 percent.
3/Four other drags, resulted in gear damage, were stopped to avoid set nets, or otherwise malfunctioned.
4/Two other drags, either resulted in gear damage or were stopped to avoid set nets.

$2\frac{1}{2}$-inches and $2\frac{3}{4}$-inches caught few yellow perch smaller than 8 inches. The $2\frac{1}{4}$-inch and $1\frac{5}{8}$-inch mesh sizes yielded increasingly greater proportions of younger yellow perch age groups.

Day-night fishing on a 14-fathom drag site off Cleveland yielded better catches at night. The main difference was caused by the presence of 92 pounds of sheepshead in each of two night drags, while comparative daytime drags contained 16 and 17 pounds of that species. Large yellow perch, the only other fish present in significant amounts in the area, were caught more readily during mid-morning hours.

Surface temperatures ranged from 57° F. to 63° F. in the eastern basin of Lake Erie, 61° F. to 65° F. in the central basin, and 59° F. to 61° F. in the western basin.

Note: See Commercial Fisheries Review, October 1962 p. 15.



Great Lakes Fishery Investigations

LAKE ERIE FISH POPULATION SURVEY CONTINUED:

M/V "Musky II" (September 1962): The Lake Erie fish population survey was continued in September by the U. S. Bureau of Commercial Fisheries research vessel Musky II. Operations in September included routine fishery and limnological observations at five stations in the western basin of Lake Erie. Two of the stations were visited twice during the month. Also, the vessel made trips to another two areas in the central basin to determine the extent and duration of oxygen deficiencies in deep water. Oxygen deficiencies in those areas were observed for the first time about the latter part of August 1962 in the deeper areas of the central basin off Lorain, Ohio.

Species and sizes of fish caught in bottom trawls were fairly consistent and uniform at different stations. The hauls averaged 821 fish for each 10-minute tow in Sandusky Bay and 765 fish in the open lake. In both the bay and lake, young-of-year fish made up about 85 percent of the catch. Somewhat fewer young white bass and yellow pike were caught than during previous months, probably because of greater escapement related to increase of size.

The growth of most young-of-year fish continued to be mediocre. Average total lengths in inches at the end of September 1962 were: yellow perch, 2.9; yellow pike, 8.6; white bass, 3.2; sheepshead, 4.4; smelt, 2.5; gizzard shad, 3.8; alewife, 4.6; spottail shiner, 2.7; trout-perch, 3.1; and emerald shiner, 2.6.

In mid-September, critically low dissolved oxygen remained in depths over 60 feet at one of the stations off Lorain. Limited numbers of trawl tows, made in conjunction with the water chemistry, yielded few fish as compared to similar tows earlier in 1962 in the same area and depth. The lower numbers of fish and low oxygen appeared to be directly correlated.

Surface water temperatures in the western basin of Lake Erie were 74° F. at the beginning of the month. Strong winds and decreasing air temperatures brought about a rapid and continuous decrease, down to an average of about 60° F. by late September. That change in temperatures was accompanied by an increase in the numbers of smelt in the western portion of the lake.

Commercial landings of yellow perch by Ohio fishermen showed signs of increasing during September. How long the good catches would continue was difficult to estimate because it was not known how long the dominant 1959 year-class of that species would support the fishery. Yellow perch of the 1960 year-class were found to be fewer in number and were growing more slowly than fish of the 1959 year class.

Note: See Commercial Fisheries Review, October 1962 p. 18.

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DREDGE PERFORMANCE TESTED FOR BOTTOM STUDIES IN SOUTHERN LAKE MICHIGAN:

M/V "Cisco" Cruise 8 (September 18-October 1, 1962): A comparison of (1) the performance and relative efficiency of various types of dredges for bottom sampling and (2) the collection of data on the distribution of bottom organisms at different water depths and in different sediments, were the major objectives of this cruise in southern Lake Michigan by the U. S. Bureau of Commercial Fisheries research vessel Cisco. Three samples were taken with each dredge at depths of 3, 10, 20, 30, and 40 fathoms off South Haven and St. Joseph, Mich., and Chicago and Waukegan, Ill. Samples were also taken at 8 fathoms off Racine, Wis. The Racine reef was selected for sampling in order to observe dredge performance in hard clay, gravel, and rock.

Studies conducted on this cruise were originally planned in 1960, when sampling off Grand Haven, Mich., with a Smith-McIntyre dredge (borrowed from the Bureau's Woods Hole Biological Laboratory) and a Petersen dredge showed that the two samplers were not performing equally at depths greater than 20 fathoms. The number of bottom organisms taken by the Petersen dredge decreased as the depth range increased from 20 to 50 fathoms, whereas the number taken by the Smith-McIntyre dredge being tested remained about the same. The orange-peel type dredge was included in the cruise 8 study because much previous sampling in gravel and hard sediments had been with that type of dredge.

A brief examination of the samples collected during the cruise indicated that sediment type at the various depths, rather than

the depth itself, probably determines the sampling efficiency of the dredges.

Bathythermograph casts were made at 1-mile intervals on a transect between Milwaukee, Wis., and Grand Haven, Mich., as part of a study of internal waves in Lake Michigan conducted by the Director of the Scottish Marine Laboratory who was then at the University of Wisconsin.

During the latter part of cruise 8, a large-mesh (No. 1558 "Nitex"), 1-meter, nylon plankton net was towed at speeds up to about 7 knots per hour to attempt to collect small fish. One 20-minute oblique tow from the surface down to 4 fathoms, over a 5-fathom bottom, yielded 41 fingerling alewives, but no other fish were caught.

The M/V Cisco was under contract to the U. S. Public Health Service during cruise VII (August 28-September 11). On that cruise, limnological and bacteriological samples were collected at 69 stations at the 1-, 4-, 7-, and 10-mile contours between Milwaukee and Chicago. No report on that cruise will be issued by the Bureau's Ann Arbor Biological Laboratory.

Note: See Commercial Fisheries Review, October 1962 p. 18.

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LAKE TROUT DISTRIBUTION STUDIES IN WESTERN LAKE SUPERIOR CONTINUED:

M/V "Siscowet" Cruise 7 (September 24-October 9, 1962): Environmental conditions were studied at three limnological stations in the Apostle Islands region of Lake Superior during cruise 6 of the research vessel Siscowet (operated by the U. S. Bureau of Commercial Fisheries). Collections included records of water temperatures, Secchi disc readings, water samples for chemical analyses, and bottom and plankton samples. Water temperatures ranged from 50° to 55° F. at the surface, dropped from 55° to 41° F. in the stratum of water between about 10 and 15 fathoms, and were 40° F. at depths of 50 fathoms or more. Plankton abundance was relatively high at all stations.

Trawl tows at depths ranging from 10 to 30 fathoms, and experimental gill nets (1- to 5-inch mesh, by $\frac{1}{2}$-inch intervals) set at 22 fathoms yielded a total of 269 young lake trout. Of that total, 264 (98 percent) were fin-clipped fish. Nearly all of the lake trout were caught at depths between 20 and 25 fathoms. Lake trout from the 1961 and 1962 Bayfield plants were most common in the catches.

Trawling during and immediately after release of about 16,000 hatchery-reared lake trout from shore at Frog Bay revealed that the fish reached a depth of 10 fathoms in slightly over 1 hour after planting. Earlier observations by the Siscowet on previous cruises showed that lake trout planted in the spring required $2\frac{3}{4}$ hours to reach that depth. The fall-planted fish were larger (8.5 fish to the pound) than those planted in the spring (22 to the pound). This was believed might be the reason for their faster movement to deep water.

In an effort to learn some of the factors which may affect the depth distribution of young lake trout, a $\frac{1}{2}$-meter plankton net was towed along the bottom at various depths between 10 and 30 fathoms. Zooplankton (predominately copepods), Pontoporeia, and Mysis were most abundant at 20-25 fathoms, but were relatively scarce at depths above 20 and below 25 fathoms.

Chubs (Coregonus hoyi) were common in nearly all the trawl catches. One 15-minute tow at 20 fathoms yielded a total of 711 fish of that species weighing 165 pounds. Other species in the catches included small numbers of smelt, sticklebacks, and sculpins.

Note: See Commercial Fisheries Review, November 1962 p. 24.

Gulf Exploratory Fishery Program

SHRIMP MARKING STUDY IN GULF OF MEXICO:

M/V "George M. Bowers" Cruise 40 (July 6-19 1962): The catching, staining and release of brown shrimp (Penaeus aztecus) was the main objective of this cruise by the gear research vessel M/V George M. Bowers of the U. S. Bureau of Commercial Fisheries. Cruise 40 which was made jointly with the Bureau's Galveston Biological Laboratory, was the initial phase of a continuing study to obtain a preliminary estimate of the growth, mortality and migration patterns of brown shrimp.

The vessel operated in two general areas. In the area off Grand Isle, La., a total of 2,370 shrimp were marked with fast green

dye and released in a depth range of 12 to 17 fathoms. In the other area off the northern Texas coast, some 3,000 shrimp were marked with a Trypan blue dye and released in $4\frac{1}{2}$ to 9 fathoms. Recoveries of marked shrimp from the first release off the Louisiana coast were reported as being very high.

Note: See Commercial Fisheries Review, November 1962 p. 24, and August 1962 p. 26.

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ELECTRICAL FIELD EXPERIMENTS AND SHRIMP BURROWING BEHAVIOR OBSERVATIONS IN GULF OF MEXICO:

M/V "George M. Bowers" Cruise 41: Electrical field strength experiments and a continuation of studies on the behavior phase of the shrimp gear research project in the Gulf of Mexico were conducted in St. Andrews Bay, Fla. (off Panama City), during this cruise by the U. S. Bureau of Commercial Fisheries gear research vessel George M. Bowers. The vessel operates from the Gulf and South Atlantic Exploration and Gear Research Base at Pascagoula, Miss., where she returned on August 31, 1962.

Electrical Field Strength Experiments: Experiments to determine the shape and magnitude of an a.c. electrical field between two electrodes in sea water were conducted on this cruise. Three sizes of brass electrodes were tested (3' and 6' $\frac{1}{8}$"rod and 3' $\frac{3}{4}$" rod). Currents tested were 1 amp, 3 amps and 6 amps. Voltage potentials were measured in predetermined planes surrounding the electrodes with a vacuum-tube voltmeter. In addition, $\frac{3}{32}$" stainless steel cable electrodes were also tested and the following factors were investigated: (1) The field above the electrodes, (2) the field below the electrodes when they are at an angle to the bottom, (3) the electrodes at right angles, and (4) various frequencies from 60 to 50,000 cycles per second.

