



TRENDS AND DEVELOPMENTS

Additions to the Fleet of U. S. Fishing Vessels

MARCH 1956: A total of 17 vessels of 5 net tons and over were issued first documents as fishing craft during March 1956, according to the U. S. Bureau of Customs. This was 14 vessels less than the number reported for the same month last year.

Section	March		Jan.-Mar.		Total
	1956	1955	1956	1955	1955
	(Number)				
New England	1	1	5	6	18
Middle Atlantic ..	2	2	7	3	13
Chesapeake	4	-	12	9	54
South Atlantic ...	1	3	11	9	65
Gulf	5	11	15	19	103
Pacific	1	11	4	17	117
Great Lakes	2	2	2	2	9
Alaska	1	1	3	8	35
Hawaii	-	-	1	-	3
Virgin Islands ...	-	-	-	-	1
Total	17	31	60	73	418

Note: Vessels have been assigned to the various sections on the basis of registered home ports.

The Gulf area led all others during March 1956 with 5 newly-documented craft, followed by the Chesapeake with 4, the Middle Atlantic and Great Lakes with 2 each, and the Alaskan, New England, and South Atlantic with 1 each.

Compared with the same month of last year, in March 1956 the Gulf area had 6 less vessels and the Pacific Coast States had 10 less newly-documented craft added to their fishing fleets. The Chesapeake area had no newly-documented vessels during March 1955.

During the first quarter of 1956, a total of 60 vessels was documented as fishing craft for the first time--13 less than the number reported for the corresponding period of last year. During the first three months of 1956, the Gulf area led all others with 15 newly-documented craft, followed by the Chesapeake area with 12 and the South Atlantic area with 11.



California

AIRPLANE FLIGHTS RESUMED TO STUDY FISH DISTRIBUTION (Flight 56-2): In order to survey the distribution, abundance, and behavior of the important pelagic species found along the coast of California, that State's Department of Fish and Game airplane flights started in 1955 were resumed in 1956. The Beechcraft (4758 N) surveyed the area from Fort Bragg to San Diego, March 2-5, and the Cessna "170" (1359D) covered the area between Sacramento Reef, Lower California, and Point Conception (March 6-17) (see charts). The aerial surveys were conducted along with surface observations made by research vessels and by commercial fishing craft.

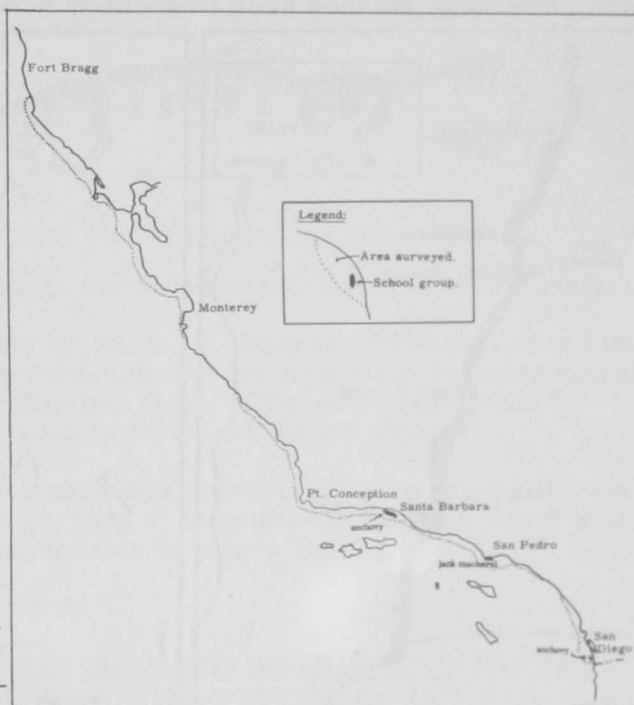
Weather conditions were ideal for aerial scouting and only one day of operation was disrupted by fog. During this period fish behavior was erratic and sudden changes in distribution and abundance of fish were observed.

Three school groups of fish were observed along the California coast from March 2-5. These included two small school groups of anchovies, one off Santa Barbara and one off San Diego, and one school group of jack mackerel off Pt. Fermin. From March 11-17 several large school groups of anchovies were observed along the coast from San Diego to Santa Barbara where a week previously very few fish had been seen.

During the last of the flight much time was spent in studying movements and changes in abundance of these large school groups. Depths of the schools were determined by the use of a portable depth-recorder mounted in the life skiff off the Department's research vessel Yellowfin. The observers in the skiff were directed by radio from the observer in the plane and as the skiff passed over a school the surface area of the school was estimated from the air. The depth of the water and the limits in depth of the top and bottom of the fish school were determined from the depth-recorder.

Sampling in daytime met with little success. Only a few fish could be caught by jigging with bare single and treble hooks and Paulas' Lures. A wire frame with treble snag hooks attached proved unsuccessful.

On March 12 biologists aboard the Scripps Institution of Oceanography research vessel Paolina T. were aided by the aircraft in the study of plankton concentrations in and near the areas of fish concentration.



Beechcraft Spotting Flight 56-2, March 2-5, 1956.

The following is a summary of observations on anchovy, jack mackerel, and sardine schools. Included with the aerial observations are data from other sources, such as the commercial and bait catches, M/V Yellowfin sampling, and commercial night-aerial scouting.

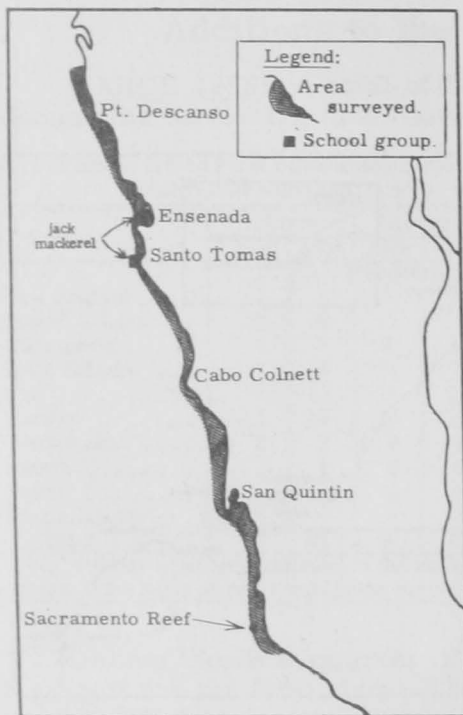
Anchovy: Two large school groups (from 80-132 schools in each school group) appeared close to the beach in the Oceanside and Huntington Beach areas sometime between the 6th and 10th of March. Smaller groups were observed in the San Diego, Santa Barbara, and Santa Monica areas. The large school groups off Huntington Beach and Oceanside remained near the beach for several days, then moved offshore in smaller units near the end of the flight period.

A movement of anchovies into Monterey Bay took place on the night of March 7 when boats scouting at night found large concentrations of fish in the bay where for several weeks previously none had been found.

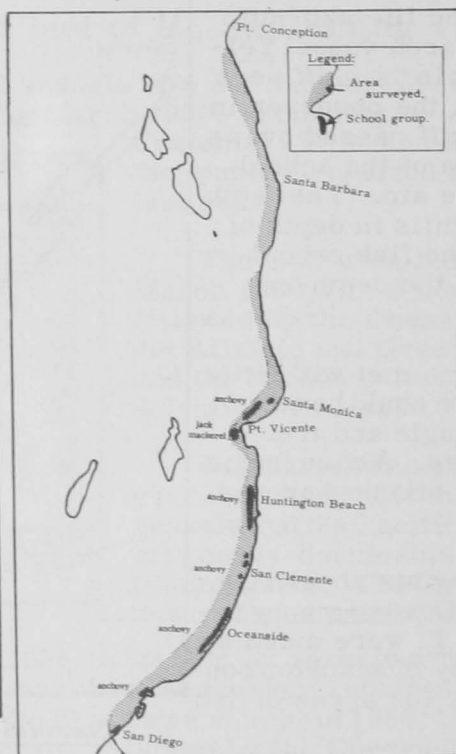
Commercial-catch sampling revealed that the adult anchovies in the Huntington Beach area were nearly all of commercial large size. The anchovies taken commercially in Monterey Bay also were of large size and from preliminary examination were predominately of the 1954-year class. Sampling by the Yellowfin revealed the presence of smaller anchovies off Pt. Vicente. These fish were probably of the 1955-year class. Sampling by the Yellowfin off Oceanside proved that the anchovies in this area were of large size.

In terms of surface area of fish observed by aerial scouting over the past two years, more anchovies were observed during this flight than on any previous flight. More schools of anchovies were observed on the June 1955 flight, but most of the schools seen then were of considerably smaller size than the schools seen during this flight. The size of the anchovies in the schools seen on this flight are much larger than the young fish seen in 1955.

Sardine: No schools which could be positively identified as sardine were observed during the flight. On several occasions off Huntington Beach and Santa Barbara, however, flashes seen in anchovy schools were most likely made by sardines.



Cessna "170" Spotting Flight 56-2, March 6-10, 1956.



Cessna "170" Spotting Flight 56-2, March 11-17, 1956.

Night sampling on the Yellowfin revealed the presence of young 1955-year class sardines mixed with the anchovies in both the Oceanside and Huntington Beach areas.

Large adult sardines were located by the commercial fleet off Pt. Fermin and Pt. Vicente. Several large tonnage hauls of pure sardines were reported made by jack mackerelfishermen. These fish were caught by mistake and were released.

Jack Mackerel: A small school group of jack mackerel observed near Santa To-

mas, Baja California, was being pursued by the Mexican fishing boats out of Ensenada. It was reported that small amounts of sierra (*Scomberomorus*) were mixed with the jack mackerel.

The school group of jack mackerel off Pt. Fermin and Pt. Vicente remained in that vicinity for several weeks. Apparently these fish were mostly "night" fish as very few schools could be seen in the daytime. Fair catches of jack mackerel mixed with Pacific mackerel and sardines were being taken sporadically during this period.

MAJOR NORTHERN CALIFORNIA KING SALMON STREAMS RESTOCKED:

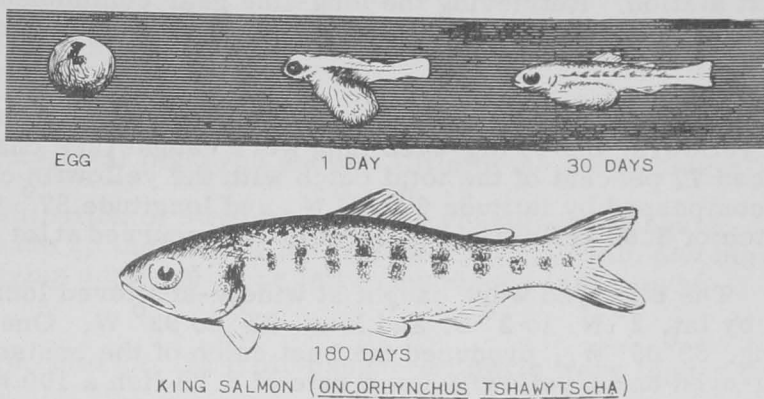
More than 3 million king salmon fingerlings were planted recently in three major northern California salmon streams, the California Department of Fish and Game announced April 1956.

Another salmon milestone was the release of the first fingerling king salmon from the new Nimbus Hatchery into the American River. By mid-May 1956 some 3 million fish will have been released from the hatchery. In addition, one million king salmon fingerlings from Coleman Hatchery were released about April 19 into the Mokelumne River in an effort to build up the run in that stream.

During March 2.6 million king salmon fingerlings were released into the Klamath River in Siskiyou County from the Mt. Shasta Hatchery. Eggs from which these fish were hatched were taken at the Fall Creek station.

Another 0.5 million king salmon were released into the Russian River below the site of Coyote Dam, which is expected to create water conditions favorable to this species. At present there are only silver salmon and steelhead trout in the river.

Nimbus Hatchery's first year's production, while far below capacity because of adverse water conditions in 1955/56, will make a definite contribution to the Sacramento River system runs.



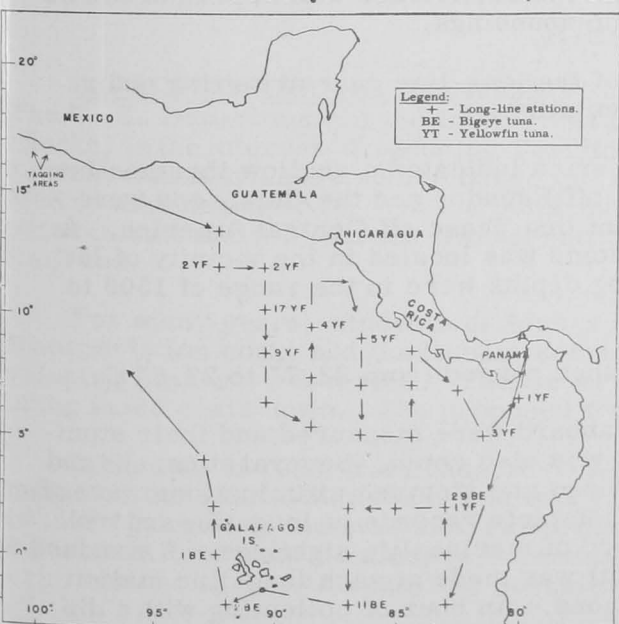
The Nimbus Hatchery was constructed by the U. S. Bureau of Reclamation and turned over to California's Fish and Game Department for operation to compensate for loss of natural spawning areas above Nimbus Dam. Operation costs will be borne by the Federal government as a part of the Central Valley Project.

The hatchery, located east of Sacramento, was authorized when the California Fish and Game personnel showed that 70 percent of the entire American River run spawned above Nimbus Dam, which is impassable to migrating fish.

YELLOWFIN AND BIG-EYED TUNA SUBSURFACE DISTRIBUTION SURVEYED

(Cruise 56-S-1): The subsurface distribution and relative abundance of yellowfin and big-eyed tuna were surveyed by California's research vessel N. B. Scofield between January 10 and March 10, 1956. This cruise made in South and Central American waters was a seasonal follow up of the cruise made by the same vessel between October-November 1955 (Cruise 55-S-5). Additional objectives of the cruise were to

make limited biological and oceanographic observations and collections that may have a bearing on tuna research or other marine life.