Data collected on this trip are being evaluated. An apparent significant increase in voltage drop with an increase in frequency was of interest.

Burrowing Observations: Observations were continued to determine the burrowing behavior of shrimp. During the observation period, the moon was at or near-dark and generally the shrimp remained out of the bottom the entire night. This was in contrast to observations during the full moon when they remained out for only a few hours.

These observations are to be continued using time-lapse cameras and a photometer in an attempt to determine whether light level, moon phase, or both are contributing significantly to this behavior.

Response To Electrical Stimulus: Experiments to evaluate the power level needed to bring about a significant response were undertaken. It was observed that frequently with shrimp in identical positions relative to the electrodes, that a given power level produced a very strong response in some animals but a very weak response in others. Possible reasons for this include: (1) The physiological condition at different molting stages, (2) the physiological condition as a result of trawl capture and tank holding or, (3) a combination of the two.

Instrumentation Development: Performance of instruments on this cruise was as follows:

1. The load cell system was tested on a 40-foot trawl and performed well electrically.

2. The door angle of attack recorder performed well mechanically.

3. The bottom speed indicator functioned well but a magnetic counter was indicated rather than the mechanical one used.

4. The bathykymograph units were tested and found satisfactory.

Gulf Fishery Investigations

Some of the highlights of studies conducted by the Galveston Biological Laboratory of the U. S. Bureau of Commercial Fisheries during July-September 1962:

SHRIMP FISHERY PROGRAM: Shrimp Spawning Populations: Brown shrimp ovaries taken off Galveston in 15 and 25 fathoms during January-June 1962 were examined. Comparison between 1961 and 1962 ovary samples shows that a much larger percentage of ripe and recently-spent females occurred in 25 fathoms in 1962. The converse was true for 15-fathom samples. The percentage of ripe and recently spent ovaries from 15 fathoms was much greater in 1961. A large proportion of the brown shrimp females from 15 fathoms in 1962

were young with ovaries either undeveloped or in early developmental stages.

During July-September 1962, six research cruises were completed in which 175 one-hour hauls were made with a 45-foot flat shrimp trawl.

There were 35,905 penaeid shrimp taken, of which 12,857 or 35 percent were commercial species. About one-third of the catch consisted of rock shrimp (Sicyonia brevirostris), a species not now exploited. The catch per unit of effort for adults of all species increased with an increase in longitude in much the same manner as the penaeid larvae.

Migrations of Brown and White Shrimp: Of the 2,431 stained and 1,690 tagged shrimp released off the Texas coast in April 1962, 144 stained shrimp and 61 tagged shrimp had been recovered by the end of the third quarter 1962.

The movement of the stained shrimp was random in relation to the Texas coast and more than 92 percent of the recoveries were captured less than 30 miles from the center of the staining area. Tagged shrimp slightly northeast of Port Aransas moved in a southerly direction, while shrimp released south of Port Aransas moved mostly in a northerly direction. One shrimp traveled about 68 miles in a northeasterly direction. None of the tagged shrimp released off Freeport traveled more than 15 miles. The data indicate no significant immigration of large adult shrimp from adjacent areas into the staining area, nor any significant emigration of shrimp from the staining area into adjacent areas.

Two mark-recapture experiments designed to obtain estimates of fishing mortality and other parameters on the brown shrimp stocks were initiated during July 1962. A total of 2,370 stained shrimp, including three different size groups, was released off Grand Isle, Louisiana, and 2,973 stained shrimp of two different size groups was released off Galveston, Tex. In addition, a preliminary estimate of the number of nonrecoveries was obtained for the Golden Meadow-Grand Isle area during July. A total of 623 shrimp had been recovered by the end of the third quarter from the Louisiana experiment, and 69 recoveries had been returned from the Galveston experiment.

During the quarter, 72 stains, pigments, and fluorescent dyes were tested to determine their suitability as primary or secondary marking agents on penaeid shrimp. Two of the stains, Bates numbering inks blue and green, tested as primary marks retained sufficient color in the gills to be considered useful as marking agents for short-term experiments.

The movement of Sanford's checkwriter inks, red, blue, and black, from the site of injection into the gill area where they mask the primary stain definitely limits the suitability of those inks as secondary marks.

A number of fluorescent pigments used as secondary marks have proved successful when used with the primary stain, fast green FCF. These pigments are easily detected and differentiated under ultraviolet light. No fading or shedding was observed at the end of 84 days. Since those pigments can be localized at the site of injection, the number of secondary marks can be increased by varying the injection site.

Bait Shrimp Fishery: Bait shrimp production in the Galveston Bay system increased in July and August 1962 as compared with the same months of 1961. However, species composition percentages indicate that juvenile brown shrimp left the Bay earlier this year than in 1961. Substantial offshore catches of brown shrimp too small to meet the required 50 count (heads-off) per pound in July, August, and the first part of September would seem to support this conclusion.

Shrimp Larval Studies: During the quarter 222 plankton samples were examined for penaeid larvae. These were collected during January-April 1962 at the 60 monthly stations between the Mississippi River and Brownsville, Texas. The data show that the relative abundance of penaeid larvae increased with an increase in longitude, i.e. moving east to west. Statistical areas 13-15 had a relatively low larval abundance. In areas 16-18 penaeid larvae were slightly more abundant and were found to be most abundant in statistical areas 19-21.

In all statistical areas penaeid larvae were more abundant in the 20-40 and 40-60 fathom depth zones than in the 0-20 fathom zone.

Larval stages consisted primarily of protozoea, mysis, and postlarva. Very few

nauplius stage shrimp were taken, an indication that spawning activity was reduced during January-April 1962.

Commercial Catch Sampling: It was reported by fishermen in July and August 1962 that large quantities of undersized shrimp (Texas law) were being discarded at sea. In mid-August a 10-day trip was made on a commercial shrimp boat to make observations on the amount of discard relative to the amount of shrimp retained. Culling ranged from 0 to 64 percent of each haul with 74 percent of the total catch being marketable. According to the captain of the boat this was an improvement over the preceding month when up to 75 percent of the catch was discarded because of size.

Measurements of tail and total length and conversion charts were completed for brown and white shrimp.

The landings of 387 vessels were sampled for size and species composition. In this work nearly 40,000 shrimp were examined of which 84 percent were brown shrimp, 14 percent white shrimp, and 2 percent pink shrimp.

Migrations of Pink Shrimp: A mark and recapture experiment designed to give additional information on the geographic distribution of the Tortugas shrimp population was initiated near Indian Key, Fla. Between August 27 and September 5, 1962, a total of 19,860 pink shrimp were marked with trypan blue and released.

Two pink shrimp marked on the Sanibel grounds in March 1962 were recovered near the northwest border of the Tortugas grounds. They had traveled about 82 nautical miles in 115 days. These recoveries were the first indication of movement between the two fishing grounds. No Tortugas marked shrimp have been taken on the Sanibel grounds.

The returns from the Sanibel experiment are complete with 563 (22 percent) of the 2,496 marked shrimp having been returned as of September 21, 1962. Growth data from this experiment indicate an average increment of 2.4 mm. per month for females and 1.3 mm. per month for males.

Study of the relative abundance and distribution of larvae of the pink shrimp (Penaeus duorarum) on the Tortugas Shelf of the Gulf of Mexico was continued by the Institute of Marine Science University of Miami, under a contract with the U. S. Fish and Wildlife Service.

Plankton collecting trips were made to the Tortugas Shelf (4) and to Buttonwood Canal (4) using a Gulf V plankton sampler in the former area and a plankton pump in the latter. Considerable time during the quarter was occupied with purchasing and assembling equipment for the year's work.

During the quarter pink shrimp were twice reared from egg to postlarvae in the laboratory. The successful rearing through metamorphosis confirms earlier conclusions regarding pink shrimp development, which were partly based on stages of larvae found in the plankton.

BEHAVIOR PROGRAM: Effect of Temperature and Salinity on Growth and Survival of Estuarine Species: The acquisition of automatic temperature recording equipment has made it possible to study the behavior of small shrimp in vertical temperature gradients. Although the experimental apparatus employed was identical to that used in testing shrimp responses to salinity gradients (previously reported), the results obtained were strikingly different. While shrimp demonstrated a marked behavioral response to salinity gradients (avoiding salinities above 35 parts per thousand), most of these animals have been found to be incapable of avoiding lethal low temperatures in temperature gradients. Thus 32 of 37 shrimp tested became immobilized through cold narcosis before the end of the 25-minute observation period.

While it is too early to postulate the relative ecological significance of salinity and temperature to small shrimp, the present findings show that under comparable conditions these animals are more responsive in terms of linear movement to salinity than to temperature.

Results of a 24-hour survival study of shrimp grown from postlarval to juvenile size strongly support our previously reported suggestion that juvenile ($1\frac{1}{2}$-inch total length) brown shrimp can tolerate considerable changes in temperature and salinity. The over-all survival was excellent (95 percent). The high level of survival in this experiment becomes even more

striking when we note that the temperature and salinity changes were immediate, providing the animals no opportunity for gradual acclimation.

ESTUARINE PROGRAM: Ecology of Western Gulf Estuaries: Analysis of 5 years of hydrological, meteorological, and biological data from the Galveston Bay estuarine system has been initiated. Analysis will include a comparison of the relative value to the fishery of four separate areas within the system.

Field sampling in the Galveston Bay system has been temporarily reduced in scope pending a preliminary review and examination of results from the past 5 years. A modified field program is being developed that will supplement and enhance the previous work.

Effects of Engineering Projects: During the quarter, 36 appraisals were made of engineering projects potentially affecting Texas estuarine fishery resources under the present system of coordination with the Branch of River Basin Studies. The majority of these resulted from the more than 109 Corps of Engineers public notices and letters received during the quarter and screened to determine which projects could materially affect estuarine areas, and consequently marine fishery resources. Portions pertaining to these fishery resources in 13 Bureau of Sport Fisheries and Wildlife draft reports were reviewed for concurrence or recommendations.

INDUSTRIAL FISHERY PROGRAM: Preliminary analysis of fish samples collected from waters off the Texas and Louisiana coasts from January through August 1962 had been completed by the end of the third quarter. Consistent trends can be seen in both the distribution and abundance of major species in spite of the fact that a relatively small number of samples are used to characterize this wide geographic area (monthly 5-lb. samples from each of 60 stations). No adequate measure of the absolute abundance of fish is available but, in general terms, it can be said that biomass appears to decrease as one proceeds westward from the Mississippi Delta or from the shoreline toward deeper waters. For the most part, these changes in biomass can be attributed to the distribution of individual species. A series of curves which relate the relative abundance of a species with depth or distance from shore have been constructed. These, when used in conjunction with a measure of the contribution to the total catch made by each species, provide an approximate description of abundance.

Variation in the species composition of trawl catches taken from a given area has been recognized in the literature by several authors. This type of variation is sometimes extreme, i.e., a particular species may either dominate or be virtually absent from trawl hauls made in the same locale. Clarification of such marked variation is necessary before either sampling data or commercial statistics can be related to the actual fish stocks available in an area. A first step in this direction was made during a cruise in June when stations were sampled at 3-hour intervals over 24-hour periods. Information gained at that time indicated that the greatest single source of variation was associated with the diurnal periods of activity of the species involved. Several species, heretofore considered to be demersal, were found to be liable to capture by the trawl during approximately half of each 24-hour period. A second, more extensive, cruise which will employ both bottom and midwater trawls is planned in order to investigate this question more thoroughly. Since several other sources of variation may tend to mask the results of the field program, the question will also be pursued under laboratory conditions. An outdoor tank, measuring 18 feet in diameter and 16 feet in depth, has been fitted with a total of 10 portholes at various depths. It is expected that an observer situated outside the tank will be able to photograph or otherwise record the relative position of each species of fish over 24-hour periods.

The industrial trawl fishery in the northern Gulf is composed of two distinct fleets. Vessels in the East Gulf fleet fish east of the Mississippi River Delta from Pass a Loutre, La., to Gulf Shores, Ala., are usually less than 60 feet in length, and have an average capacity of about 30 tons. The West Gulf fleet generally fishes west of the Delta from Southwest Pass to Ship Shoal, La., and is made up of vessels more than 60 feet long with an average capacity of about 90 tons.

Relative fishing effort between the two fleets was calculated from 363 trips between April and September 1962. About 93

percent of the effort by both fleets occurred within the 10-fathom curve. The most concentrated efforts by vessels of the East Gulf took place in an area of about 300 square miles east of the entrance to Mobile Bay, Ala. Grounds of most importance to the West Gulf fleet lay immediately off Barataria Bay, Timbalier Bay, and Terrebonne Bay, occupying about 400 square miles of Louisiana coastal waters.

Work continues on collecting and reading scales and otoliths of Atlantic croaker, spot, and sand sea trout.

Note: See Commercial Fisheries Review, June 1962 p. 19.

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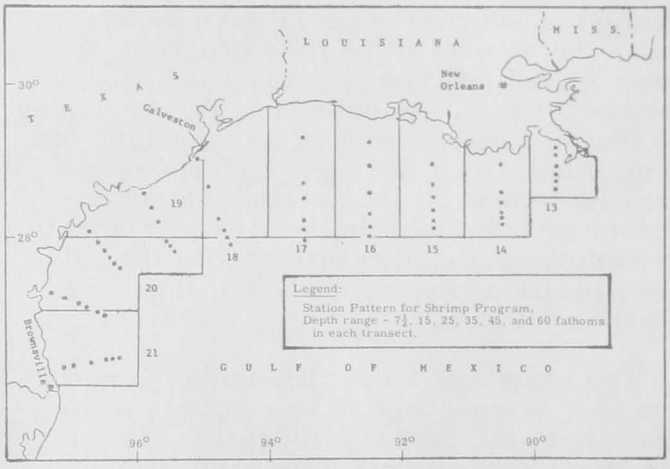
SHRIMP DISTRIBUTION STUDIES:

M/V "Belle of Texas" Cruise BT-29 (October 16-27, 1962): Four statistical areas were covered on this cruise by the research vessel Belle of Texas, 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 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 October 27.



Shows the station pattern for Cruise BT-29 of the M/V Belle of Texas, October 16-27, 1962.

Catches of brown shrimp were very small at all depths except 0-20 fathoms in areas 18 and 19. The largest total catch of any area was in area 21 which yielded about 28 pounds, most of it large brown shrimp counting 12-15 to the pound from 20-40 fathoms. Catches in other depths of that area were small, and included a scattering of white and pink shrimp.

A total catch of about 20 pounds from area 20 was made up of 12 pounds of 21-25 count brown shrimp from the 20-40 fathom depth, and 6 pounds of 31-40 count brown shrimp from 0-20 fathoms. A small amount of 12-15 count brown shrimp and some 21-25 count white shrimp were also caught in that area.

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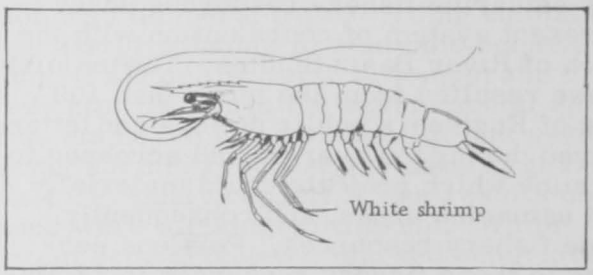
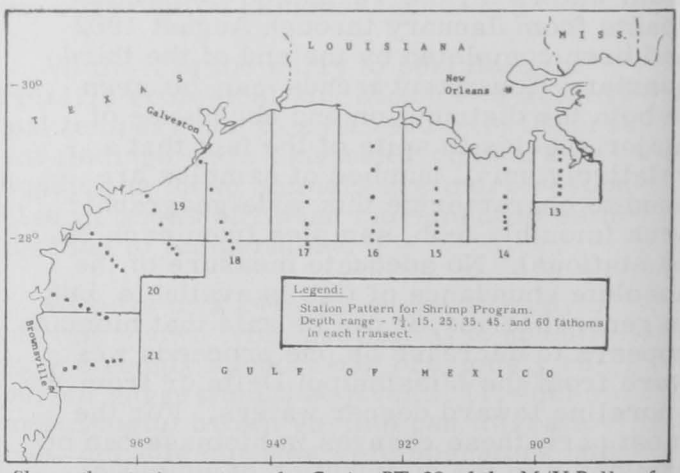
M/V "Belle of Texas" Cruise BT-30 (October 27-30, 1962): Shrimp catches were relatively good in 2 of the 4 statistical areas worked by the Belle of Texas during this 4-day cruise. A 45-foot shrimp trawl was used, and one 3-hour tow was made in each of the 3 depth ranges.

Areas 16 and 17 yielded an average of 40 pounds each, mostly large brown shrimp counting 9-20 to the pound. A total of 16 pounds of smaller brown shrimp counting 26-30 were caught at 0-20 fathoms in area 16.



In area 14, shrimp counting 31-40 to the pound were caught at 0-20 fathoms--11 pounds were white shrimp and 6 pounds brown shrimp. Brown shrimp caught at other depths in that area counted 12-15 to the pound.



Shows the station pattern for Cruise BT-30 of the M/V Belle of Texas, October 27-30, 1962.

Area 15 accounted for 25 pounds of brown shrimp ranging from 21-30 count caught at depths up to 40 fathoms, and a small amount of larger shrimp from deeper water.

Notes: (1) Shrimp catches are heads-on weight; shrimp sizes are the number of heads-off shrimp per pound.
(2) See Commercial Fisheries Review, November 1962 p. 26.

Industrial Fishery Products

FISH MEAL, OIL, AND SOLUBLES:

U. S. Production, September 1962: Preliminary data on U. S. production of fish meal, oil, and solubles for September 1962 as collected by the U. S. Bureau of Commercial Fisheries and submitted to the International Association of Fish Meal Manufacturers are shown in table 1.

During September 1962, a total of 31,200 tons of fish meal and scrap and 4 million gallons of marine-animal oils were produced in the United States. Compared with September 1961, this was an increase of 2,400 tons or 8 percent in meal and scrap production and 608,000 gallons or 18 percent in oil.

Menhaden meal amounted to 27,200 tons--accounting for 87 percent of the September 1962 meal total. Oil from menhaden (3.7 million gallons) comprised 94 percent of the September 1962 oil production.

There were 12,000 tons of fish solubles produced in September 1962--1,500 tons above the same month of the previous year. There was no homogenized condensed fish produced in September 1962 as compared with 710 tons in the same month of 1961.

During the first 9 months of 1962, meal and scrap production totaled 238,300 tons--13,900 tons below the same period of 1961. The marine animal oil yield totaled 26.3.

U. S. Production[1] of Fish Meal, Oil, and Solubles, September 1962 (Preliminary) with Comparisons

Area	Meal	Oil	Solubles	Homogenized[3]
	Short Tons	1,000 Gallons	(Short Tons)	
September 1962:				
East & Gulf Coasts	29,808	3,902	11,088	-
West Coast[2]	2,090	70	1,532	-
Total	31,898	3,972	12,620	-
Jan.-Sept. 1962 Tot.	239,840	26,220	50,843	6,570
Jan.-Sept. 1961 Tot.	248,645	28,620	82,071	9,532

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

Table 2 - U.S. Production of Fish Meal, Oil, and Solubles, September 1962, with Comparisons

Product	September		Jan.-Sept.		Total
	1/1962	1961	1/1962	1961	1961
	(Short Tons)				
Fish Meal and Scrap:					
Herring	424	525	3,051	4,987	5,268
Menhaden 2/	27,217	24,914	202,866	218,091	247,551
Sardine, Pacific	8	688	714	688	2,518
Tuna and mackerel	1,368	1,958	15,096	15,416	21,243
Unclassified	2,148	715	16,613	13,092	14,757
Total	31,165	28,800	238,340	252,274	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	12,009	10,522	93,023	84,299	100,551
Homogenized condensed fish	-	710	8,065	9,407	11,690
	(Gallons)				
Oil, body:					
Herring	82,455	164,017	610,180	801,547	818,017
Menhaden 2/	3,733,844	2,963,935	24,495,198	27,024,984	31,355,570
Sardine, Pacific	755	22,851	21,239	22,851	86,167
Tuna and mackerel	60,223	109,968	463,022	485,145	762,509
Other (including whale)	87,037	95,741	695,831	1,141,940	1,386,542
Total oil	3,964,314	3,356,512	26,285,470	29,476,467	34,408,805

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

Table 3 - U.S. Foreign Trade in Selected Industrial Products, August and September 1962 with Comparisons

Product	August		September		Jan.-Sept.		Total
	1/1962	1961	1/1962	1961	1/1962	1961	1961
	(Short Tons)						
Imports:							
Fish meal & scrap	28,253	19,026	13,698	13,941	208,694	159,503	217,845
Fish solubles	422	318	178	263	5,196	2,508	6,739
	(Gallons)						
Whale oil, sperm (crude and refined)	-	717,855	462,576	293,081	4,740,749	4,938,798	7,807,625
	(Pounds)						
Exports:							
Fish & fish-liver oils	33,271,765	13,304,278	219,241	9,521,370	96,624,014	95,374,843	122,485,721
Whale and sperm oil	6,892	-	30,300	6,826	1,972,811	169,952	1,205,674

1/Preliminary data.

million gallons--a drop of 3.2 million gallons as compared with the same period in 1961.