The M/V N. B. Scofield departed Los Angeles Harbor, January 10, 1956, and proceeded through the first nine scheduled stations. The tenth and eleventh scheduled stations were omitted due to foul weather. Nine more stations were occupied before the vessel arrived at Balboa, Panama Canal Zone, February 9. Departed Balboa, February 12, and occupied remaining 11 stations. A 24-hour stop was made at Santa Maria Island, Galapagos, on February 23. Finished last station February 27, and arrived at Los Angeles Harbor March 10.

Fishing: At each station forty baskets of sardine-baited long-line gear

N. B. Scofield tuna long-line Cruise 56-S-1, Jan. 10-Mar. 10, 1956.

were set commencing at 0600 hours. Sets were usually completed by 0745 hours. Two depths were fished by using 5- and 15-fathom float lines. Surface trolling was carried on along the long-line set while the gear soaked and while under way for the next station. Retrieving the long-line gear commenced at 1230 hours and was generally completed by 1445 hours. The vessel then proceeded to the next station 120 miles away.

Results: During the cruise 29 long-line stations were occupied, and a total of 44 yellowfin and 43 big-eyed tuna were caught (see chart). Four of the stations produced 77 percent of the total catch with the yellowfin catch concentrated in an area encompassed by latitude 8° - 12° N. and longitude 87° - 91° W. The heaviest of the catch of 3.89 yellowfin a hundred hooks occurred at lat. $10^{\circ}04'$ N. and long. $90^{\circ}38'$ W.

The big-eyed were caught at widely-scattered locations in the area encompassed by lat. 2° N. to 2° S. and long. 83° to 92° W. One station at lat. $1^{\circ}58'$ N., long. $83^{\circ}09'$ W., produced the best catch of the cruise. This station yielded 29 big-eyed and 1 yellowfin for a rate of 6.89 fish a 100 hooks. This was also the only station at which the two species were taken together. Other catches included 122 spearfish, 143 sharks, 57 dolphins, and 6 miscellaneous species.

Surface trolling on long-line stations produced only one small yellowfin. Surface indications of tunalike fishes were observed on two occasions at long-line stations: A school of large yellowfin, observed near the long-line set at lat. $7^{\circ}58'$ N., long. $90^{\circ}37'$ W., and was thought to have been responsible for the yellowfin catch on that station. Several small schools of frigate mackerel were observed near the long-line set at the station of heaviest catch. The total troll catch consisted of 731 yellowfin tuna, 20 black skipjack, 5 dolphin, 2 bonito, 1 sailfish, and 1 oceanic bonito.

The catches on this cruise were, in general, consistent with those of Cruise 55-S-5 in regard to occurrence of fish. In the number of fish caught, however, there were far fewer big-eyed tuna caught on the latest cruise.

Oceanographic Observations: Bathythermograph casts and surface salinity samples were taken on each station and at 1800, 2100, and 0200 hours while under way between stations. Surface water temperatures were taken at regular intervals both on station and under way. A recording fathometer trace was kept in areas between stations where charts showed few or no soundings.

Positions were computed for each end of the long-line gear at setting and retrieving; these were to be used for drift calculations.

Bathythermograph casts off Central America indicated a shallow thermocline, the shallowest being 30 feet. Thermoclines off Ecuador and the Galapagos were generally deeper and were markedly different than those off Central America. A shoal area with a minimum depth of 405 fathoms was located in the vicinity of lat. $5^{\circ}38'$ N., long. $88^{\circ}26'$ W. The surrounding depths were in the range of 1500 to 1600 fathoms.

Surface water temperatures in areas fished ranged from 22.7° to 27.6° C.

Biological Activities: All tuna brought aboard were measured and their stomach contents examined. Gonad development was also noted. Several stomachs and ovaries were collected for study ashore. Gonad and stomach examinations were also made of other species brought aboard. Complete records of long-line and troll catches were kept, along with a bridge record of marine-life sightings. A standard oblique plankton tow (450 meters of cable out) was made at each long-line station and at 2100 hours each evening between stations. An hour of collecting with a dip net under a light suspended over the water followed the evening plankton tow. Biological observations included the following:

1. **Size composition:** A majority of the long-line yellowfin catch was centered about a mode of 100 cm. fork length. Two minor size groups of small and very large fish were also caught.

There were two defined groups comprising the big-eyed catch; averaging 98 cm., and 174 cm.

2. **Sexual maturity:** Many yellowfin in the 100 cm. group and larger were in a ripe or ripening state of maturity. All big-eyed showed little or no development.

3. **Stomach contents:** Examination of stomach contents revealed that squid, octopi, and swimming crabs made up the bulk of the food of both yellowfin and big-eyed. Snake mackerel (*Gemphylus serpens*) were fairly numerous in big-eyed stomachs at two stations.

4. **Tagging:** Near Acapulco, Mexico, 22 troll-caught yellowfin were tagged and released with spaghetti-type tags.

5. **Marine life sightings:** Numerous schools of yellowfin tuna were sighted in the vicinity of Cape Corrientes, Mexico. Small scattered schools of skipjack were quite numerous near Cape Mala, Panama. On the night of January 18, 1956, in the vicinity of lat. 15°35' N., long. 94°48' W., a large area of flipping lanternfish (*Benthoosema pterota*) was passed through by the vessel for at least 5 miles and probably more.

In general much more marine life was encountered near shore than in outlying waters.

6. **Specimen collections:** A variety of marine-life collections was made under the night light, from the stomachs of long-line fish, and during a stop at Santa Maria Island, Galapagos. These collections are in the process of being identified at this time. Larvae of yellowfin and black skipjack taken off Costa Rica have been thus far identified.



Alaska

IMPROVED TRANSPORTATION PROMOTED BY INTERIOR DEPARTMENT:

The U. S. Department of the Interior will continue to promote seairline service to Alaska, in the interest of reducing Territorial transportation costs, even though the new service may cause some change in existing trade channels, Secretary Douglas McKay stated March 20. On the other hand, the Department will not discriminate between rail and motortruck transportation in spite of its ownership of the Alaska Railroad.

For many years, students of Alaska economic problems have pointed to high transportation costs and inadequate service as principal obstacles in the way of developing Alaska's resources. The Department has been doing everything it can to bring those costs down. The proposed trainship is one step in that direction.

In the fall of 1955, rate reductions were made on certain types of quantity shipments on the Alaska Railroad, and this year no increases have been made similar to those granted to the stateside railroads. The Department is sponsoring an action before the Interstate Commerce Commission to eliminate stateside rail-rate discriminations against Alaska, the so-called Export Rate Case.

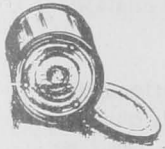
The trainship service involves provision of roll-on, roll-off car-ferry operation to Alaska on two vessels proposed to be built by a private ocean carrier, the Alaska Steamship Company, provided financing and other arrangements can be made. Whittier was selected as the Alaska terminus in a joint decision of the Alaska Steamship Company and the Alaska Railroad because of the comparatively short haul and moderate grades to Anchorage. The shipping company has guaranteed to continue to serve other Alaska ports, even if the seatrains service is provided.

In discussing truck transportation, it is pointed out that the Department has charge of most highway construction and maintenance in the Territory, through the Alaska Road Commission. The Department has been pleased to note the rapid development of trucking in Alaska during recent years, and intends to continue to foster it in any way possible.

With respect to Alaskan ports competitive with Whittier, the Department has completed a paved highway from Seward to Anchorage, and is fast developing a hard-surfaced network of through roads from Valdez to interior points. In addition, large sums have been expended on rehabilitation of the Alaska Railroad line from Portage to Seward, and on new dock facilities at Seward. With cheaper and better transportation, Alaska will continue to grow in population and wealth as it should.



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



Total shipments of metal cans for fishery products during January-February 1956 amounted to 9,841 short tons of steel (based on the amount of steel consumed in the manufacture of cans) as compared with 9,353 tons in January-February 1955. Fish canning in January-February 1956 was confined largely to tuna and oysters, and the increase was principally due to a spurt in tuna packing operations early this year.

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

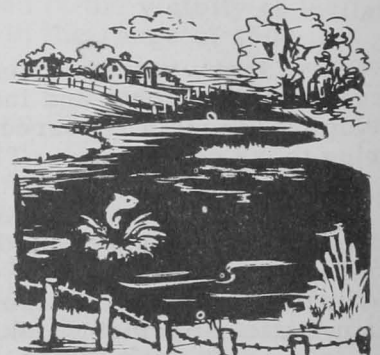


Farm Fish Ponds

A one-acre fish pond--well-managed, properly fertilized, and adequately fished--will yield an annual harvest averaging 20 pounds of fish each year and provide 400 hours of good fishing, the U. S. Fish and Wildlife Service announced April 15. In the United States there are more than 1.5 million farm ponds of varying sizes but averaging an acre apiece. Many more ponds are being made each year through soil conservation and water-storage projects.

In 24 states, laws and policies prohibit stocking of farm ponds with fish produced in the state hatcheries. The U. S. Fish and Wildlife Service has been called upon to fill that gap and each year provides more than 30 million fish, mainly warm-water species, for approximately 28,000 noncommercial ponds in 42 States.

Many of these are multipurpose ponds created as part of the Federal Soil Conservation and Watershed Protection program. The fact that the Federal Government and many states furnish the appropriate kind and



Farm fish pond.

number of fish for stocking, plus the knowledge that information on the development and management of ponds is readily available, has greatly stimulated the pond-construction program.

Interest in farm ponds is steadily increasing. The idea, which "took hold" first in the Southeastern States (where almost half the ponds are located) has spread to other sections of the country where topography and climate make these small fishing areas practical. They have a direct value in providing family fishing and at the same time they relieve fishing pressure on natural fishing areas.

Ponds smaller than a half acre rarely furnish good fishing, but ponds of from one to three acres are ideal for the average family and friends. Larger fishing ponds require more management, effort, and expense; however, they do produce a bigger crop of harvestable fish. These large ponds should be opened to public fishing because the quality of the sport is generally improved, never harmed, by heavy recreational fishing. Intensive cropping is an asset in the management of successful fish ponds.

To produce gratifying fishing, a farm pond must be well constructed on a favorable site, properly stocked, and must receive continuing management. Small fishing ponds should be stocked only with hatchery fish of the species, sizes, and numbers recommended for the area by state or Federal biologists. Promiscuous introduction of wild fish, either before or after stocking with the approved hatchery fish, is a common cause of poor fishing.

During 1954 the U. S. Fish and Wildlife Service distributed a total of 46 million eggs and 164 million fish varying from fry to catchable size. Of these 58 million were fry and fingerlings of warm-water species distributed to farm ponds and nearly 1,200 lakes and reservoirs.

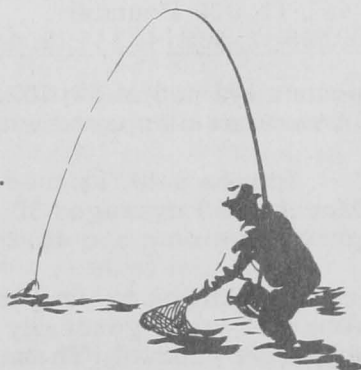


Federal Aid to States Increases Gamefish Supply

A permanent additional supply of gamefish amounting to more than 1 million pounds a year has been provided by the manmade lakes created with Federal assistance, the Interior Department announced April 13. U. S. Fish and Wildlife Service experts predict that each of the nearly 8,000 acres of public fishing waters so far completed under the Federal Aid program may be expected to produce at least 150 pounds of game fish annually.

The first Federal Aid lake was completed in 1953, a 32-acre impounded area on Virgin Run, near Pittsburgh, Pa. The latest and largest is Arkansas' Atkin Lake, 652 acres of water backed up behind a dam 2,500 feet in length.

These fishing waters and 79 others like them have been built by the respective States with the help of Federal funds (Dingell-Johnson) made available by the U. S. Fish and Wildlife Service. The fish restoration money involved comes from a Federal excise tax on sport fishing tackle. Since important waterfowl and fur-animal usage is expected to be made of 22 of the lakes, some of the money was made available under the Pittman-Robertson Act which levies an excise tax on sporting arms and ammunition to provide funds for game restoration projects.



The 81 lakes are located in 27 States and represent a total of 7,908 acres of new fishing waters. The cost of these new areas averages from \$1,000 to \$3,000 per acre of water.

Federal participation in the lake construction program is new. Only nine lakes have been fished for two years and some of them are storing their first water. But the possibilities are clearly indicated by the early returns. On the lake created at Oak Mountain State Park in Alabama, where a dam 825 feet in length impounds 250 acres of fine angling water, 2,308 fishermen caught more than 5,000 pounds of bass and sunfish in three days. On Yellowstone Lake in Wisconsin, where 456 acres of water accommodate thousands of anglers every week, a sample of 226 fishermen shows 1,661 fish in the creel with a catch rate of 3.2 fish per hour. Approximately one-half fish an hour is considered good fishing while an average catch of one fish an hour is considered excellent.

Arizona's Luna Lake, while only 32 acres in extent, has had a terrific economic impact on the adjacent town which has become a hustling mecca for anglers.

Of the 81 lakes created to date, 22 are set up for joint use by fish and waterfowl. On the other 59 waterfowl use is merely incidental. Many of the lakes have other values--but these values are subordinate to the whip of the fly when fishing season is open. No other use is permitted to damage the fishing values of the waters.



Federal Purchases of Fishery Products

FRESH AND FROZEN FISHERY PRODUCTS PURCHASED BY THE DEPARTMENT OF DEFENSE, MARCH 1956: A total of 2,198,000 pounds (valued at \$1,106,000) of fresh and frozen fishery products for the use of the U. S. Army, Navy, Marine Corps, and Air Force were purchased in March 1956 by the Army Quartermaster Corps. This was 32.5 percent more in quantity and 30.1 percent more in value

than purchases the previous month, but 15.7 percent less in quantity and 3.9 percent less in value than purchases in March 1955.

Purchases of Fresh and Frozen Fishery Products by Department of Defense (March and the First 3 Months of 1956 with Comparisons)

QUANTITY				VALUE			
March		Jan.-March		March		Jan.-March	
1956	1955	1956	1955	1956	1955	1956	1955
.. (1,000 Pounds) (\$1,000)			
2,198	2,606	4,943	6,444	1,106	1,151	2,702	2,765

For the first three months in 1956, purchases of fresh and frozen fish amounted to 4,943,000

pounds (valued at \$2,702,000)--a drop of 23.3 percent in quantity and 2.3 percent in value as compared with the same period a year earlier.

Prices paid for these fishery products by the Department of the Defense in March 1956 averaged 50.3 cents a pound as compared with 51.2 cents a pound the previous month and 44.2 cents a pound in March 1955.

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



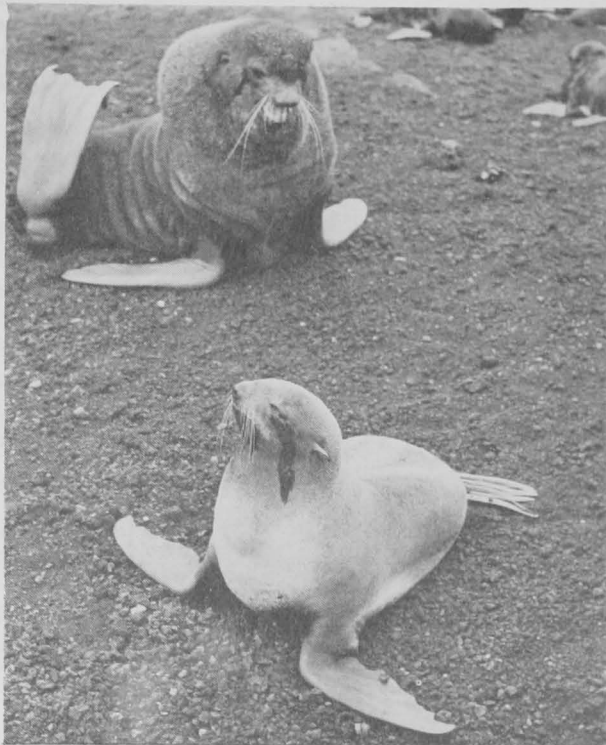
Fur-Seal Skins

PRICES DOWN SLIGHTLY AT SPRING AUCTION: Fur-seal skin prices were lower by about 3.2 percent from the 1955 fall sale, but total revenue increased because of a greater volume at the semiannual auction of Government-owned fur-seal skins at St. Louis on April 16, 1956.

A total of 27,017 skins, products of the sealing industry administered by the U. S. Fish and Wildlife Service on the Pribilof Islands, Alaska, brought \$2,519,994. This compares with 24,610 skins sold for \$2,316,735 at the October 10, 1955, sale. The grand average for all skins sold for the account of the United States Government was \$93.27; at the October 1955 sale it was \$94.14.

Of the Alaska skins, 16,193 were dyed "matara" (brown), 1,705 were "safari" brown (a lighter brown), and 9,119 were blacks. The matara skins brought an average of \$90.58, a decline of 4.8 percent below the October auction. The safari skins sold for an average of \$65.90, a decline of 7.6 percent. The black skins averaged \$103.18, virtually unchanged from last October's price of \$103.46.

In addition to the United States skins, 4,525 Cape of Good Hope fur-seal skins were sold for the account of the Government of the Union of South Africa at an average of \$26.94, a decline of 12.1 percent from the last sale. A total of 450 Uruguay fur-seal skins were sold for the Government or Uruguay at an average of \$45.12, a slight increase over last October's price of \$44.30.



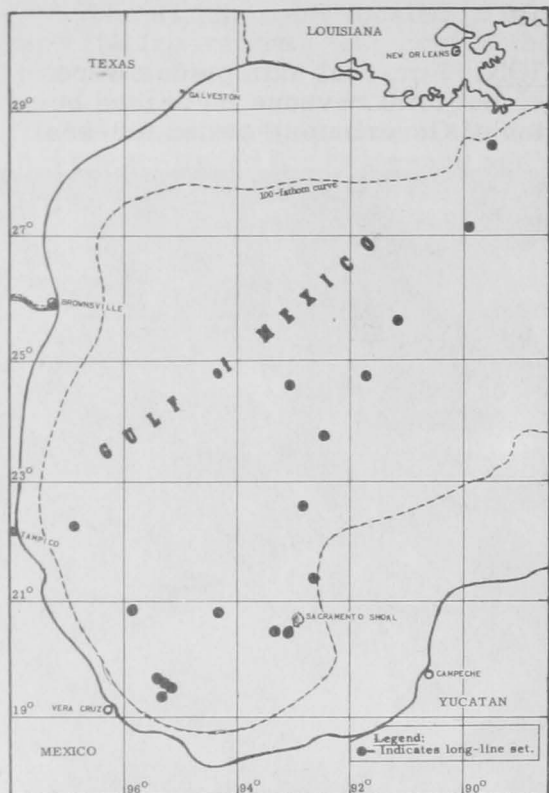
Fur-seal cow and bull with pups in background at U. S. Government Reservation, St. Paul Island, Alaska.



Gulf Exploratory Fishery Program

LONG-LINE YELLOWFIN TUNA TRIP SUCCESSFUL (Cruise 37): Over 26 tons of yellowfin tuna were caught by the Service's exploratory fishing vessel *Oregon* on 17 sets averaging 59 baskets (590 hooks) each in the southwestern Gulf of Mexico during cruise 37 (March 22-April 17). Highest catches were made in the southeastern Gulf of Campeche off Sacramento Shoal. An 80- and 91-basket set in this area on April 13 and 14 caught 103 and 117 yellowfin tuna, respectively, with a total weight of 25,431 pounds (12.8 yellowfin/100 hooks). Catch rates on the four sets in other areas of the Gulf of Campeche outside of the 1,000-fathom curve averaged 5.0 yellowfin/100 hooks. The remaining 11 sets were made in the central and southwestern Gulf and caught $4\frac{3}{4}$ tons of yellowfin at an average rate of 1.5 fish/100 hooks.

In addition to the yellowfin catch, 10 bluefin tuna (average weight of 339 lbs.), 1 skipjack, 10 white marlin, 3 blue marlin, 1 swordfish, and 63 sharks were caught; 30 yellowfin, 1 bluefin, 4 white marlin, and the 3 blue marlin were tagged and released. Approximately 13 percent of the yellowfin catch was damaged by sharks.

M/V Oregon long-line Cruise 37.

Most of the sets were made in moderately heavy seas restricting the amount of gear that could be used. All sets caught yellowfin with the exception of one on the northern edge of the Sigsbee Deep. Two large schools of blackfin and one small school of 60- to 70-pound yellowfin were observed during the cruise. Bathythermograms were obtained at the beginning and end of each set.

The Oregon was scheduled to leave Pascagoula on May 1 to carry out three weeks of deep-water shrimp exploration in the north-central and northwestern Gulf of Mexico. The primary objective of this trip was to be to conduct extensive coverage of the 200- to 300-fathom area off the Texas coast using 40-foot flat trawls. If significant quantities of shrimp are located, production-type dragging will be carried out using 80-foot balloon and 100-foot flat trawls.

At the request of several members of the Gulf shrimp industry, a series of exploratory drags will be made for brown-grooved shrimp in depths of 40 to 75 fathoms along the Louisiana and Texas coasts between the Mississippi Delta and Aransas Pass, Tex.



Maine

SARDINE CANNERS PREPARE FOR 1956 SEASON: Most of Maine's 40 sardine canning plants are being put in readiness for the official opening of the season on April 15, but activity will be light until mid-May unless the herring appear earlier than they have for the past 10 years.

Data released by the Maine Sardine Industry's Executive Secretary on April 7 revealed that the average date for a sizable run of fish on any section of the coast for each year since 1945 was May 15. Some activity got under way on May 1 in 1954 and 1955, while it was early June before packing started generally in 1947 and 1948.

Hopes for an early run of fish in eastern Washington County (Eastport area) have diminished somewhat due to the erratic behavior of some large schools that were in evidence for most of the winter.



Sardine boat unloads at a cannery in Maine.

The Industry spokesman said that most companies were eager to start canning as the industry's inventories were at the lowest ebb since the war years. He states: "There is a virtual sell-out of the small 1955 pack of 1,250,000 cases plus the large carry-over from 1954 and most packers are pressed to supply their customers."



Maine Sardines

CANNED STOCKS, APRIL 1, 1956: Distributors' stocks of Maine sardines amounted to 268,000 actual cases as of April 1, 1956; 63,000 cases (or 19 percent) less than on April 1 a year ago. April 1, 1956 stocks were 58,000 cases less than on January 1, 1956, according to estimates based on the results of a series of measurements for the 1955/56 marketing season by the U. S. Bureau of Census.

Canned Maine Sardines--Wholesale Distributors' and Cannery's Stocks, April 1, 1956, with Comparisons									
Type of Stocks	Unit	1955/56 Season			1954/55 Season				
		4/1/56	1/1/56	11/1/55	7/1/55	6/1/55	4/1/55	1/1/55	11/1/54
Distributors	1,000 actual cases	268	326	354	235	n. a.	331	n. a.	n. a.
Cannery's	1,000 standard cases ^{1/}	152	475	625	723	575	715	1,239	1,410

^{1/}100 $3\frac{1}{4}$ oz. cans equal one standard case. n.a. - not available.

Cannery's stocks as reported by the Maine Sardine Industry amounted to only 152,000 standard cases (100- $3\frac{1}{4}$ oz. cans) on April 1, 1956. Cannery's stocks on April 1, 1955, were 715,000 standard cases, and on January 1, 1956, totaled 475,000 cases.



Market Outlook for Fishery Products

APRIL-JUNE 1956: The fresh fish season is on and for the next six months consumers will have greater freedom of choice between fresh, frozen, and canned fish in markets throughout the country, according to the Commercial Fisheries Outlook, April-June 1956, Fishery Leaflet 336bb, issued by the U. S. Fish and Wildlife Service on April 16.

While some fishing is done in every month of the year, the big harvest begins in the second quarter with several major fisheries reaching peak production during that period.

The North Pacific halibut fishermen begin their season in May and expect to be at peak production by the end of June. Prices probably will be a little higher on the new catch because of light stocks. Salmon are being landed now, but early landings were light as usual for the time of year. The trolling season in Washington and Oregon began April 15. Troll-caught salmon in Alaska find a ready market also.

Good seasonal supplies of fresh mackerel, whiting, bluefish, sea bass, shad, scup, striped bass, mullet, red snapper, and haddock will be available at their usual markets at prices dependent upon local supply situations.

Production of shrimp will also increase with a steady market and good demand expected.

COMMERCIAL FISHERIES OUTLOOK

MARKETS



SUPPLY

DEMAND

April - June 1956

FISH AND WILDLIFE SERVICE
United States Department of the Interior
Washington, D. C.



Fishery Leaflet 336 bb



Fresh-water fish landings of bullheads, catfish, buffalofish, carp, smelt, whitefish, yellow pike, and others will be at about the usual level for this time of year. The market for shellfish is generally steady, supplies ample, and demand good.

Cold-storage holdings of salmon are down in the United States and Canada, the demand is good, and prices will probably remain above normal. Canned salmon supplies are practically exhausted and the demand far exceeds the supply. Canning of salmon in Bristol Bay, Alaska, will start June 25.

The tuna industry is getting off to a good start. Domestic landings in the first quarter were nearly twice the landings of the like quarter in 1955 but some of this increase was due to delayed unloadings. Albacore, or white-meat tuna, continues in short supply. However, other kinds of tuna are plentiful. Demand is usually good in the summer.

The Maine sardine packing season began April 15. A better pack is expected than in 1955.

Menhaden landings will reach a peak in the South Atlantic and Gulf States area during the quarter and the demand for fish meal and oil is expected to continue strong.

Fish-stick and other packaged fish and shellfish producers will be attempting to expand markets by overcoming price competition which has hampered promotional efforts.



Marketing Prospects for Edible Fishery Products, Spring-Summer 1956

Total supplies of edible fishery products were expected to continue somewhat lower this spring than last, particularly for the canned commodities. Retail prices for fishery products this spring were expected to average a little higher than a year earlier.

Supplies of fresh and frozen fishery products were expected to increase during the summer months as commercial fishing operations expanded seasonally. Total commercial freezings of fish and shellfish probably were expected to reach a peak between late spring and midsummer. Imports of frozen groundfish (including ocean perch) fillets and blocks were expected to continue larger than a year earlier through the summer.

The smaller supplies of canned fishery products this spring than last reflect smaller 1955 packs of salmon and Maine sardines than in 1954. There was no likelihood of much improvement in the canned fish supply situation at least until about midsummer, when the 1956 packs would start moving to market in volume. Except for tuna, the production season for the important canned products is from late spring until about midfall. Tuna is canned the year round. It is still too early to forecast the size of the 1956 canned fish pack because of the great uncertainty as to the availability of fish during the canning season.

Civilian per capita consumption of fishery products this spring and early summer probably would be a little lower than a year earlier. This was expected to reflect mainly the lower supplies and somewhat higher prices in prospect.

This analysis appeared in a report prepared by the Agricultural Marketing Service, U. S. Department of Agriculture, in cooperation with the U. S. Fish and Wildlife Service, and published in the former agency's May 1, 1956, release of The National Food Situation (NFS-76).