Imports and Exports: Imports of fish meal during January-September 1962 (208,700 tons) were 49,200 tons above the same period in 1961, and imports of fish solubles (5,200 tons) were up 2,700 tons. Exports of fish and fish-liver oils amounted to 96.6 million pounds (129 million gallons) during the first 9 months of 1962--up 1.2 million pounds (166,600 gallons) compared with the same period in 1961.

* * * * *

HOW MUCH FISH MEAL SHOULD BROILER RATIONS CONTAIN FOR BEST RESULTS?

The question of how much fish meal is enough in an otherwise all vegetable ration for broilers is, in part, answered by research on the subject. Levels of 7- and 10.5-percent fish meal in rations yielded significantly greater weight gains in broilers than did a 3.5-percent fish meal level. These were the results of experiments at the Mississippi State University carried out with broilers fed rations having nearly equal amounts of protein.

The two higher levels of 7- and 10.5-percent fish meal also increased efficiency of feed utilization (pounds of feed per pound of gain) when added to corn-soybean oil meal rations. Results obtained with the two higher levels of fish meal were not significantly different. These results indicate that as far as the fish growth factor of UGF (unidentified growth factor) is concerned, a 3.5-percent level of fish meal is not enough whereas a 7-percent level is sufficient. Where neither 3.5-percent fish meal nor 4-percent condensed fish solubles as the only source of animal protein in a ration was adequate for maximum growth and feed efficiency, excellent results were obtained with 3.5-percent fish meal plus 4-percent fish solubles.

Broiler rations containing 7-percent fish meal were not improved by the addition of methionine (an amino acid or protein constituent), showing that this level of fish meal supplies all the methionine that is required. In addition, the efficiency of feed utilization was about the same at relatively high and low levels of protein intake when as much as 7-percent of the ration consisted of fish meal. But this was not true with only 3.5-percent fish meal. This means that 7-percent fish meal in a corn-soybean oil meal ration fully supplies the required amounts of methionine and other necessary amino acids. Raising the fish meal level to 10.5 percent did not further improve the ration.

According to research reported by nutritionists in the July issue of Poultry Science a 7-percent fish meal level is enough in an otherwise all vegetable broiler ration. Poultry Science is the official journal of the Poultry Science Association.

* * * * *

MORE FISH MEAL AND OIL IN ANIMAL MIXED FEEDS ENCOURAGED:

The Midwest represents a good potential market for the additional use of fish meal in noncritical rations where only very small amounts are used primarily so that the meal can be mentioned on the tag. This was the opinion of a U. S. Bureau of Commercial Fisheries animal nutritionist after a trip to

Illinois and Missouri to encourage the use of more fish meal in mixed feeds, and to determine possible ways in which more fish oil can be utilized in animal feeding.

Fish meal is generally used in Illinois in critical rations such as breeder, turkey starter, and broiler rations, despite the added transportation charges that increase costs of industrial fishery products in the Midwest.

There is only a limited demand at this time for stabilized fish oil for use in poultry feeds. Eventually, uses may be found for the oil in feeds other than poultry feeds. In order to increase the demand for fish oil, quality should be improved, and definite efforts should be made to:

1. Produce a uniform and dependable product.
2. Stabilize the oil.
3. Determine how fish oil can best be marketed. (As pure fish oil? As a blend? As a partially hydrogenated fat?)

A long-range point of view suggests that research should be carried out to determine uses of fish oil in animal nutrition, in addition to those already known.

At the Annual Convention of the National Feed Ingredients Association, held September 12-14, 1962, at Chicago, a motion picture produced by Successful Farming, "Farming's New Face," was shown. The basic idea conveyed by the picture is that with the formation, now taking place in the United States, of relatively large farm units from several small farms, profits to farm operators have increased. As a result of increased profits, such operators are now potentially better customers of feed and other supplies than they were formally.

In the sectional meetings of the Chicago Convention, both the "feed manufacturers" and the "specialty ingredients" groups seemed mainly concerned with Food and Drug Administration (FDA) restrictions on labeling. When feed producers wish to add a new drug to their feed line, they need permission from FDA under certain conditions but not under others. In general, if the additive is supposed to have a therapeutic effect (medicine), permission is needed. If the additive is considered a nutrient only, then permission from FDA is not needed.

A great deal of interest in trace minerals in nutrition was in evidence at the Convention meetings. The known diseases related to trace mineral deficiencies were described. Processors of salt and other minerals were represented by specialists on the program who pointed out the values of their products in preventing deficiencies.

Inventions

NEW OUTBOARD MOTOR TILTING DEVICE PATENTED:

The inventor of an outboard motor tilting device claims his device allows a person in any part of a small boat to lift the motor easily. He claims the device is very useful when the motor is stuck in sand or mud. It consists of an elongated rod which is attached in an upright position to the forward tilting handle of an outboard motor. A cable is attached to the top of the rod and then looped about the rear tilting handle of the motor. To tilt the motor, the top of the elongated rod is pulled forward. The device is simple, inexpensive, and easily attached and detached. (Patent Number 2,979,017, U. S. Patent Office Classification Number 115-17, granted April 11, 1961, to Donald H. Soper, 1015 L. Avenue, Nevada, Iowa.)

* * * * *

NEW FISH LURE PATENTED:

The inventor of a new fish lure claims his lure is long-lasting and creates the impression of a swimming fish by the use of multicolored mirrors which rotate within sealed watertight transparent plastic tubing. The lure turns freely on a metal shaft. Angular fins on the outside create a rotary movement. (Patent Number 3,031,796, U. S. Patent Office Classification Number 43-42.2, granted May 1, 1962, to Carl Ellis Swenson, 9 Magnolia Street, Bergenfield, N. J.

* * * * *

NEW LIFEBOAT LAUNCHING DEVICE PATENTED:

The inventor of a new lifeboat launching device claims his device can be used for launching lifeboats or rafts even if a ship is tilted or has its port holes open. The device consists of a metal carriage and cradle. The carriage has 8 wheels which go over a ship's port holes. The cradle sits in the carriage

on a pivot which holds the lifeboat at even keel at all times. The lifeboat is ready for launching by one man at all times and is automatically released once it is in the water. (Patent Number 3,032,786, U. S. Patent Office Classification Number 9-41, granted May 8, 1962, to Frank and Russell W. Hudson, Box 411, Line Road, Manorville, L. I., N. Y.)

Massachusetts

NEW MARINE FISHERIES ADVISORY COMMISSION:

The purpose of the new Massachusetts marine fisheries law (Chapter 715) which became effective July 23, 1962, was to immediately bring about the orderly and coordinated activities of the Massachusetts marine fisheries and all related activities. The law as amended provided for a Marine Fisheries Advisory Commission composed of 9 members within the Division of Marine Fisheries. All 9 members appointed by the Governor of Massachusetts were confirmed by The Governor's Executive Council by the end of October 1962.

The members of the new Commission are given considerable latitude in using their experience, knowledge, and ideas for the benefit of the Commonwealth of Massachusetts in the field of marine fisheries. Under the law, meetings must be held at least quarterly, but opinions were that more than 4 meetings a year would be held, with perhaps as many as 10 a year, according to one suggestion.

The Director of the Massachusetts Division of Marine Fisheries said he was certain the new Commission would be a great help to the State. He stated that when fisheries matters come up in the future, point of view of various interests can be expressed through the Commission, instead of having hundreds of persons forced to give up a day's work in order to attend meetings.

Commission members pointed out that there were numerous problems to be resolved but that none was yet singled out for priority. There was a possibility of early consideration to the question of how to regulate tuna fishing, bearing in mind the interests of both sport fishermen and commercial fishermen. Zoning of certain waters for one or the other interests also was proposed.

It appeared that the Commission would not immediately consider the spending of additional money for the benefit of the fisheries. Funds were expected to be available in the coming year, with a quarter of a million dollars estimated as potentially available from the State tax on fuel consumed by boats.

Members of the new Commission include a cross-section of well known persons in the Massachusetts commercial and sport fisheries, and related industries.

Note: See Commercial Fisheries Review, September 1962 p. 34.

Michigan

LAKE TROUT PLANTED IN SIX LAKES:

Michigan's late fall lake trout planting program called for some 32,500 lake trout to be released for restocking six lakes in the northern peninsula, announced the Michigan Department of Conservation on November 1, 1962.

A total of 5,000 lake trout were released in Big Glen Lake, Leelanau County, during the latter part of October. Other lakes scheduled for lake trout restocking early in November were: Higgins Lake, Roscommon County, 10,000 fish; Elk and Torch Lakes, Antrim County, 5,000 each; Walloon Lake, Emmett County, 5,000; Lake Avalon, Montmorency County, 2,500.

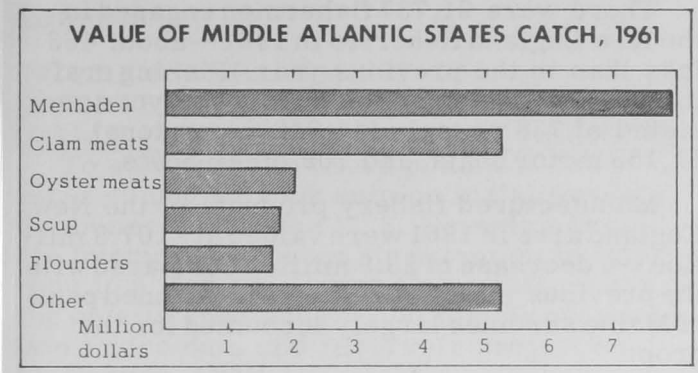
The plantings were made at dusk when seagulls have less chance of preying on the fish before they take to deep water. Releases consisted of 2-year-old lake trout measuring 7 inches and longer.