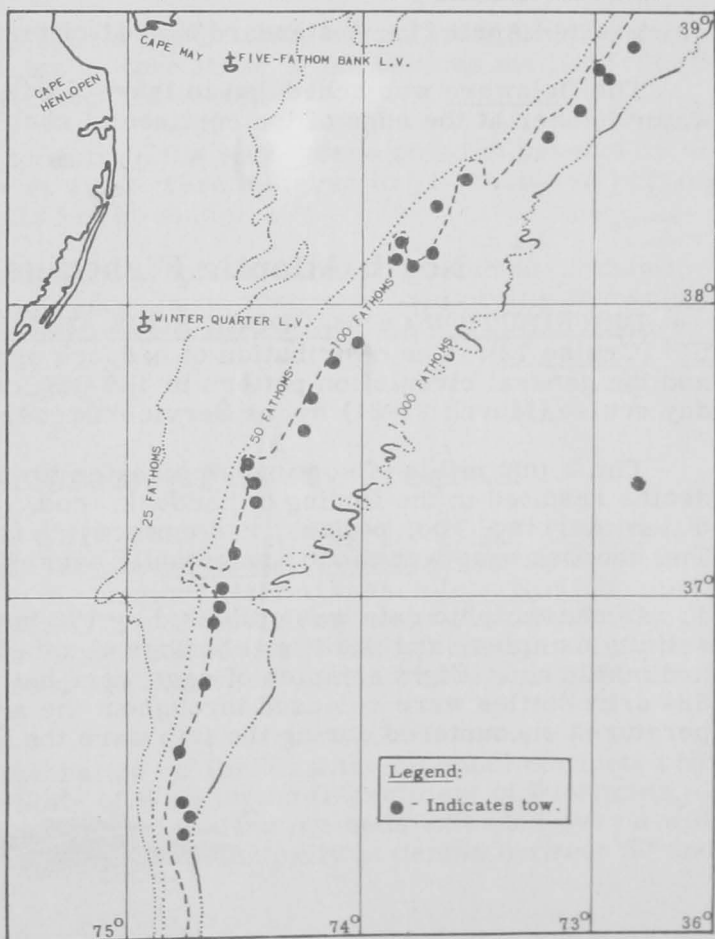
North Atlantic Fisheries Exploration and Gear Research

FISHERIES RESOURCES ON EDGE OF CONTINENTAL SHELF SURVEYED BY "DELAWARE" (Cruise 17): The Service's exploratory fishing vessel Delaware returned on March 30 from a survey of the fishery resources in deep water on the edge of the Continental Shelf offshore from New Jersey to Virginia (see chart). Large schools of spiny dogfish (Squalus acanthias) were encountered on the 11-day trip, with the largest single tow yielding close to 12,000 pounds.

Common lobsters (Homarus americanus) were found to be widely distributed over the area surveyed, but were not caught in large quantities. Other varieties taken during the trip included the deep-water red crab (Geryon sp.), white hake (Urophycis tenuis), and whiting (Merluccius sp.)

The vessel made 27 tows with a standard No. 41 otter trawl equipped with 20-fathom ground cables and 45 feet of rollers. All tows were of one hour duration; 1½ days were lost due to stormy weather.

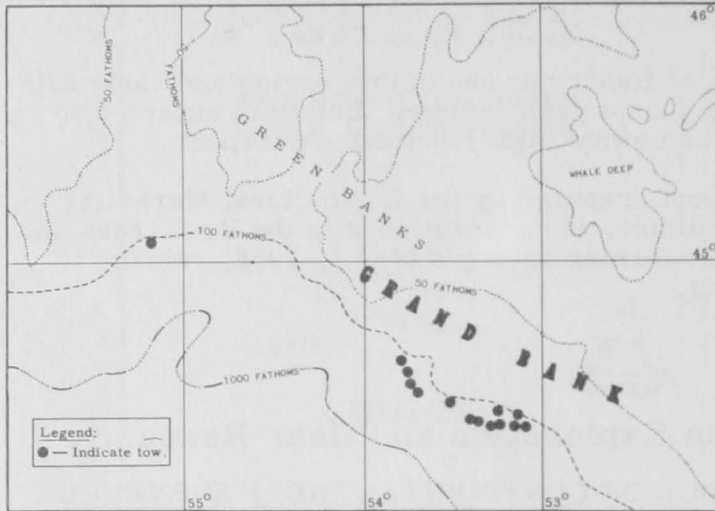
The Delaware is scheduled to leave its East Boston base on April 9 to continue the survey of the deep-water fishery resources on



The area surveyed by the Service's exploratory fishing vessel Delaware (Cruise 17).

the edge of the Continental Shelf. The area to be surveyed will be near the Grand Banks, south of Newfoundland.

OCEAN PERCH EXPLORATORY FISHING ON GRAND BANK BY "DELAWARE"
(Cruise 18): A total of 25,724 pounds of ocean perch (*Sebastes marinus*) was taken



M/V Delaware, Cruise 18, April 9-21, 1956.

on the western edge of Grand Bank during Cruise 18 of the Service's exploratory fishing vessel Delaware. The fish was taken in the 150- to 400-fathom depth range, with the largest single one-hour catch amounting to 5,052 pounds. Contrary to expectations, the ocean perch taken were of very small size, ranging from 0.6 to 1.1 pounds in weight. Previous cruises in the Sable Island area, to the westward, had yielded ocean perch two to three times as large from deep water.

High wind and snow permitted completion of only 14 tows in deep water during the 13-day cruise,

which ended April 21. A standard No. 41 otter trawl was used.

The Delaware was scheduled to leave April 30 to continue exploration for deep-water lobster at the edge of the continental shelf.



North Atlantic Fisheries Investigations

DISTRIBUTION OF HADDOCK EGGS AND LARVAE STUDIED BY "ALBATROSS III" (Cruise 72): The distribution of haddock eggs, larvae, temperature and salinity, and the general circulation pattern in the Gulf of Maine were studied during a ten-day cruise (March 21-31) by the Service's research vessel Albatross III.

The 2,000 miles of continuous plankton tows at the surface and at ten-meter depths resulted in the finding of haddock, cod, gray sole, and sea dab eggs. In addition, herring, cod, pollock, and ammodytes (sand lance) larvae were found. The haddock eggs were found principally over the southeast part of Georges Bank.

Oceanographic data was collected by 190 bathythermograph lowerings and 90 salinity samples, and additional biological data by 14 surface tows with the standard meter net. Eight samples of eggs were hatched for identification purposes and 624 drift bottles were released throughout the area of the cruise. The surface temperatures encountered during the trip were the lowest in recent years.



North Atlantic Herring Research

AERIAL SURVEYS OF MAINE HERRING SCHOOLS STARTED (Flight No. 1):

An aerial survey was made by the U. S. Fish & Wildlife Service of coastal waters from Eastport, Me., to Muscongus Bay. All bays, rivers, and inlets were thoroughly covered. The objectives of this survey were as follows:

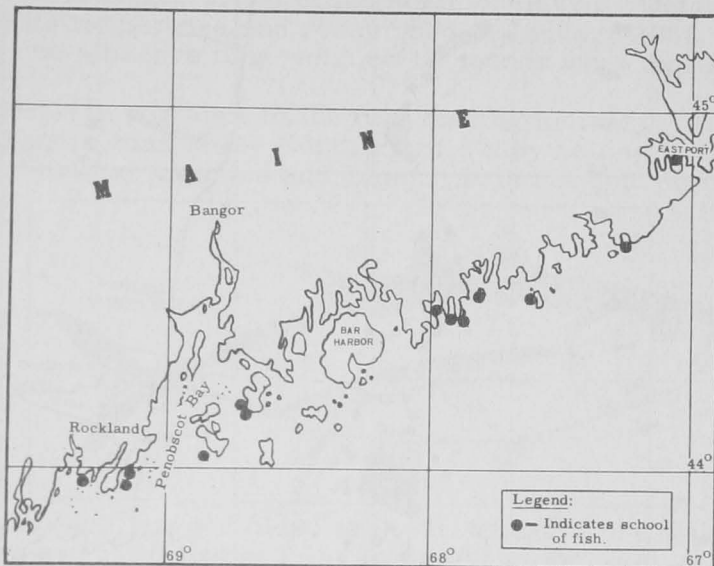
1. Locate any schools of herring present along the coast.
2. Evaluate the possibilities of this method of surveying as an aid to the research program on herring.

The aircraft used was a four-place Cessna 172. The survey was made in two flights from the Bar Harbor Airport. The first flight was from Bar Harbor to Eastport and return, and the second flight was from Bar Harbor to Muscongus Bay and re-

turn. It was planned to cover the coast from Muscongus Bay to Portland on a third flight, but unfavorable weather prevented this. Movies and still pictures were made of the various methods of constructing and locating herring weirs along the coast.

Observable indications of fish schools in the water were noted at several localities shown on the accompanying chart which were believed to be schools of herring. However, positive identification could not be made.

Survey plans for 1956 call for the use of a seaplane for herring spotting, both in cooperation with a Service surface fishing vessel and to assess the availability of herring in the inshore areas and to note the major school-group movements in the fishery.



Airplane Spotting Flight No. 1 for Maine herring.

North Pacific Exploratory Fishery Program

GOOD PINK SHRIMP CATCHES REPORTED BY "JOHN N. COBB" (Cruise 26):

Good catches of "cocktail-size" pink shrimp (Pandalus jordani) were made off the coast of Washington by the Service's exploratory fishing vessel John N. Cobb during a four-week cruise which ended on April 20. Best fishing areas yielded shrimp at the rate of 2,000 pounds per hour off Grays Harbor, and fairly consistent catches of 500 pounds or more per hour were made in several areas with a Gulf of Mexico shrimp trawl.

This was the second shrimp exploration off the Washington coast conducted by the Service in cooperation with the State of Washington Department of Fisheries. The first trip in the fall of 1955 revealed that the shrimp beds extended over a wide area from off Willapa Bay to off Cape Johnson principally at depths between 50 and 100 fathoms.

The second trip showed excellent prospects for development of a commercial shrimp fishery off the Grays Harbor area. Most productive depths were from 65

to 85 fathoms both north and south of the entrance to Grays Harbor on green mud bottom. In order to test commercial possibilities in one of the better areas, the

John N. Cobb made a series of "production" drags over a 6-hour period approximately 26 miles true west of Copalis Head on April 18. From 6 a. m. to noon, seven 30-minute drags at 74 to 79 fathoms produced a total of 5,210 pounds of shrimp. Random samples from these catches ranged from 110 to 122 whole (heads-on) shrimp a pound.

A total of 94 drags, mostly of one-hour duration, were completed during the trip at depths of 48 to 138 fathoms from off Long Beach to Destruction Island: 51 drags were made with a 40-foot Gulf of Mexico shrimp trawl having a 1½-inch mesh cod end, 39 with a 20-foot beam trawl, and 4 with a small-mesh Western otter trawl.

The Gulf shrimp trawl, used for the first time in this region as far as is known, proved to be from two to three times as efficient as the beam trawl. The gear caught only small amounts of fish, mostly species not considered as food fish, such as skates, ratfish,

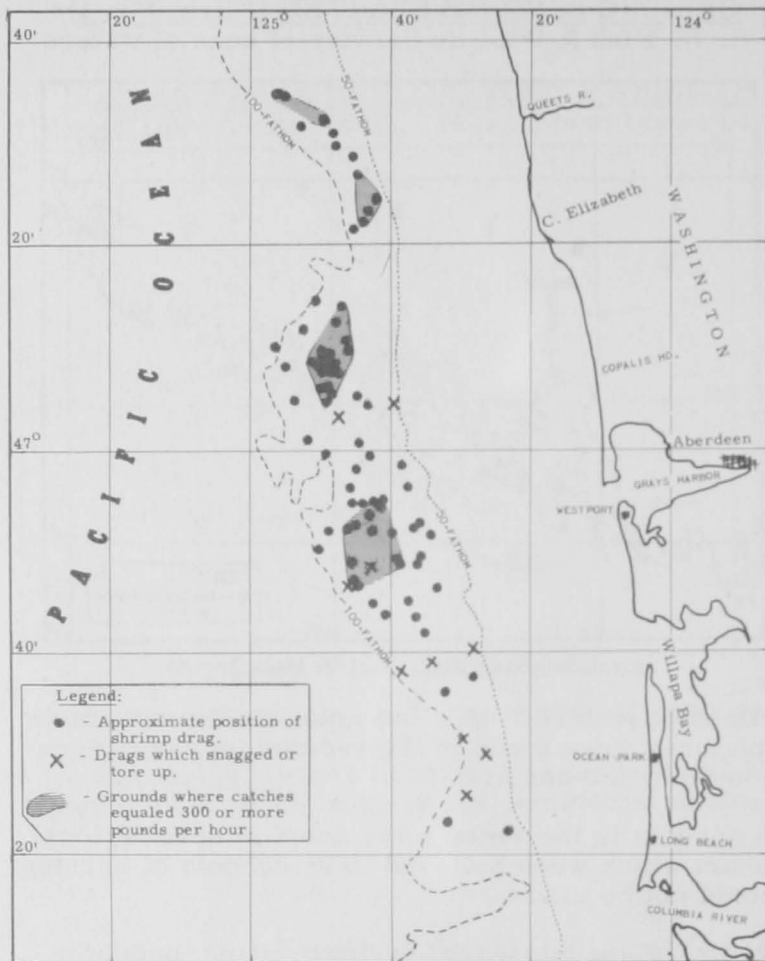
turbot, etc. The Gulf trawl was fished from one trawling cable on a 25-fathom bridle, a method easily adaptable to small commercial vessels in the 50- to 60-foot class.

Night fishing on two different occasions resulted in very small catches on identical grounds where good shrimp catches were made during the day.

An experiment in holding the fresh whole pink shrimp on ice was carried out aboard the John N. Cobb over a 6-day period. Although final technological tests are not yet completed, preliminary examination indicates that the shrimp can be held several days on ice with no apparent damage to the meat. The fresh shrimp peeled easily after being held in ice at least 24 hours.

A biologist from the Shellfish Division of the Washington State Department of Fisheries participated in the cruise, and numerous samples of shrimp were frozen for biological analysis at the State laboratory at Aberdeen.

One commercial vessel out of Westport started to fish the shrimp grounds and had boated several catches before the John N. Cobb left the area.



M/V John N. Cobb, Cruise No. 26 (March-April 1956).

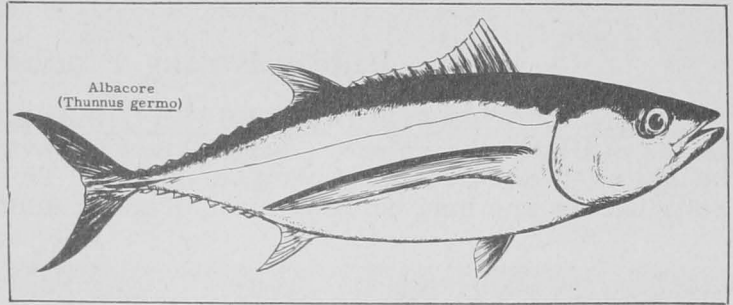


Pacific Oceanic Fishery Investigations

TAGGED ALBACORE TUNA RECAPTURED AFTER LONG MIGRATION: The fact that albacore tuna range over vast distances in the Pacific was proven by the recapture of a 40-pound albacore tuna tagged 1,300 miles north of Hawaii, October 5, 1954, by the U. S. Fish and Wildlife Service and recaptured in January 1956 near Japan, 2,370 miles away. The albacore tuna weighed 15 pounds when tagged.

The recovery may be of extreme importance to the tuna fishing industry. It is additional evidence that the albacore tuna of the North Pacific may belong to a single population which migrates between America and Japan. It is not conclusive, however, because this is only the second instance in which an American tagged albacore has been taken in Japanese waters. The first such instance was about three years ago when an albacore tagged off the California coast was taken near Tokyo.

It was also reported that another tagged tuna had been recaptured. This one, a 7-pound skipjack, tagged close to the Hawaiian shore was taken 252 days later only 30 miles away. It had doubled in weight in the interim.



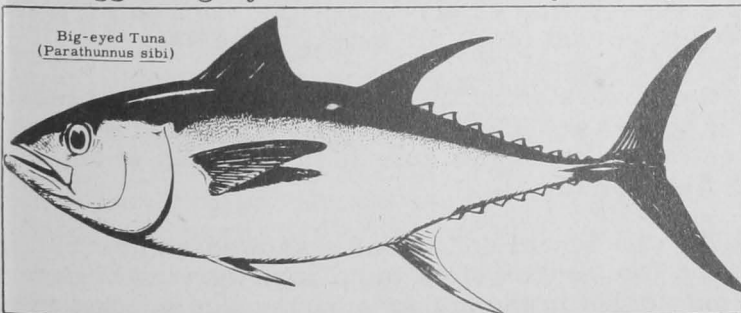
The tuna migration study is one of many being conducted by the Pacific Oceanic Fishery Investigations unit of the U. S. Fish and Wildlife Service. Its purpose is to find out as much as possible about the life history of the fish so as to be able to predict abundance, probable best fishing seasons and locations, and to get other information which will aid the industry to develop new high-seas fisheries.

Fishing for the albacore, which has the whitest meat of all tunas, is a valuable segment of the tuna industry. However, its variations in time and place of appearance along the North American coast presents commercial albacore fishermen with more than the usual number of problems. There are several thousand tagged albacore in the Pacific Ocean now and Service scientists hope that tuna migrations will be clearly defined in the future.

SECOND TAGGED BIG-EYED TUNA RECAPTURED: The recapture of a second tagged big-eyed tuna was made by the Japanese long-liner Shoyu Maryu on February 3, 1956, near 25° N. latitude and 177° E. longitude. The tuna was one of three fish tagged and released on January 31, 1955, by one of the Pacific Oceanic Fishery Investigations research vessels at 30° 59' N. latitude and 171° 14' W. longitude (about 400 miles NE. of Midway Island). During the course of the 12 months and three days that the big-eyed

tuna was in the water, it had traveled nearly 750 miles in a southwesterly direction and gained 35 pounds in weight. The first recovery (also tagged on January 31, 1955) was made by the Japanese long-liner Nikkon Maru on November 24, 1955, about 800 miles east of the release point and the fish had gained about 10 pounds in weight.

Note: See Commercial Fisheries Review, February 1956, p. 25.



STUDY OF LONG-LINE SHARK CATCH COMPLETED: A study of the catch per unit of effort for long-line-caught sharks made during cruises of the Pacific Oceanic Fishery Investigations research vessels was completed in March 1956. The analysis of the data, seasonally and geographically, indicates that of the six species captured most frequently, two (the white-tip and brown) are equatorial and moderately abundant, one (the bonito shark) is wide-ranging but uncommon, another (the great blue shark) is wide-ranging and very abundant in cold water, a fifth (mackerel shark) is limited to cold water, while a sixth variety (thresher shark) may have longitudinal restrictions.



Public Eating Places Survey

MENU PRICES FOR DINNERS IN PUBLIC EATING PLACES: In almost two-thirds of United States public eating places serving fish and shellfish, the dinners bought most often cost less than one dollar. This fact will be of interest to fish distributors who may note that restaurants customarily don't spend more than 20

percent of the plate or menu price for the major ingredient. About 22 percent of the establishments indicated that the dinners they sold most often were priced between \$1 and \$2. Relatively few (less than 8 percent) of the establishments sold more dinners priced at \$2 or over than any other price category. These figures are based on a scientific sample survey of approximately 4,500 public eating places. For the nation as a whole, 65 percent of the restaurants as compared with 91 percent of the cafeterias sell dinners of less than \$1 more often than dinners of over \$1.



This price category for dinners was reported by 41 percent of the hotel eating places as compared to a national average of 7 percent of all the establishments.

Regionally, the distribution of responses as to the price of dinner bought most often varies only slightly except in the West. The West, when compared with the other regions, included proportionately more restaurants and cafeterias which sold the higher-priced dinners between \$1 and \$4.

Public eating places when grouped by annual dollar sales showed an interesting relationship between annual sales and the number of eating places serving higher-priced dinners. Restaurants and cafeterias in the higher annual sales bracket reported the expensive dinners more often.

This study on the consumer's cost of dinners bought most often is one part of a broader study of fish and shellfish consumption characteristics in public eating

places. The Fish and Wildlife Service contracted with the Bureau of the Census to conduct the survey with funds provided by the Saltonstall-Kennedy Act of 1954.

Percentage of Public Eating Places Serving Fish and Shellfish in the United States by Menu Price of Dinners Bought Most Often

	Total		Menu Cost of Dinners						
			Less Than \$1	\$1-\$2	\$2-\$4	Over \$4	More Than One Dining Facility	No Dinners Served	No Answer
	No.	%	%	%	%	%	%	%	%
United States total	208,100	100.0	62.3	21.9	7.1	0.5	0.8	5.4	2.0
Region:									
Northeast	68,000	100.0	62.0	22.1	8.7	0.7	1.0	4.0	1.5
North Central	59,700	100.0	66.5	19.4	5.9	0.2	0.5	4.7	2.8
South	45,900	100.0	67.3	19.1	3.7	0.4	0.4	7.6	1.5
West	34,500	100.0	49.0	29.9	10.7	0.9	1.2	6.3	2.0
Type of Establishment:									
Restaurants	105,700	100.0	65.5	26.5	6.2	0.6	0.2	0.4	0.6
Cafeterias	4,300	100.0	90.7	7.0	-	-	-	2.3	-
Restaurants or cafeterias in hotels	15,300	100.0	13.7	30.7	41.2	2.6	7.2	2.0	2.6
Drug or proprietary stores with fountain	9,800	100.0	81.6	3.1	-	-	2.0	8.2	5.1
Other ^{1/}	73,000	100.0	63.8	16.8	2.6	0.1	0.1	13.0	3.6
City Size--Population:									
500,000 or more	42,600	100.0	64.8	18.8	8.7	1.4	1.6	2.1	2.6
100,000 to 499,999	26,100	100.0	71.3	11.5	6.9	0.4	2.3	3.8	3.8
25,000 to 99,999	27,400	100.0	65.0	17.5	6.6	0.7	0.4	9.5	0.3
2,500 to 24,999	39,900	100.0	65.2	24.6	3.5	-	0.2	4.5	2.0
Less than 2,500	72,100	100.0	55.1	27.7	8.5	0.3	0.1	6.8	1.5
Annual Sales:									
\$100,000 or more	15,200	100.0	22.4	30.3	37.5	3.9	4.6	1.3	-
\$40,000 to \$99,999	24,800	100.0	48.8	33.9	11.3	0.8	0.4	3.6	1.2
\$10,000 to \$39,999	62,600	100.0	68.7	22.8	4.6	0.2	0.3	1.6	1.8
Less than \$10,000	91,600	100.0	69.3	17.0	2.6	-	0.5	8.6	2.0
No reply	13,900	100.0	55.4	19.4	7.2	1.4	1.4	8.7	6.5

^{1/} Includes drinking places, lunch counters, and refreshment stands.
 Note: The data are a projection based on the probability sampling of 4,500 public eating places.
 Note: Also see *Commercial Fisheries Review*, February 1956, pp. 31-33.

POPULARITY OF FISH AND SHELLFISH IN PUBLIC EATING PLACES: Canned tuna was found to be the most popular fish in restaurants, cafeterias, and other public eating places in the United States and shrimp the most popular shellfish.

According to the recent U. S. Fish and Wildlife Service sample survey, tuna was served as the most popular species in 43,000 establishments out of 190,000 serving fish. Halibut vied with flounder for second place, while haddock, salmon, cod, ocean perch, pike, and catfish followed in popularity in the order given.

Shrimp was sold as the most popular shellfish in 112,000, or over 80 percent, of the 134,000 public eating places serving shellfish. Oysters were next in sales with scallops and lobsters a close third and fourth. Crabs and clams followed in fifth and sixth place.



The findings mentioned are based on a statistical sample of the number of establishments reporting their three most-often-sold species of fish and their three leading species of shellfish.

Species	United States	Northeast	North Central	South ^{2/}	West ^{2/}
Fish:					
Tuna	1	1	9	10	3
Flounder	2	2	-	3	4
Halibut	3	4	8	-	1
Haddock	4	3	3	6	-
Salmon	5	5	7	9	2
Cod	6	6	6	4	5
Ocean perch	7	-	1	5	-
Pike	8	8	2	-	-
Catfish	9	-	4	1	-
Swordfish	10	7	-	-	9
Yellow perch	11	-	5	-	-
Sea bass	12	-	-	8	7
Sea trout	13	-	-	2	-
Whitefish	14	-	10	-	-
Red snapper	15	-	-	7	-
Fish sticks ^{3/}	16	-	-	-	10
Lake trout	17	-	11	-	-
Scup	18	9	-	-	-
Whiting (Jack salmon)	19	-	-	13	-
Sardines	20	10	-	-	-
Brook trout	21	-	-	-	6
Spanish mackerel	22	-	-	12	-
Bluefish	23	11	-	-	-
Shellfish:					
Shrimp	1	1	1	1	1
Oysters	2	6	2	2	2
Scallops	3	2	4	5	5
Lobsters	4	3	3	4	4
Crabs	5	5	-	3	3
Clams	6	4	-	-	6
Abalone	7	-	-	-	7

^{1/} Ranking is based on total number of establishments reporting a species most often sold as either first, second, or third choice.
^{2/} Mullet ranked 11th in the South; rock cod ranked 8th in the West.
^{3/} Includes more than one species of fish.
 Note: The data are a projection based on the probability sampling of 4,500 public eating places.

Differences in the rankings of the species of fish on a regional basis are most striking. Tuna ranked first in the Northeast region, but dropped to ninth, tenth, and third place in the North Central, South, and Western regions, respectively. The more frequent sale of tuna in the Northeast region may be due to the larger proportion of drug stores, drinking places, lunch counters, and refreshment stands which normally serve tuna in salads and sandwiches. Flounder ranked second, third, and fourth in the Northeast, South, and West, respectively, but was insignificant in the North Central region. Halibut ranked first in the West and fourth and eighth in the Northeast and North Central, respectively,

but was not among the leaders in the South. Haddock was in third place in the Northeast and North Central, sixth in the South, but was not ranked among the leaders in the West. Salmon was second in the West and fifth, seventh, and ninth in the Northeast, North Central, and South, respectively. The ranking of cod was more uniform. It ranked fourth in the South, fifth in the West, and sixth in both the Northeast and North Central.

Shrimp outdistanced by a wide margin all other species of shellfish in the four regions in popularity. Oysters are the second most-often-sold shellfish in the North Central, South, and West, but, oddly enough, in sixth place in the Northeast. Scallops ranked second in the Northeast, fourth in the North Central, and fifth in both the South and West. Lobsters ranked third in the Northeast and North Central and fourth in the South and West. Crabs claimed third place in the South and West, fifth in the Northeast, and unranked in the North Central.

The U. S. Fish and Wildlife Service contracted with the Bureau of the Census to conduct the survey with funds provided by the Saltonstall-Kennedy Act of 1954.



Saltonstall-Kennedy Act Fisheries Projects

EFFECT OF LOGGING AND SEA LIONS AND HAIR SEALS ON ALASKA FISHERIES TO BE STUDIED: The effect which Alaska's new industry, logging for pulp production, will have upon its old industry, salmon fishing, will be the object of a special study, the Acting Secretary of the Interior announced March 22. The study will be made by the Fisheries Research Institute of the University of Washington under a contract signed by the U. S. Fish and Wildlife Service. The one-year contract provides for an expenditure of \$35,000.

It was also announced that the Fisheries Research Institute would make a study of the effect of Alaska sea lions and hair seals on the salmon and halibut fisheries. This contract is for \$20,000 and provides for a year's study.

Large-scale logging operations in the huge stands of virgin timber in Alaska are just beginning and the Service is concerned about any possible damage to salmon streams. As a result, the Service is seeking ways to protect the fishery against harmful effects which might occur. A field station is being established near Ketchikan and detailed observations will be made of biological and physical changes resulting from the logging. Of particular interest will be the extent of silting in the stream bed and any changes in salmon runs and the success of spawning.