About 5,000 lake trout were planted in Crystal Lake, Benzie County, in the spring of 1962, as part of Michigan's Department of Conservation 1962 lake trout planting program.

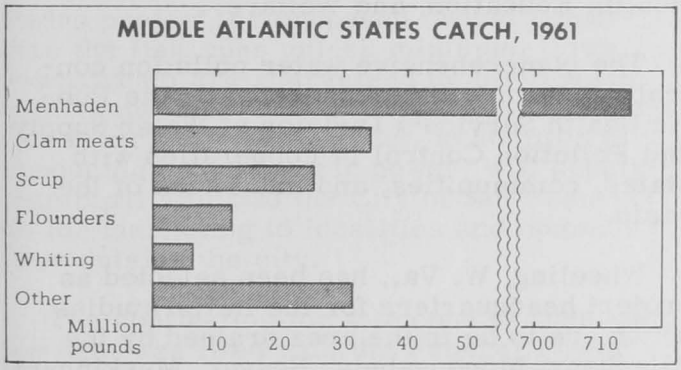
Middle Atlantic States

FISHERY LANDINGS, 1961:

Landings of fish and shellfish in the Middle Atlantic States (New York, New Jersey,



and Delaware) during 1961, totaled 825 million pounds valued at $24 million ex-vessel. Landings (up 41.6 million pounds over 1960) were the highest since 1957. The value was more than $2 million over the previous year. Increased catches of menhaden largely accounted for the gain in volume. The higher value was mainly the result of improved prices received for menhaden and oysters.



New Jersey, with 397 million pounds, accounted for 48 percent of the catch, followed by Delaware with 37 percent. New Jersey also led in ex-vessel value with $11 million or 46 percent of the total; New York was second with 38 percent.

Boxing and icing butterfish from vessel at Fulton Fish Market, New York City.

There were 8,559 fishermen engaged in the Middle Atlantic fisheries in 1961--227 more than in 1960. This increase took place in the shore and boat fisheries; fewer men fished aboard vessels. Fishing craft operated in the Middle Atlantic area during the year consisted of 602 vessels (31,159 gross tons), 3,676 motorboats, and 447 other boats.

Manufactured fishery products of the Middle Atlantic area in 1961 amounted to $91.8 million--an increase of $11.4 million over the previous year. Increased production of breaded fresh or frozen fish, canned fish and shellfish, smoked and kippered fish, and industrial products largely accounted for the gain.

Missouri

FISHERIES RESEARCH UNIT FOR MISSOURI UNIVERSITY:

The Missouri Conservation Commission, the U. S. Fish and Wildlife Service, and the University of Missouri will cooperate in establishing a fisheries research unit at the university. It will be the third such unit in the nation.

The research unit will be staffed by two employees of the Fish and Wildlife Service and will have its facilities in the wildlife building, Stephens Hall, on the university's campus. The work will include research, teaching, extension, and fish resource surveys.

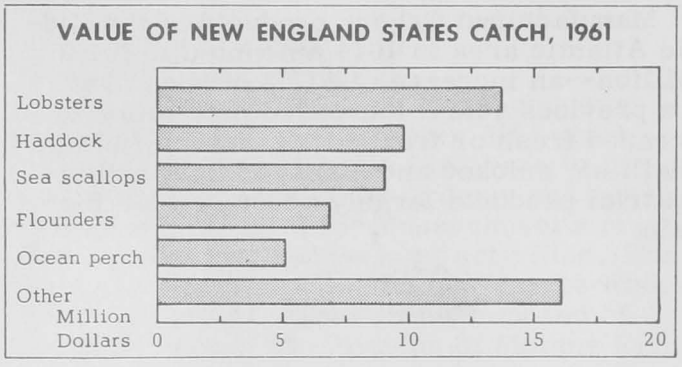
With the university furnishing the quarters, the Conservation Commission will furnish $10,000 and the Fish and Wildlife Service will furnish $30,000. Of the Federal appropriation, $3,000 will be used for administration at the regional and national level and $27,000 will come into Missouri.

The unit is expected to go into operation this fall after a unit leader is selected, according to an October 12, 1962, news release from the Conservation Commission.

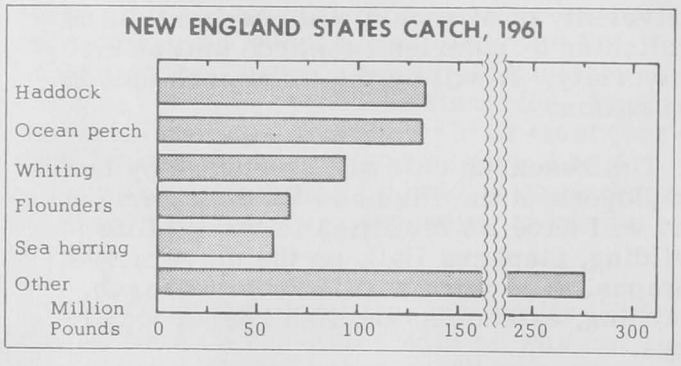
New England

FISHERIES, 1961:

Fish and shellfish landings in the New England States (Maine, New Hampshire, Massachusetts, Rhode Island, and Connecticut) during 1961 amounted to 760 million pounds valued at $60.9 million ex-vessel. The 1961 catch was 92 million pounds less than in the previous year and the smallest in that region since 1944. The value fell $616,000 below the 1960 level.



Only one State--Rhode Island--gained in volume over 1961. This increase of nearly 15 million pounds resulted from larger landings of fish taken for industrial purposes.



The 1961 decline in volume was due chiefly to greatly reduced landings of Maine sea herring. Total landings of that species fell from 155 million pounds in 1960 to 58 million pounds--the lowest yield since 1940. The value decreased more than $1 million ex-vessel. Landings of menhaden were down almost 17 million pounds; whiting, down 10 million pounds; ocean perch, down 9 million pounds; and lobsters, down over 3 million pounds. There were moderate increases in the catches of haddock, scup, cod, flounders, alewives, and species taken for industrial use. Sea scallop landings of 23.8 million pounds (mostly at New Bedford, Mass.), exceeded the 1960 record yield of 22.5 million pounds.

There were 21,737 fishermen engaged in the New England fisheries in 1961--about 463 less than in the previous year. Fishing craft in the New England area during the year consisted of 738 vessels (44,242 gross tons), 11,155 motor boats, and 709 other boats.

Manufactured fishery products of the New England area in 1961 were valued at $107.8 million--a decrease of $8.9 million compared with the previous year. A decline in the canned pack of Maine sardines largely accounted for the drop.

Ohio River Basin

WATER QUALITY MANAGEMENT PLAN FOR UPPER OHIO RIVER BASIN:

A six-year water quality management plan for the upper Ohio River Basin was announced on October 31, 1962, by the Secretary of Health, Education, and Welfare.

The comprehensive water pollution control program will be conducted by the Public Health Service's Division of Water Supply and Pollution Control in cooperation with states, communities, and industries of the basin.

Wheeling, W. Va., has been selected as project headquarters for the initial studies which are to be in the area drained by the Allegheny, Monongahela, Beaver, Muskingum, Hocking, Kanawha Rivers, and the Ohio River itself upstream from the mouth of the Kanawha River.

Acid mine drainage is probably the greatest single pollution problem in the basin and constitutes the greatest unknown factor with respect to satisfactory and economical means for pollution control and abatement.

The object of the study is to assure the Ohio River Basin of high quality water which will help improve the economy and recreational facilities of the area and protect the public health.

At its peak of activity a staff of 40 to 50 engineers, chemists, biologists, and other scientific and supporting personnel will be required to collect and evaluate the plan's engineering and laboratory data.

Salmon

INTERIOR DEPARTMENT TO INTERVENE IN NEW DON PEDRO (CALIF.) RESERVOIR PROJECT HEARING:

To safeguard an average annual run of about 40,000 chinook salmon in California's Tuolumne River, the U. S. Department of the Interior announced its intention to intervene in a Federal Power Commission hearing on a license application for the proposed Don Pedro dam and reservoir project near La Grange, Calif.

The salmon are an important interstate and international fishery resource, supporting sport and commercial fisheries, not only in California waters, but also in the Pacific Ocean off the coasts of Oregon, Washington, British Columbia and, probably southern Alaska, the Department said.

Studies by the Department's Fish and Wildlife Service indicate that the new Don Pedro project, as proposed, would jeopardize the fish runs unless minimum flows downstream are guaranteed by the license applicants, the Turlock and Modesto Irrigation Districts. The project, in addition to producing hydroelectric power, will supply municipal water to the City of San Francisco for marketing to localities and communities outside the city.

The application for a license to construct the dam was filed with the Federal Power Commission over a year ago. Since then, the California Department of Fish and Game and the Fish and Wildlife Service have held discussions with the applicants to try and reach a compromise that would allow the project to be constructed and still maintain the valuable fishery. This fishery annually produces about one million pounds of commercial salmon and provides 36,000 man-days of sport fishing.

Under the terms requested in the application by the irrigation districts it would be possible to remove all the water from the Tuolumne River in dry years.

Negotiators from the California Fish and Game Department, the City and County of San Francisco, and the irrigation districts drafted a proposed agreement on the problem subject to ratification by their governing bodies. This agreement, however, was rejected as inadequate by the California Fish and Game Commission at its meeting July 20, 1962. Following this rejection, the Federal Power Commission scheduled a hearing on the project for October 16, 1962, in San Francisco.

The Interior Department has now started action to intervene formally in the case and to participate in the hearing in order to present license conditions to protect adequately the fishery resources of the Tuolumne River.

Shrimp

UNITED STATES SHRIMP SUPPLY INDICATORS, OCTOBER 1962:

Item and Period	1962	1961	1960	1959	1958
		(1,000 Lbs., Heads-Off)			
Total landings, So. Atl. and Gulf States:					
December	-	6,538	7,097	8,716	8,099
November	-	9,996	14,454	12,412	12,416
October	13,000	12,696	21,690	19,602	16,461
January-September	69,280	62,165	97,794	89,929	79,576
January-December	-	91,395	141,035	130,659	116,552
Quantity canned, Gulf States 1/:					
December	-	800	977	1,278	1,943
November	-	2,215	1,614	2,312	3,424
October	3,900	2,310	2,567	2,531	3,489
January-September	15,154	10,438	23,436	18,558	17,548
January-December	-	15,763	28,594	24,679	26,404
Frozen inventories (as of end of each mo.) 2/:					
December 31	-	19,755	40,913	37,866	32,844
November 30	-	20,668	37,264	37,334	30,211
October 31	18,944	17,811	31,209	33,057	24,620
September 30	14,111	13,361	24,492	26,119	18,079
August 31	12,754	12,728	20,171	23,780	15,274
July 31	13,677	14,849	17,397	22,352	12,351
February 28	19,012	37,612	29,063	27,555	16,359
Imports 3/:					
December	-	15,442	12,411	10,611	10,448
November	-	14,852	13,516	10,269	10,617
October	4/	16,813	14,211	15,340	11,463
September	9,696	8,629	8,190	7,541	7,620
January-August	79,647	70,546	65,090	62,794	45,246
January-December	-	126,282	113,418	106,555	85,394
		(¢/lb., 26-30 Count, Heads-Off)			
Ex-vessel price, all species So. Atl. and Gulf Ports:					
December	-	75.2	54.2	48.4	70.8
November	-	73.5	54.0	46.2	69.0
October	5/96.0	68.7	53.0	44.4	66.4
September	5/95.0	70.1	52.2	46.4	65.6
August	5/93.0	66.1	52.0	46.9	70.8
July	5/90.0	55.8	54.6	49.2	72.6
January-June	81.0	53.8	56.7	66.5	74.9
Wholesale price for froz. domestic brown species (5-lb. pkg.) at Chicago, Ill.:					
December	-	91-92	68-70	64-66	87-89
November	-	89-92	69-73	60-65	83-87
October	111-115	83-90	69-73	59-62	80-84
September	113-118	87-90	65-70	62-64	78-84
August	110-112	76-91	64-67	62-64	81-86
July	-	70-75	72-77	62-74	90-93
January-June	91-104	67-72	64-77	70-88	81-98

1/Pounds of headless shrimp determined by multiplying the number of standard cases by 33.
2/Raw headless only; excludes breaded, peeled and deveined, etc.
3/Includes fresh, frozen, canned, dried, and other shrimp products as reported by the Bureau of the Census.
4/Not available.
5/Estimated.
Note: Data for 1962 and 1961 are preliminary. October 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.

Tuna

PACK IN UNITED STATES AND TERRITORIES IN 1962 AT RECORD HIGH:

As of November 1 for the United States west coast and as of October 1 for Hawaii, American Samoa, and Puerto Rico, this year's combined tuna pack for those areas totaled about 12.9 million cases--an increase of 800,000 cases or 6.6 percent as compared with the previous record pack in 1961 for the same period. The pack in the areas mentioned represents about 70 percent of the total pack in the United States, American Samoa, and Puerto Rico, during 1962.

The California tuna pack up to November 1 totaled 9.6 million cases in 1962, or an increase of 500,000 cases as compared to the same period in 1961. Up to October 1, the combined 1962 pack in Puerto Rico, American Samoa, and Hawaii of almost 2.8 million cases was over 400,000 cases more than at the same date in 1961. The increase was both in white meat and light meat tuna.

* * * * *

BLUEFIN TAGGED OFF CALIFORNIA:

A total of 960 tagged bluefin tuna was released from the commercial purse-seiner West Point August 13-23, 1962, by the U. S. Bureau of Commercial Fisheries Biological Laboratory, San Diego, in cooperation with the California Department of Fish and Game.

Releases were made about 30 miles north of the 176-Fathom Spot (30° N., 117° W.), the 43-Fathom Spot (32°36' N., 118°06' W.), and 20 miles west of the north end of San Clemente Island (33°00' N., 119°00' W.). These releases are the first of a series designed to provide vital information on migration, availability, and other aspects of the life history of this little-known tuna in the eastern north Pacific.

Tags used are of standard yellow plastic dart-type design, identical to those used by the Inter-American Tropical Tuna Commission for marking of yellowfin and skipjack, and are attached to the left side of the fish below and aft of the second dorsal fin. The tags are marked "Return to California Department of Fish and Game." If you should catch a tagged bluefin, please preserve the specimen. Upon return to port, contact waterfront representatives of the Tuna Commission, California Department of Fish and Game, or U. S. Bureau of Commercial Fisheries. Any one of these representatives will measure and check the condition of the fish, as well as take the tag from it. Be sure to record the date and location of capture. There is a $1.00 reward for the return of each properly documented tag.

* * * * *

SHARK-TUNA RELATIONSHIPS IN EASTERN PACIFIC UNDER STUDY:

A study of sharks and their relationships with the tropical tuna species has been started by scientists of the U. S. Bureau of Commercial Fisheries Biological Laboratory, San Diego. A total of 160 tagged sharks has been released. Of that number, 70 were released from the commercial fishing vessel Royal Pacific off Guatemala, Colombia, and Ecuador; the remainder were released from the commercial purse-seiner West Point off the Revilla Gigedo Islands.

The tags are monel metal straps attached to the dorsal fin of the shark. A colored vinyl disk has been added on the latest tags to make them more conspicuous. Purse-seine fishermen are requested to look over all sharks taken in purse-seine hauls--a $1.00 reward will be paid to persons recovering the tags and noting the date and place of capture.

United States Fisheries

COMMERCIAL FISHERY LANDINGS, JANUARY-OCTOBER 1962:

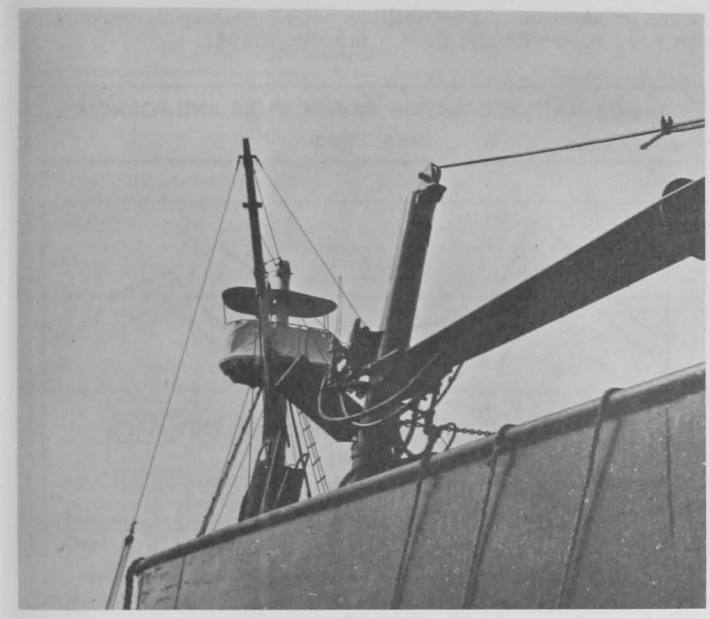
Landings: Landings of fish and shellfish in the United States during the first 10 months of 1962 were 63 million pounds or 2 percent more than during the same period a year earlier. The gain resulted from sharply increased production of menhaden and Maine herring.

Menhaden: Total landings for the first 10 months of 1962 amounted to 2,160.0 million pounds--about 21 million pounds more than during the same period in 1961. During October, there was a marked increase in landings all along the Atlantic and Gulf Coasts as compared with October 1961.

Salmon: On the basis of the reported pack of canned salmon, it was estimated that the Alaska catch for the 1962 season totaled approximately 280 million pounds--15 million pounds more than in 1961.

Tuna: Landings in California (including transshipments of United States-caught fish from South America) totaled about 257 million pounds to November 10, 1962--30 million pounds less than for the same period in 1961.

Shrimp: South Atlantic and Gulf States landings amounted to 16.4 million pounds in the first 9 months of 1962--an increase of 12 million pounds as compared with the same

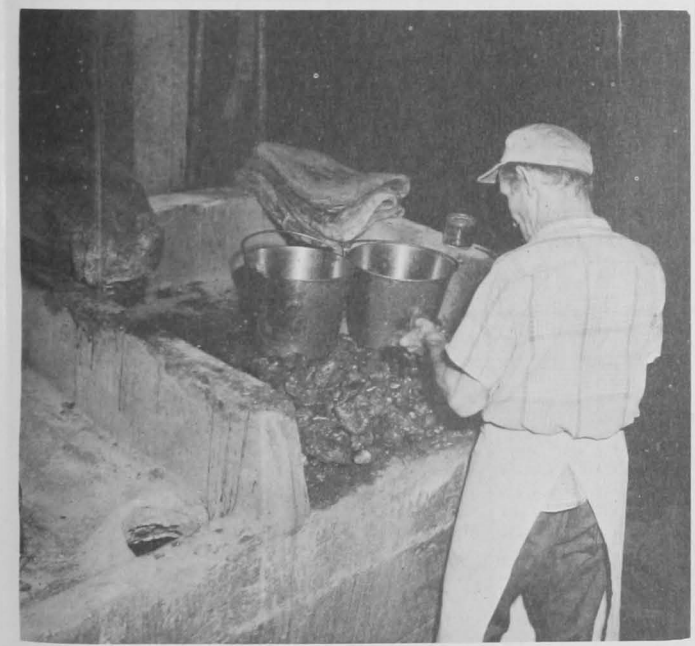


Crows nest of a menhaden fishing vessel operating out of Reedville, Va.

period in 1961. A slight upward trend took place in the landings in all but three of the states.

Mackerel: Jack mackerel landings of 65 million pounds to November 3, 1962, fell slightly below the 70.4 million pounds taken during the same period in 1961. Pacific mackerel with 34.7 million pounds exceeded by 3 million pounds the 1961 landings through the same date.

Maine herring: Landings through September 1962 totaled 142 million pounds--up sharply from the 39.2 million pounds taken during the first 9 months of 1961.



In some areas, shell oysters are brought to the shucking plants in bags. Shuckers may be paid by the number of bags shucked rather than by the volume of shucked oysters. This is the reason for compartmented benches in this New Orleans oyster shucking plant.