The damaging effect which the big sea lions and the hair seals have upon fishing gear in those northern waters is well known to the fishing industry, but the general effects on fisheries have not been measured. For some time these animals have been considered serious predators on salmon and halibut, but to what extent is not known. The U. S. Fish and Wildlife Service is asking that special attention be given to the locations of the rookeries of these animals, the total populations, the trend in populations, and the food habits.

The results of this study will be related to the findings of other studies on hair seal and sea lions made by the Institute.



Sea lions on breeding grounds about 2 weeks after height of breeding season.

These research projects are financed by the Saltonstall-Kennedy Act of 1954 which provides for the development of fisheries and markets for fishery products.



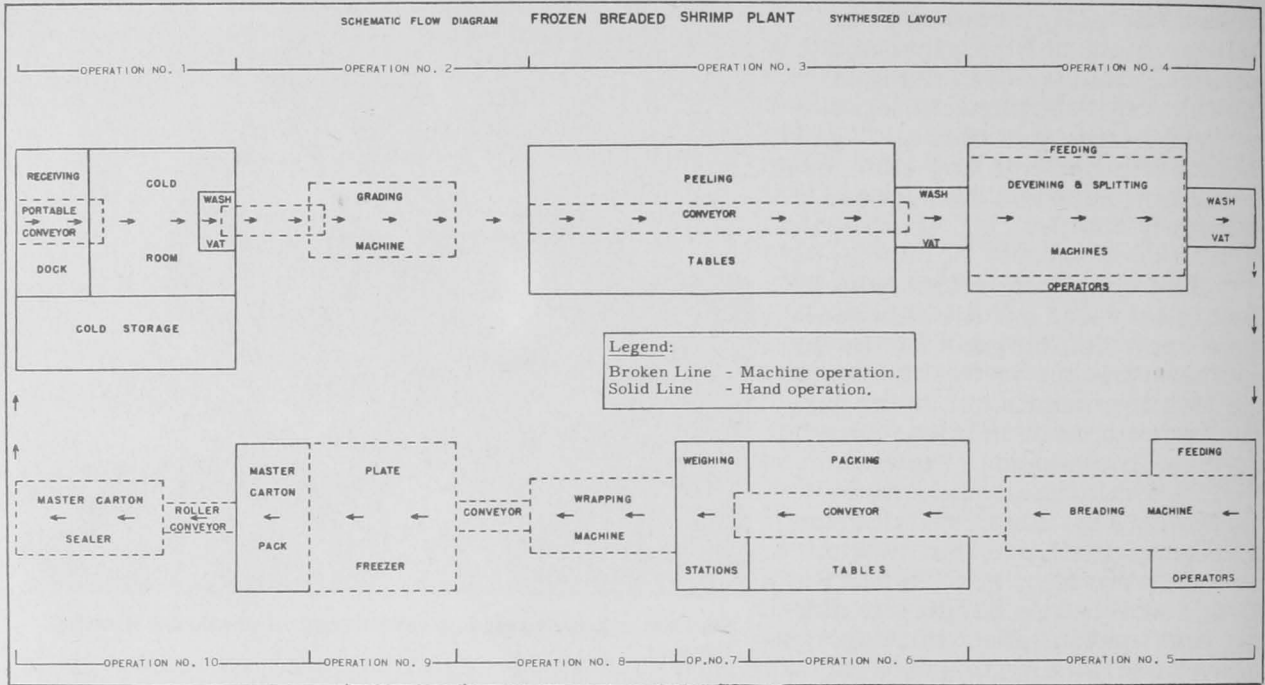
Shrimp

BREADED SHRIMP PLANT ENGINEERING SURVEY: Considerable savings in breaded shrimp production costs may be made by reorganizing plant layout using the existing facilities, according to a plant engineering survey in Florida and Georgia, made by the First Research Corporation of Miami, Fla., under the supervision of the U. S. Fish and Wildlife Service. The survey was financed by funds provided by the Saltonstall-Kennedy Act of 1954 to help the domestic fishing industry.

In a study of typical shrimp breading and freezing plants in Florida and Georgia, the plant engineering specialists found that all of the plants may have an opportunity to cut production costs by certain improvements in the arrangement of existing plant equipment. Almost without exception, rearrangement of the plant layout within the space available could offer labor savings through the reduction of transport which was considered excessive in some cases.

The man-hours expended in various operations were measured and compared by the engineers. A synthesized plan for a plant layout was developed for maximum efficiency using equipment and machinery in common use in the industry.

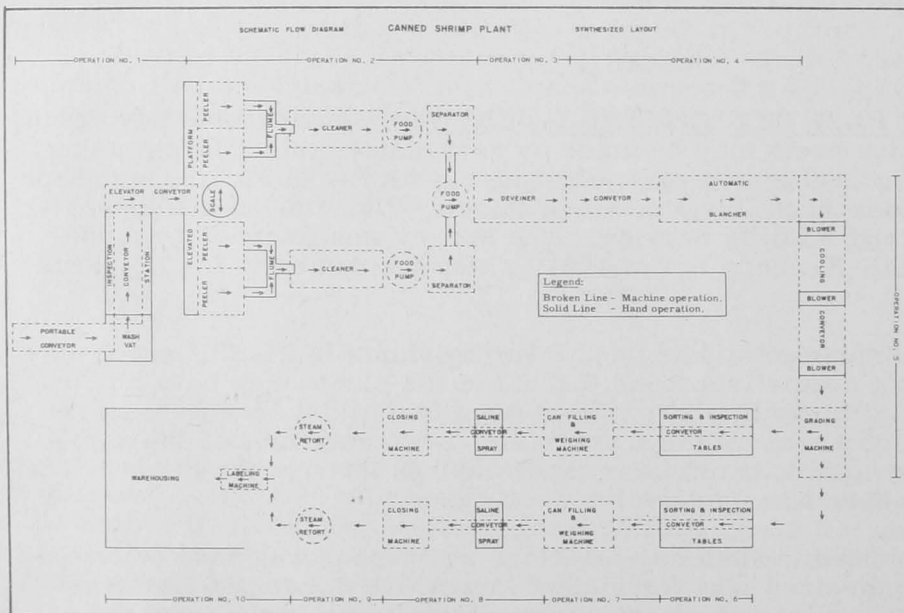
This plan may be adjusted to the particular needs of the individual enterprise. In many cases the adoption of only some phase of the synthesized layout plan may offer real savings in man-hour costs.



Model engineering layout plan of a frozen breaded shrimp plant.

SHRIMP CANNERY COST-CUTTING OPPORTUNITIES: Canned shrimp plants are the most highly mechanized segment of the shrimp industry. Nevertheless, it is reported that about 85 percent of the total man-hours required to pack canned shrimp consist of hand operations. Opportunities may exist in the shrimp canneries to cut labor costs

by saving man-hour losses created by crossover and backtracking in product flow, according to a survey made in Louisiana by industrial engineers of the First Research Corporation, Miami, Fla., under the supervision of the U. S. Fish and Wildlife Service. The survey was financed by the Saltonstall-Kennedy Act of 1954.



Model engineering layout plan of a canned shrimp plant.

Shrimp canners use proven machinery wherever possible in the production line, but recognize the need

for further refinement of their mechanized equipment, according to the engineers of the First Research Corporation. The automatic peeling machines and automatic deveining machines introduced in recent years have greatly reduced manpower requirements. However, satisfactory machinery to perform sorting and inspection operations may be needed.

In connection with the survey, the industrial engineers developed a cannery layout plan for maximum efficiency using equipment and machinery now in common use in the industry. In many cases, the adoption of only some phase of the synthesized layout plan may offer real savings in man-hour costs.

A detailed description of the advantages of the model plan is available from the U. S. Fish and Wildlife Service, Washington, D. C.

STUDY OF FUEL CONSUMPTION BY GULF SHRIMP FLEET: Fuel consumption is one of the leading cost factors in vessel operation. Moreover, as compared

with such fixed expenses as insurance, depreciation, licenses, and interest charges, it is one of the few costs over which vessel operators have some degree of control. Fuel consumption for five shrimp vessels based in Key West and fishing the Tortugas grounds in 1954 ranged from 57.4 gallons of Diesel fuel per day to 76.2 gallons. However, the same figures expressed in terms of the vessel's shrimp catch ranged only from 0.32 gallons per pound of shrimp caught to 0.37 gallons per pound.



Typical offshore trawlers tied to the dock at Morgan City, La.

The figures for Brownsville, Tex., expressed in terms of shrimp catch ranged from 0.3 gallons per pound of shrimp caught to 0.48 gallons. The fuel consumption for Biloxi, Miss., expressed in terms of the vessel's shrimp catch ranged from 0.22 gallons per pound of shrimp caught to 0.29 gallons.

Fuel Consumption On Shrimp Vessels: Annual, Per Day, and Per Pound of Shrimp Caught, 1954

Vessel	Tonnage		Dimensions in Feet			Year Built	Engine		Net		Jan.-Dec. 1954 Gallons of Fuel			Fishing Grounds
	Gross	Net	Length	Breadth	Depth		Type	hp.	Size	Type	Total	Per Day	Per Lb. of Shrimp Caught	
Key West, Florida														
A	26	11	44.8	16.0	6.3	1946	D.	165	62'	SB.	16,679	76.2	.37	Tortugas
B	22	8	41.1	14.2	5.9	1948	D.	110	62'	SB.	12,413	57.4	.35	
C	28	11	46.1	16.2	5.4	1943	D.	100	62'	SB.	14,792	65.4	.35	
D	21	8	41.8	14.7	6.3	1947	G.	165	62'	SB.	12,254	61.9	.33	
E	48	33	52.8	15.9	8.3	1953	D.	165	65'	SB.	15,887	68.7	.32	
F	65	29	61.6	18.4	8.4	1953	D.	165	65'	SB.	9,430	134.8	1/1 .34	Campeche
G	63	28	58.7	18.5	8.2	1952	D.	120	65'	SB.	8,602	108.8	1/1 .28	
Biloxi, Mississippi														
H	18	11	42.5	14.3	4.4	1944	D.	110	55'	B.	12,481	51.8	.29	Delta
I	49	33	57.1	17.6	6.4	1943	D.	120	64'	B.	16,032	61.2	.28	
J	22	14	48.2	15.7	4.3	1942	D.	77	52'	B.	10,780	42.4	.23	
K	16	10	42.9	14.3	4.5	1945	D.	83	56'	B.	8,551	41.9	.22	
Brownsville, Texas														
L	53	23	59.9	18.5	6.9	1951	D.	120	86'	F.	25,717	137.9	.48	Off Brownsville
M	57	25	54.2	18.9	8.2	1950	D.	120	86'	F.	27,458	131.4	.43	
N	57	23	59.5	17.9	7.7	1951	D.	120	86'	F.	27,822	115.9	.33	
O	57	23	59.5	17.9	7.7	1951	D.	120	86'	F.	24,233	114.3	.30	
P ^{2/}	72	35	64.8	19.7	7.4	1952	D.	170	86'	F.	31,198	125.3	.30	
Q	73	34	66.9	19.0	9.2	1954	D.	330	110'	F.	17,000	204.8	1/1 .41	
R	73	34	66.9	19.0	9.2	1954	D.	330	110'	F.	17,000	204.8	1/1 .41	

^{1/} September through December only.

^{2/} Steel.

SB. - Semi balloon, B. - Balloon, F. - Flat, D. - Diesel, G. - Gas.

A rule-of-thumb method of fuel efficiency appraisal for a vessel operator is derived by dividing his annual catch by his annual fuel purchases. The table shows the results for vessels shrimping in the areas mentioned by various tonnages, dimensions, engine power, and by type and size of net. By selecting a vessel with about the same characteristics, an operator can estimate approximately his vessel's fuel consumption rate in relation to others in the shrimping industry. Such a comparison must, of course, take into consideration equal distances to fishing grounds.

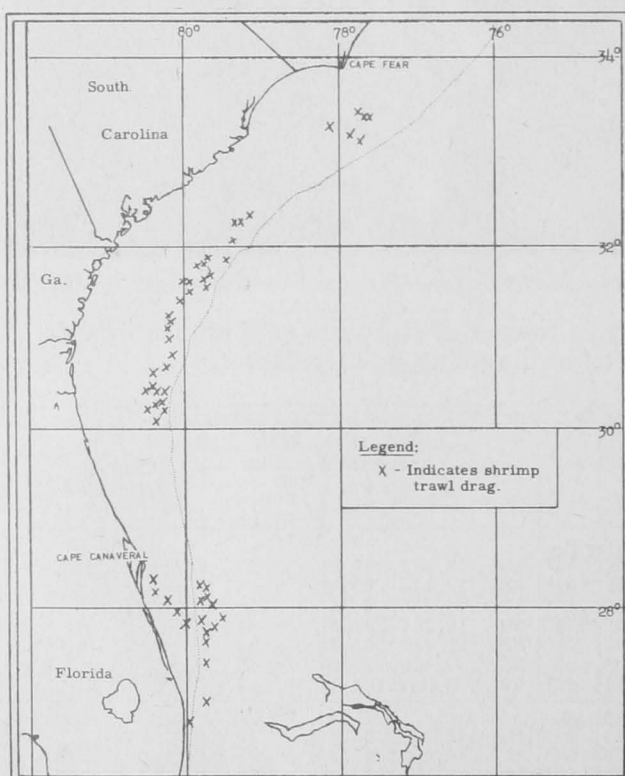
The fuel consumption study is one phase of the vessel efficiency study made by a contractor under the supervision of the U. S. Fish and Wildlife Service. The data are a part of a study to investigate important features of vessel design and construction, vessel productivity, and efficiency of navigational and fishing aids. The study was financed by funds made available by the Saltonstall-Kennedy Act of 1954 to help the domestic fishing industry.