United States Commercial Fishery Landings for Periods Shown, 1962 and 1961

Species	Period	1/1962	1961	Total 1961
		(1,000 Lbs.)		
Anchovies, Calif.	to Nov. 3	1,800	5,762	7,712
Cod:				
Maine	8 mos.	1,700	1,908	2,507
Boston	10 "	19,600	17,300	18,837
Gloucester	10 "	3,100	2,585	3,358
Total cod		24,400	21,793	24,702
Haddock:				
Maine	8 mos.	1,500	1,881	2,940
Boston	10 "	74,700	73,800	84,093
Gloucester	10 "	13,600	12,722	15,025
Total haddock		89,800	88,403	102,058
Halibut 2/:				
Alaska	9 mos.	27,100	24,496	25,077
Wash. & Oreg.	9 "	11,900	14,121	14,947
Total halibut		39,000	38,617	40,024
Herring, Maine	9 mos.	142,000	39,235	54,463
Industrial Fish, Me. & Mass. 3/	10 mos.	40,400	40,186	41,851
Mackerel:				
Jack	to Nov. 3	65,100	70,438	97,606
Pacific	to Nov. 3	34,700	31,688	44,110
Menhaden	10 mos.	2,160,000	2,139,207	2,314,677
Ocean perch:				
Maine	8 mos.	50,800	55,606	77,350
Boston	10 "	700	559	701
Gloucester	10 "	50,600	49,876	53,991
Total ocean perch		102,100	106,041	132,042
Salmon:				
Alaska	year	279,700	264,814	264,814
Oregon	5 mos.	1,200	835	7,064
California	year	6,000	8,638	8,638
Sardine, Pacific	to Nov. 15	13,300	31,333	43,169
Scallops, sea, New Bedford (meats)	10 mos.	17,000	17,534	20,648
Shrimp (heads-on):				
So. Atl. & Gulf	9 mos.	116,400	104,436	153,544
Washington	9 "	1,400	751	1,464
Oregon	5 "	1,000	224	1,427
Squid, California	9 mos.	7,100	1,360	5,410
Tuna, California	to Nov. 10	257,300	286,890	307,263
Whiting:				
Maine	8 mos.	17,500	13,761	14,147
Boston	10 "	200	99	144
Gloucester	10 "	4,700	49,189	51,598
Total whiting		22,400	63,049	65,889
Total all above items		3,422,100	3,361,234	3,738,575
Other 4/		665,700	663,530	1,442,196
Grand Total		4,087,800	4,024,764	5,180,771

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.

* * * * *

FISH STICKS AND PORTIONS PRODUCTION, JULY-SEPTEMBER 1962:

United States production of fish sticks amounted to 15.8 million pounds and that of fish portions was 18.5 million pounds during the third quarter of 1962, according to preliminary data. This was a gain of nearly 1 percent in fish sticks and 26 percent in portions as compared with the same

Table 1 - U.S. Production of Fish Sticks by Months and Type, July-September 1962 1/

Month	Cooked	Raw	Total
	(1,000 Lbs.)		
July	3,262	351	3,613
August	5,315	381	5,696
September	6,005	501	6,506
Total 3rd Qtr. 1962 1/	14,582	1,233	15,815
Total 3rd Qtr. 1961	14,450	1,258	15,708
Tot. 1st 9 mos. 1962 1/	49,049	3,725	52,774
Tot. 1st 9 mos. 1961	48,172	3,608	51,780
Tot. Jan.-Dec. 1961	65,006	4,813	69,819

1/Preliminary.

Table 2 - U. S. Production of Fish Sticks by Areas, July-September 1962 and 1961

Area	1/1962		2/1961	
	No. of Firms	1,000 Lbs.	No. of Firms	1,000 Lbs.
Atlantic Coast States	20	12,789	22	12,625
Inland & Gulf States	4	1,765	6	1,647
Pacific Coast States	8	1,261	10	1,436
Total	32	15,815	38	15,708

1/Preliminary. 2/Revised.

Table 3 - U.S. Production of Fish Sticks by Months, 1958-1962

Month	1/1962	2/1961	1960	1959	1958
	(1,000 Lbs.)				
January	6,104	6,091	5,511	6,277	5,471
February	6,859	7,092	6,542	6,352	5,925
March	7,706	7,233	7,844	5,604	5,526
April	5,480	5,599	4,871	4,717	4,855
May	5,609	5,129	3,707	4,407	4,229
June	5,058	4,928	4,369	4,583	4,702
July	3,613	3,575	3,691	3,790	4,574
August	5,696	6,927	5,013	3,879	4,358
September	6,506	5,206	5,424	5,353	5,328
October	-	6,133	6,560	5,842	5,485
November	-	6,288	6,281	4,831	5,091
December	-	5,618	5,329	4,743	5,467
Total	-	69,819	65,142	60,378	61,011

1/Preliminary. 2/Revised.

quarter of 1961. The increase in portions was due mainly to greater production of raw breaded portions (up 3.8 million pounds).

Cooked fish sticks (14.6 million pounds) made up 92 percent of the fish stick total. The remaining 8 percent consisted of raw fish sticks. A total of 18 million pounds of breaded fish portions (of which 15 million pounds were raw) and 537,000 pounds of unbreaded portions were processed during the third quarter of 1962.

Plants on the Atlantic Coast produced the bulk of the fish sticks and portions--22.4 million pounds. The Gulf and inland States produced 10 million pounds, and the Pacific Coast States, 1.9 million pounds.

During the first 9 months of 1962, fish stick production of 52.8 million pounds was up 2 percent, and the fish portions production of 55.3 million pounds was up 31 percent as compared with the first 9 months of 1961.

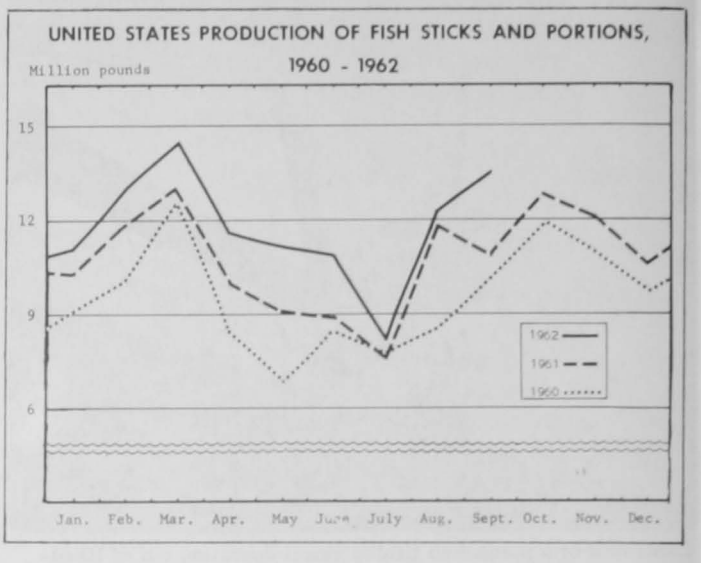


Table 4 - U. S. Production of Fish Portions by Months and Type, July-September 1962 1/

Month	Breaded			Unbreaded	Total
	Cooked	Raw	Total		
	(1,000 Lbs.)				
July	486	3,998	4,484	222	4,706
August	957	5,565	6,522	140	6,662
September	1,561	5,423	6,984	175	7,159
Tot. 3rd Qtr. 1962 1/	3,004	14,986	17,990	537	18,527
Tot. 3rd Qtr. 1961	2,597	11,633	14,230	440	14,670
Tot. 1st 9 mos. 1962 1/	9,743	43,995	53,738	1,580	55,318
Tot. 1st 9 mos. 1961	7,485	33,219	40,704	1,404	42,108
Tot. Jan.-Dec. 1961	11,003	46,783	57,786	2,061	59,847

1/Preliminary.

Table 5 - U. S. Production of Fish Portions by Months, 1958-1962

Month	1/1962	2/1961	1960	1959	1958
	(1,000 Lbs.)				
January	5,102	4,303	3,632	2,692	1,973
February	6,374	4,902	3,502	3,025	1,254
March	6,931	5,831	4,706	3,225	1,471
April	6,350	4,484	3,492	2,634	2,268
May	5,749	3,879	3,253	2,684	1,478
June	6,082	4,039	3,995	3,247	1,504
July	4,706	3,962	4,088	2,227	2,161
August	6,662	4,963	3,558	2,796	1,516
September	7,159	5,745	4,631	3,558	1,566
October	-	6,759	5,275	4,314	2,560
November	-	5,789	4,790	3,483	1,979
December	-	5,191	4,459	3,262	2,060
Total	-	59,847	49,381	37,147	21,790

1/Preliminary. 2/Revised.

Table 6 - Production of Fish Portions by Areas, July-September 1962 and 1961

Area	1/ 1962		2/ 1961	
	No. of Firms	1,000 Lbs.	No. of Firms	1,000 Lbs.
Atlantic Coast States	23	9,601	23	8,744
Inland & Gulf States	7	8,258	12	5,578
Pacific Coast States	8	668	6	348
Total	38	18,527	41	14,670

1/Preliminary. 2/Revised.

U. S. Fishing Vessels

DOCUMENTATIONS ISSUED AND CANCELLED, SEPTEMBER 1962:

During September 1962, a total of 26 vessels of 5 net tons and over were issued first documents as fishing craft, as compared with 22 in September 1961. There were 36 documents cancelled for fishing vessels in September 1962 as compared with 25 in September 1961.

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

Area (Home Port)	September 1962	September 1961	Jan.-Sept. 1962	Jan.-Sept. 1961	Total 1961
	(Number)				
Issued first documents 2/:					
New England	2	1	24	27	33
Middle Atlantic	-	2	2	11	12
Chesapeake	3	5	29	48	75
South Atlantic	6	6	37	40	47
Gulf	9	4	87	87	100
Pacific	5	4	115	141	149
Great Lakes	1	-	3	11	12
Puerto Rico	-	-	-	2	2
Total	26	22	297	367	430
Removed from documentation 3/:					
New England	5	2	19	15	20
Middle Atlantic	3	4	31	23	34
Chesapeake	2	1	19	27	28
South Atlantic	4	2	29	21	30
Gulf	15	7	86	77	103
Pacific	4	8	82	71	112
Great Lakes	3	1	18	13	14
Hawaii	-	-	3	-	-
Puerto Rico	-	-	1	-	-
Total	36	25	288	247	341

1/For explanation of footnotes, see table 2.

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

Gross Tonnage	Issued 2/	Cancelled 3/
	(Number)	
5-9	3	9
10-19	6	5
20-29	6	5
30-39	1	5
40-49	2	2
50-59	-	4
60-69	2	1
70-79	3	2
80-89	1	1
120-129	-	1
260-269	1	-
270-279	-	1
340-349	1	-
Total	26	36

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: 18 in 1962, and 8 prior to 1950. Assigned to areas on the basis of their home ports.
3/Includes vessels reported lost, abanoned, forfeited, solid alien, etc.
Source: Monthly Supplement to Merchant Vessels of the United States, Bureau of Customs, U. S. Treasury Department.

U.S. Foreign Trade

IMPORTS OF CANNED TUNA IN BRINE UNDER QUOTA:

United States imports of tuna canned in brine during January 1-September 29, 1962, amounted to 42,335,267 pounds (about 2,015,965 std. cases), according to data compiled by the Bureau of Customs. This was 4.1 percent more than the 40,664,702 pounds (about 1,936,414 std. cases) imported during January 1-September 30, 1961.

The quantity of tuna canned in brine which may be imported into the United States during the calendar year 1962 at the $12\frac{1}{2}$-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.

* * * * *

EDIBLE FISHERY PRODUCTS, SEPTEMBER 1962:

Imports of fresh, frozen and processed edible fish and shellfish into the United States in September 1962 were up 9.8 percent in quantity and 6.8 percent in value as compared with the previous month. In September, there was a large increase in imports of frozen albacore tuna (mostly from Japan and British West Pacific Islands). Imports were also

up for fish blocks and slabs, groundfish fillets, fillets other than groundfish, canned tuna in brine, canned sardines in oil (increase mostly from Norway and Portugal), canned sardines not in oil (increase from South Africa), and frozen shrimp. There was a decline in imports of some of the higher priced products such as fresh and frozen salmon (mostly from Canada), canned salmon (mostly from Canada and Japan), fresh swordfish (from Canada), canned crab meat (mostly from Japan), canned oysters (mostly from Japan), live lobsters (from Canada), frozen spiny lobsters, sea scallops (mostly from Canada), and frozen frog legs (mostly from India and Japan).

Compared with the same month in 1961, the imports in September 1962 were up 35.9 percent in quantity and 31.9 percent in value. Imports were much greater this September for frozen tuna (increase mostly from Japan and Peru). Imports also increased for fish blocks and slabs, groundfish fillets, fillets other than groundfish, fresh and frozen salmon, canned sardines not in oil, canned oysters, frozen shrimp, and frog legs. But imports of canned salmon dropped sharply and there was some decline in imports of canned tuna in brine, live lobsters (from Canada), and sea scallops.

In the first nine months of 1962, imports were up 18.1 percent in quantity and 23.9 percent in value as compared to the same period in 1961. The greater increase in value was because of the higher prices which prevailed this year for most imported fishery products. Most fishery products were imported in greater quantity this year and imports were up substantially for fish blocks or slabs (increase mostly from Norway), canned salmon (mostly from Canada and Japan), frozen tuna (increase mostly from Japan and Peru), canned tuna in brine other than albacore (mostly from Japan), canned sardines in oil, frozen shrimp, and sea scallops. Imports were down for the following products: haddock fillets, fresh and frozen salmon (mostly from Canada), canned albacore tuna in brine, canned bonito and yellowtail, canned oysters (mostly from Japan), and fresh swordfish (from Canada).

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

Item	QUANTITY				VALUE			
	Sept.		Jan.-Sept.		Sept.		Jan.-Sept.	
	1962	1961	1962	1961	1962	1961	1962	1961
	(Millions of Lbs.)				(Millions of $)			
Imports:								
Fish & Shellfish: Fresh, frozen, & processed 1/	112.8	83.0	879.4	744.6	34.7	26.3	293.5	236.8
Exports:								
Fish & Shellfish: Processed only 1/ (excluding fresh & frozen)	2.5	1.3	23.7	17.4	1.1	0.7	9.9	9.0

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

Exports of processed fish and shellfish from the United States in September 1962 were up 47.1 percent in quantity and 22.2 percent in value as compared with the previous month. Exports were up in September 1962 for canned salmon (mostly to the United Kingdom), canned sardines in oil, canned sardines not in oil, and canned squid. But exports were down for canned mackerel and canned shrimp (mostly to Canada and the United Kingdom).

Compared with the same month in 1961, the exports in September 1962 were up 92.3 percent in quantity and 57.1 percent in value. Exports were up this September for canned salmon, canned sardines in oil, canned sardines not in oil, canned shrimp, and canned squid. The increase was slightly offset by a decrease in exports of canned mackerel. Most of the increase in exports this September was concentrated in the lower priced products so the value of the exports did not increase as much as the quantity.

Processed fish and shellfish exports for the first nine months of 1962 were up 36.2 percent in quantity, but the value was up only 10.0 percent as compared with the same period of 1961. Exports of the lower priced canned squid (principally to Greece and the Philippines) showed the greatest increase in 1962. Exports were also up for canned mackerel, canned salmon, and canned sardines not in oil. But exports were down for canned shrimp (decline mostly in exports to Canada and the United Kingdom). Although not covered in the table, exports were up for frozen salmon, and were down for frozen shrimp (decline mostly in exports to Japan) and shucked oysters (principally to Canada).

Wholesale Prices

EDIBLE FISH AND SHELLFISH, OCTOBER 1962:

Prices of fishery products during October 1962 were generally slightly lower. The October 1962 wholesale price index for edible fishery products (fresh, frozen, and canned) at 119.0 percent of the 1957-59 average was lower (down 0.7 percent) than for September because of lower prices for fresh and frozen shrimp, a more marked price drop for frozen salmon, and a sharp price decrease for Great Lakes yellow pike. As compared with October a year earlier, most of the fishery products index items were higher priced in October 1962.

The fresh and frozen drawn, dressed, or whole finfish subgroup index this October dropped 3.4 percent from the previous month due to lower prices at New York City for frozen dressed king salmon (down 6.9 percent) and Great Lakes yellow pike (down 15.2 percent). From September to October 1962, prices rose for fresh large haddock (ex-vessel price at Boston up 1 cent a pound, or 5.2 percent), frozen dressed western halibut (wholesale price at New York City up 2.4 percent), and fresh Lake Superior whitefish (wholesale price at

Shrimp, prior to canning, being carefully inspected at a canning plant in Westwego, La.

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

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices 1/ ($)		Indexes 2/ (1957-59=100)			
			Oct. 1962	Sept. 1962	Oct. 1962	Sept. 1962	Aug. 1962	Oct. 3/1961
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					119.0	119.8	121.6	111.2
Fresh & Frozen Fishery Products:					124.3	125.6	124.3	109.1
Drawn, Dressed, or Whole Finfish:					120.7	125.0	131.6	107.1
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.11	.10	82.2	78.1	109.8	82.6
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.44	.43	129.6	126.6	138.9	102.6
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.98	1.05	136.2	146.3	146.7	118.8
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.73	.66	108.2	98.5	78.4	103.0
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.48	.56	77.8	91.7	81.9	73.7
Processed, Fresh (Fish & Shellfish):					123.8	123.1	117.6	113.5
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.38	.36	92.3	86.2	89.8	77.7
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	1.05	1.07	122.5	125.4	114.3	101.4
Oysters, shucked, standards	Norfolk	gal.	7.75	7.50	130.7	126.5	126.5	134.9
Processed, Frozen (Fish & Shellfish):					122.7	122.8	117.8	102.5
Fillets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.40	.40	100.1	100.1	100.1	97.6
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.36	.35	105.5	101.1	101.1	96.7
Ocean perch, lge., skins on 1-lb. pkg.	Boston	lb.	.32	.32	110.4	110.4	105.2	105.1
Shrimp, lge. (26-30 count), brown, 5-lb. pkg.	Chicago	lb.	1.13	1.15	134.0	136.4	128.1	104.4
Canned Fishery Products:					110.2	110.2	117.4	115.5
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	25.50	25.50	111.1	111.1	124.2	122.0
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	11.75	11.75	104.4	104.4	107.9	103.5
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	110.6
Sardines, Maine, keyless oil, 1/4 drawn (3-3/4 oz.), 100 cans/cs.	New York	cs.	9.11	9.11	116.9	116.9	119.4	132.2

1/ Represents average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.
2/ Beginning with January 1962 indexes, the reference base of 1947-49=100 was superseded by the new reference base of 1957-59=100.
3/ Recomputed to be comparable to 1957-59=100 base indexes.

Chicago up 7 cents a pound, or 9.8 percent). Compared with the same month of 1961, the subgroup index this October rose 12.7 percent. Prices were up sharply for frozen dressed western halibut (up 26.3 percent) and frozen dressed king salmon (up 14.6 percent); prices were also higher for Lake Superior whitefish (up 5 percent) and yellow pike (up 5.6 percent).

The fresh processed fish and shellfish subgroup index rose slightly (up 0.6 percent) from September to October this year, and was up 9.1 percent from October 1961. Fresh shrimp prices at New York City were firm in September, but brief fluctuations toward the end of that month indicated the beginning of a downward trend from the spiraling midsummer prices. Although fresh shrimp prices this October were down 2.3 percent from the previous month, they were still 20.8 percent higher than in the same month of 1961. Prices this October for fresh small haddock fillets at Boston were higher (up 7.1 percent) than in September and in October 1961 (up 18.8 percent). Fresh shucked oysters (standards) at Norfolk in October rose 25 cents a gallon from September, but were lower than the $8.00 high of October 1961.

Slightly lower frozen shrimp prices caused a fractional decrease (down 0.1 percent) in the processed frozen fish and shellfish subgroup index this October, but the index was still 19.7 percent higher than in October 1961. From September to October, prices were lower for frozen shrimp (wholesale prices at Chicago down 2 cents a pound, or 1.8 percent), but prices were higher for haddock fillets (up 4.5 percent) at Boston. The shrimp supply situation improved somewhat in October with an increase of about 6 million pounds in stocks of raw headless shrimp from the end of September to the end of October. Domestic shrimp landings were better in October, but much of the increase was in imports from Mexico. As compared with October 1961, prices this October were higher for all items in the subgroup; prices for frozen shrimp were up 28.4 percent and haddock fillets were up 9.1 percent.

The canned fishery products subgroup index in October was unchanged from September, but was down 4.6 percent from October 1961 due to lower prices of canned Pacific salmon and canned Maine sardines. Prices of all items in the canned fish subgroup this October were the same as the previous month. The 1962 packs of canned tuna, canned Maine sardines, and canned pink salmon all exceeded those of the previous season. As of the end of October, the California canned tuna pack amounted to 9.6 million cases; the canned Maine sardine pack was 2.1 million cases, the first season since 1958 that the pack exceeded 2 million cases; the Alaska pink salmon pack was about 1.8 million cases, the largest pack for the past 8 years.

As compared with a year earlier, canned tuna prices this October were still about 1 percent higher but canned Maine sardine prices were 11.6 percent lower than at the same time last year. The October 1962 California sardine landings were very light. Stocks of California canned sardines were limited in October with prices holding at $5.25 a case the same as in September, but 7.1 percent higher than a year earlier.