South Atlantic Exploratory Fishery Program

EXPLORATORY SHRIMP CRUISES IN SOUTH ATLANTIC, MARCH 1956: Pelican (Cruise 1): The deep-water trawling phase of the Service's South Atlantic exploratory fishery program was initiated by the Pelican, a vessel chartered by the U. S. Fish and Wildlife Service. In a series of 15 deep-water trawling stations off

Ft. Pierce and Cape Canaveral, Fla., using a 40-foot flat shrimp trawls and a 10-foot beam trawl, large deep-water red shrimp (Hymenopenaeus robustus) were caught in all drags between 180 and 235 fathoms. Catches of shrimp ran from 5 to 20 pounds per 2-hour drag. A 4½-hour drag off Cape Canaveral using an 80-foot balloon trawl caught 125 pounds of red shrimp of mixed sizes, averaging 26-30 count heads off. Numerous problems were encountered in trying to trawl in the strong Gulf Stream current. Attempts to tow against or across the current were unsuccessful. Excellent trawling bottom was found between Ft. Pierce and Cape Canaveral, but on a drag southeast of Ft. Pierce the trawl hung up on a rock "ledge" and the vessel almost capsized before the trawling warp parted.



Shrimp Trawling Stations. M/V George M. Bowers (Cruise 2) and the M/V Pelican (Cruise 1) during March 1956.

A series of 5 drags were made in depths of 21 to 80 fathoms between Lake Worth and Cape Canaveral. One pound of 10-count mixed brown shrimp (Penaeus aztecus) and pink shrimp (P. duorarum) were caught in one-hour day and night drags in 21 fathoms southeast of Cape Canaveral.

George M. Bowers (Cruise 2): Exploration of the continental shelf area was continued during cruise 2 of the Service's George M. Bowers (March 6 to 25). Work during this period extended from St. Augustine to Wilmington, N.C. A total of 37 one-hour drags using a 40-foot flat trawl were made in depths of 14 to 45 fathoms.

Commercial shrimp species were caught in only two of these drags. Three individual brown shrimp were caught in 22 fathoms off Savannah, and $3\frac{1}{2}$ pounds of 10-count brown shrimp were caught in a one-hour drag in 40 fathoms off St. Augustine. Two 80-foot balloon trawl drags in this area were unsuccessful in reaching the bottom and fishing operations were discontinued due to bad weather.

Small quantities of rock shrimp (*Sicyonia brevirostris*) were caught in 17 of the 18 night drags and in 6 of the 15-day drags. Best catches ran about 15 pounds per hour.

Two species of commercially-valuable flounders were caught in most of the drags. *Paralichthys dentatus* (summer flounders), averaging $\frac{3}{4}$ of a pound, and *P. albigutta* (sand flounder), averaging about 1 pound, were caught at rates of 2 to 80 pounds per hour. In general, nonutilized fish catches at all stations were small with the exception of one drag at $31^{\circ}42.5'$ N. lat., $79^{\circ}37'$ W. long., in 36 fathoms, that caught 1,365 pounds of spot (*Leiostomus xanthurus*). These fish averaged about 3 or 4 to the pound.



South Carolina

SEED OYSTER EXPORT LAW PASSED: During March 1956 the South Carolina Legislature passed a law which makes it legal to cultivate seed oysters in South Carolina for export. The law, as set up, encourages the use of polluted grounds for seed purposes since the seed would be moved when very small. They would then have ample time to cleanse themselves before reaching marketable size. The new act specifies that oysters to be exported as seed may not be over $1\frac{1}{2}$ inches. The tax to ship seed oysters out of state has been established at 2 cents a bushel. There are several other provisions which will be of particular interest to possible seed growers in South Carolina. Commercial oystermen must continue to plant the same amount of cultch for market production as they have in the past. Only shells over and above that amount can be used for export.

The new law was to become effective upon the signature of the Governor of South Carolina. The Governor was expected to act on the legislation promptly. If so, it may be possible that some seed for export may be produced in the State during the summer season of 1956. Experimental shipments of seed oysters to various laboratories along the East Coast have already been made and the results of these plantings may determine if South Carolina seed will have a chance for growth and survival in out-of-state waters.



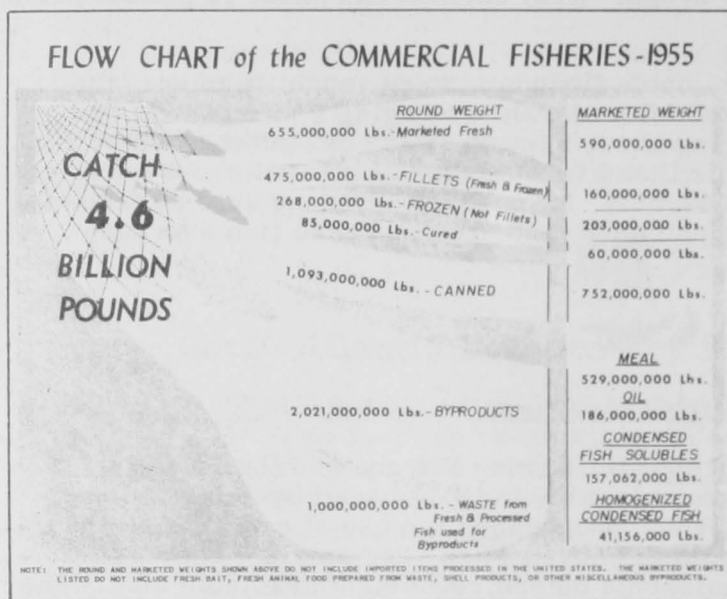
United States and Alaska

ECONOMIC DATA ON COMMERCIAL FISHERIES, 1955: It would take the income from a capital investment of \$10.5 billion dollars at 4 percent annual interest to maintain earnings equivalent to those obtained in the United States and Alaska commercial fisheries during 1955. This information is one part of a preliminary analysis of the 1955 fisheries made by the U. S. Fish and Wildlife Service.

Earnings, which in this instance include profit on the investment and the wages or commissions paid those who handle the fish in the various States, are estimated statistically as follows: At the boat side, 75 percent of the value of the catch at that point; at the processor level, 10 percent of the value at that stage; wholesale, 5.5 percent; retail, 8 percent.

The catch for 1955 was 4.6 billion pounds and the ex-vessel value was \$325,000,000. At the processor level the 1955 catch was worth \$548,000,000; at the wholesale level, \$775,000,000; and at the retail level, \$1,010,000,000. In all instances these are slightly below 1954 when the ex-vessel value of the catch was \$360,000,000.

There were 555,000 workers employed as the result of the activities of the fishing industry. Of these 153,000 were fishermen, 4,000 transporters, and 98,000 shore workers (which include those engaged in canning and other processing). There were 300,000 employed indirectly in such industries as gear manufacture, boat building, and manufacturing processing equipment. This is slightly less than the 568,394 employed in 1950 but considerably higher than the 428,965 in 1945.



American fishermen and businessmen had an investment with a replacement value of \$958,000,000 in the commercial fish business in 1955. This figure is an estimated replacement value based upon 1955 data which shows that boats and gear in the commercial fisheries represented an original investment of \$428,204,000; freezing and processing plants, \$215,649,000; wholesale facilities, \$193,475,000; and fish units in retail establishments, \$92,257,000.

There were 87,000 craft of all types engaged in the year's fishing. These included 11,000 vessels of five tons net and over; 48,000 motorboats, and 26,000 other boats, all engaged in fishing. In addition there were 2,000 boats used for transportation of fish and shellfish between the fishing grounds and the docks.

The Pacific Coast States had the highest number of processing plants, 148. Of these Washington led with 76, California second with 52, and Oregon next with 20. The South Atlantic and Gulf States were next with 131 plants, Louisiana having 53 and Mississippi 23. The New England States had 84, of which 63 were in Maine; the Middle Atlantic States had 46 with 20 in New Jersey and 16 in New York. There were 20 processing plants in the Mississippi Valley and Great Lakes regions, of which 11 were in Iowa. Alaska was far in front among areas outside the continental United States with 109; Puerto Rico and American Samoa had one each; and Hawaii 2. There were 400 plants in which fish were canned and 227 in which byproducts were processed. The total number of plants, with duplications excluded, was 579.

The monthly catch in 1955 hit its peak in July when 887,800,000 pounds of fish were taken. The April catch was 170 million pounds, and the December catch 271,400,000 pounds.

In value at ex-vessel the shrimp industry was at the top, a position it has held for several years. The 1955 value for shrimp was \$70,000,000. Tuna and salmon follow in that order.

The 1955 supply of canned sardines was considerably below that of 1954. Heavy reductions in the supply of canned salmon and more moderate reductions in canned tuna stocks were noted. There was a decrease also in the supply of groundfish fillets (including ocean perch). Slight increases were noted in the supplies of shrimp, canned crab meat, and northern lobsters.

San Pedro, Calif., retained its leadership of individual ports in pounds of fish landed (365 million) followed by Reedville, Va., with 305 million; Lewes, Del., with 274 million; and Gloucester, Mass., with 265 million pounds.

The breakdown of manufactured products for 1955 was not available at the time of the analysis, but the 1953 figures show that the \$585,995,000 value at the processor level was divided as follows: canned products, \$306,874,000; packaged shellfish, \$115,994,000; byproducts, \$74,372,000; packaged fish, \$52,163,000; cured fish, \$36,592,000. Since the estimated value of the 1955 catch at the processor level is \$548,000,000, the value of the various categories will probably be correspondingly less.

Fresh-water fishing in 1953 employed the most number of fisherman, 24,000; salmon was next with 21,000; then clamming with about 16,000; and shrimping fourth with 15,000. There were 14,000 engaged in taking oysters; other fisheries employed less than 9,000 each with the Maine herring fishery fifteenth on the list with only 1,050 workers.

Latest data on an area basis is for 1954 when the total American catch was 4,645,000,000 pounds, 45,000,000 pounds higher than the estimated catch for 1955. The data show the Atlantic and Gulf area most productive with 3,301,405,000 pounds, followed by the Pacific Coast States with 825,966,000, Alaska with 337,629,000 pounds, and the Great Lakes and Mississippi River fisheries with 180,000,000 pounds.

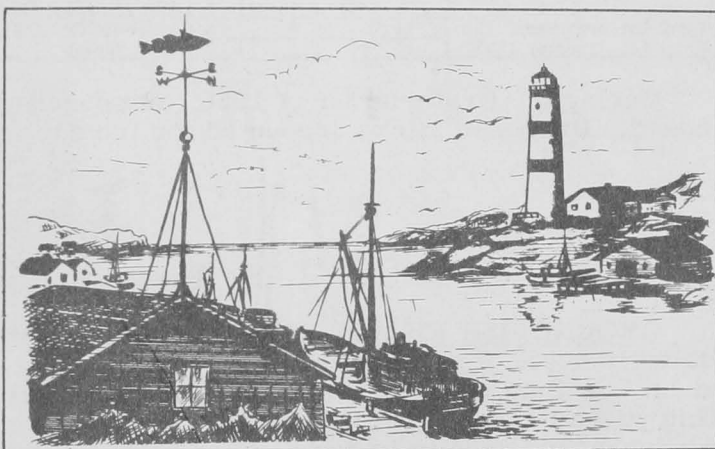
Imports of edible fishery products for 1954 totaled 803,369,000 pounds, compared with 725,195,000 in 1953 and 404,768,000 in 1945.



U. S. Canned Fish Production, 1955

California led the Nation in 1955 in the production of canned fish and in the manufacture of fishery byproducts, according to figures released April 5, 1956, by the U. S. Fish and Wildlife Service. The total value of these commodities was \$147.4 million, nearly 40 percent of the national total of \$386 million (value to the manufacturers).

Alaska was second with canned fish and byproducts valued at \$60 million. Washington was third with like commodities valued at \$26.5 million, with Oregon, Maine, and Louisiana grouped with outputs approximating \$21 million.



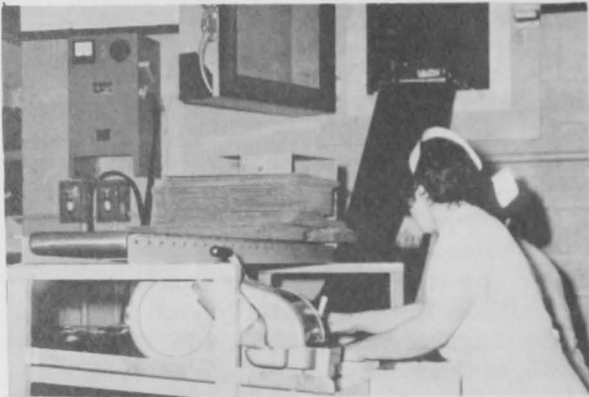
Nationwide there were 533 establishments engaged in canning fish and in the preparation of byproducts.

The value of the canned commodities was approximately \$303.6 million and that of the byproducts about \$82.5 million. The value of canned tuna and tunalike fish was \$125 million; salmon \$81 million; Pacific sardines \$10 million; and Maine sardines \$9 million. The value of canned shellfish was set at approximately \$38.5 million.

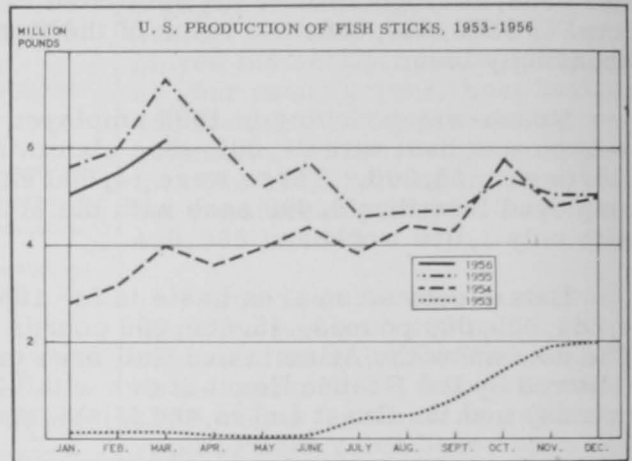


U. S. Fish Stick Production

JANUARY-MARCH 1956 PRODUCTION BELOW LAST YEAR: The United States production of fish sticks during the first three months of 1956 amounted to 16.6 million pounds, according to *Fish Stick Report, January-March 1956* (C. F. S. No. 1307) recently released by the U. S. Fish and Wildlife Service. This was 2.3 million pounds less than the quantity produced during the same period of 1955 but 1.2 million pounds more than the reported production for the last quarter of 1955.



Packing frozen packaged fish sticks into cartons as they come from the freezer on the conveyor system in a Boston plant.



A total of 5.0 million pounds of fish sticks was packed during January, 5.5 million pounds during February, and 6.1 million pounds during March. The largest quantity of fish sticks produced in a single month occurred during March 1955 when 7.4 million pounds were packed.

Table 1 - U. S. Production of Fish Sticks, January-March 1956

Month	Cooked Uncooked Total		
	.. (Million Pounds) . . .		
January	4.4	0.6	5.0
February	4.8	0.6	5.5
March	5.5	0.7	6.1
Total 1st. Quarter 1956	14.7	1.9	16.6
Total 1st. Quarter 1955	16.5	2.5	18.9

Table 2 - U. S. Fish Stick Production by Areas, Jan. - Mar. 1955-56

Area	January-March			
	1956		1955	
	Firms	Quantity	Firms	Quantity
Atlantic Coast States	27	13,060	33	15,591
Interior and Gulf States . . .	7	2,283	11	1,918
Pacific Coast States	10	1,259	15	1,440
Total	44	16,602	59	18,949

During the first quarter of 1956, 88 percent of the total production was pre-cooked. Uncooked sticks accounted for the remaining 12 percent.



U. S. Foreign Trade

GROUND FISH FILLET IMPORTS DROP 19 PERCENT IN MARCH 1956: United States imports of groundfish (including ocean perch) fillets during March 1956 totaled 11.7 million pounds, compared with 14.5 million pounds in March of last year. This was a decrease of 19 percent. The major cause for the decline was a 2.0-million-pound drop in imports of groundfish fillets from Canada. Smaller decreases were also noted for Iceland, Denmark, the United Kingdom, and Netherlands. Imports of groundfish fillets from Norway and West Germany were somewhat higher during March of this year than during the same month in 1955.

Canada again led all other countries exporting groundfish fillets to the United States with 6.4 million pounds in March 1956--54 percent of the total groundfish fillet imports during the month. Iceland was in second place with 4.3 million pounds.

Total groundfish fillet imports into the United States during the first quarter of 1956 amounted to 38.2 million pounds. This was 6 percent more than the quantity imported during the corresponding period of 1955. Canada, with 25.6 million pounds, led all other countries exporting fillets to this country during the above period, followed by Iceland (9.4 million pounds) and Norway (1.5 million pounds).

EDIBLE FISHERY PRODUCTS, JANUARY 1956:

United States imports of edible fresh, frozen, and processed fish and shellfish for January increased about 28.9 percent in quantity as compared with December 1955, and were also 32.5 percent higher than the imports for January 1955. The value of the imported fishery products in January 1956 increased by 15.1 percent as compared with December 1955 and were higher by 39.4 percent than January 1955. The dollar value in January 1956 was close to 27.2 cents a pound, compared with 25.9 cents a pound in January 1955. Shrimp and fillet imports both increased in January 1956 when compared with January 1955.

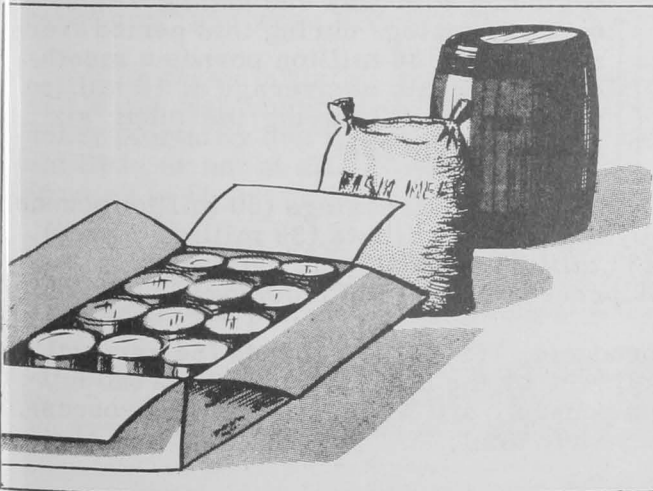
Item	Quantity		Value			
	Jan. 1956	Year 1955	Jan. 1956	Year 1955	1955	
	(Millions of Lbs.)		(Millions of \$)			
Imports:						
Fish & shellfish; fresh, frozen, & processed ^{1/} . .	72.7	54.9	768.3	19.8	14.2	206.4
Exports:						
Fish & shellfish; processed ^{1/} only (excluding fresh and frozen)	10.9	12.2	91.0	2.1	2.3	21.6

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

Exports of processed fish and shellfish for January 1956 decreased about 11 percent from the December 1955 total, and were 10 percent less than in January 1955. Stocks of exportable canned fishery products other than tunas were low in January 1956.

IMPORTS AND EXPORTS OF SELECTED FISHERY PRODUCTS, JANUARY-FEBRUARY 1956:

Notable among the trends shown in United States imports of fishery products during the first two months of 1956 were substantial increases in imports of groundfish fillets, frozen tuna, shrimp, canned salmon, fish meal, and fillets of flounder, wolffish, and fresh-water fish.



Compared to the first two months in 1955, imports for the first two months of this year of groundfish fillets and blocks increased 21 percent; blocks or slabs, however, were 26 percent less, while the plain fillets were 52 percent greater. Shrimp imports were 154 percent larger than those of the first two months of 1955. All frozen tuna imports increased 8 percent, but imports of albacore tuna

were 28 percent less and other frozen tuna imports 55 percent greater than those of the same period a year ago. Imports of canned tuna this year were down 11 percent. Canned salmon imports in the first two months of 1956 were much greater than those of a year ago--5.3 million pounds, largely from Japan. Imports of fish meal were 16 percent larger than a year ago.

United States exports of canned sardines during the first two months of 1956 were 13 percent greater. Fish oil exports gained 13 percent.

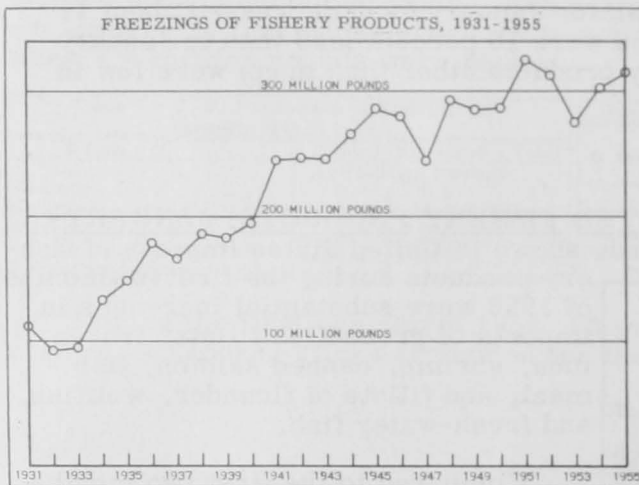
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SHRIMP IMPORTS FROM MEXICO INTO ARIZONA-CALIFORNIA, 1955/56 SEASON THROUGH MARCH 17: The catch of shrimp in the Gulf of California appears to have set a record, according to the Service's Fishery Marketing Specialist at San Pedro, Calif. The imports of shrimp this season to March 17, 1956, from Mexico and entering the United States through Arizona and California totaled 28.6 million pounds as compared with 12.4 million pounds in the similar period of 1954/55. The 1955/56 Mexican west coast shrimp fishing season has been one of the most successful due to excellent production and a high price level because of poor catches in the Gulf of Mexico.



United States Freezings of Fish and Shellfish, 1955

Freezings of fish and shellfish in the United States and Alaska in 1955 amounted to 314.7 million pounds, according to Frozen Fish, 1955 (C.F.S. No. 1276) recently issued by the U. S. Fish and Wildlife Service. This was an increase of 12 million pounds, or 4 percent, over 1954 freezings. A catch of approximately 505



million pounds of fish and shellfish was required to produce the 314.7 million pounds of round, dressed, and drawn fish, fillets, steaks, and packaged shellfish frozen during 1955 by 287 firms throughout the United States and Alaska.

Of the year's total freezings, 69 percent were handled during the 6 months beginning with May and ending with October. Freezings during this period averaged nearly 36 million pounds a month, compared with an average of 16 million pounds a month during the other six months of the year.

Shrimp freezings (50 million pounds) led all others during the year, followed by ocean perch fillets (39 million pounds), whiting (36 million pounds), fish sticks (32 million pounds), and halibut (27 million pounds). These 5 items accounted for 58 percent of the total freezings.

Of the total 1955 freezings of fishery products, 169 million pounds (54 percent) was handled in the New England Area, followed by the South Central Area (46 million pounds), the Pacific Area (33 million pounds), and Alaska (32 million pounds). These four areas froze 89 percent of the yearly total.



Washington

BRINE SHRIMP USED TO FEED PINK SALMON FINGERLINGS: The Washington State Department of Fisheries is feeding Utah brine shrimp to pink salmon fry at its Hood Canal hatchery and the fish are thriving on them. The tiny salt-water shrimp are so tiny that it takes 26 million of them to fill a measuring cup.

Feeding the shrimp to the pink salmon fingerlings is part of an experiment which may ultimately aid in transplanting an even-year pink salmon run into Washington waters. (Pink salmon with a two-year life cycle normally run in Washington streams only on odd-numbered years.)

The salmon grow more uniformly with a brine shrimp diet than with the usual diet of fish viscera, and the shrimp diet virtually eliminates "pinheads" (fish that do not feed) and the subsequent mortalities from pinheads, report fisheries research workers.

Brine shrimp of the genus *Artemia* are a popular aquarium diet but have not been utilized previously in this state for the hatchery-produced salmon. The shrimp are commonly found in salty and alkaline lakes and artificial salt ponds throughout the world. The eggs are extremely hardy and will survive in a dried condition for years without harm to the germ cell. Upon introduction into water of proper salinity and temperature, they will hatch within about 48 hours and reach sexual maturity in about three weeks.

The dormant shrimp eggs are imported from Great Salt Lake, Utah, where they are harvested on the shore and dried. When placed in aerated jugs of heated sea water the tiny shrimp hatch out, increasing six times in volume and become live animacules that not only are relished by the pink salmon fry but are easier for the fish to eat. The shrimp go a long way as food, too; a quart of dry eggs will feed 500,000 pink salmon fry for a day.

The attempt by the Washington Fisheries Department to create an even-year run of pink salmon has met with varying results. A batch of 900,000 eggs from Alaska and Canada, hatched at the Samish hatchery in 1948 and transferred to the Deception Pass marine research station for salt-water rearing, brought gratifying results in 1950 when between 300 and 500 surviving adult pinks returned.

With these initially-encouraging results additional rearing of young pinks in salt water was undertaken, but new problems arose. The most spectacular was a heavy mortality due to pinheads. In effect, some of the fry eat well, while others eat little or not at all. Total mortality on regular hatchery diets in the past ranged from 40 to 60 percent, with a bulk of the mortalities caused by pinheads.

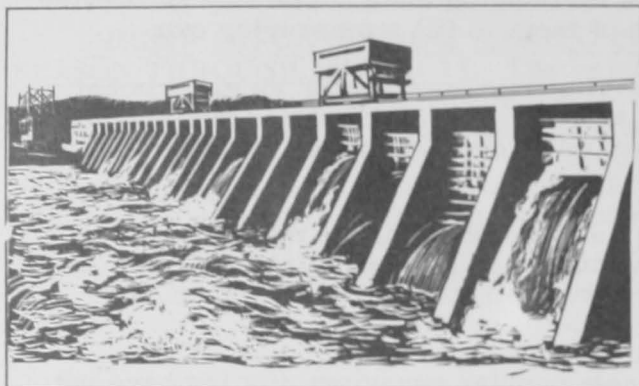
Rearing pink salmon to a size where they are competitive when they enter the open salt-water areas is a ticklish business and requires a closely supervised diet. The pinks feed primarily on plankton in the ocean.

Experiments in the feeding of brine shrimp will continue, but results so far add a happy note to the possibilities of creating a good, healthy liberation of reared even-year pink salmon in Washington waters.

* * * * *

EXPERIMENTS TO AID DOWNSTREAM SALMON MIGRATIONS AT MERWIN DAM: Juvenile salmon who landlock themselves behind power dams and never go to sea are as useless in maintaining their race as those who plunge to their death over spillways, according to a February 29 news release of the Washington State Department of Fisheries.

During the spring of 1956 the Washington Department of Fisheries, in cooperation with Pacific Power & Light Co., will attempt to solve the problems that make Merwin Dam on the Lewis River as much an obstacle to the downstream migrants on their way to sea as their parents found on their upstream spawning migration.



Rehabilitation of several depleted salmon runs on major rivers is awaiting the outcome of this and associated studies.

The double barrier formed by Lake Merwin is typical at high dams which spill little or no incoming water during much of the spring and summer migration period. Silver salmon especially tend to landlock themselves on the Lewis River, and each spring yearlings by the tens of thousands never leave the upper watershed.

Experiments in 1952-55 at dams on the Elwha, Baker, and White rivers on Puget Sound proved that salmon were reluctant to use the turbine intake as an impoundment exit route if the latter were at substantial depths, particularly if surface water was being spilled. Moreover, even if the spillways and turbines were accessible, in most cases their mortality tolls made them equally undesirable.

The Merwin Dam tests will utilize a variety of flow volumes and intake depths over the next three months to find how much water it takes to attract impounded migrants into a collection system at the face of the dam, where they can be counted and led downstream. The different attraction depths will be tried because salmon have been found to disperse themselves over a wider vertical range behind a dam when it is not spilling water. When it is spilling, the young fish tend to move with the surface layer.

The end result, not only at Merwin Dam, but at others throughout the Pacific Northwest, should be a workable method of passing migrants around such structures with minimum mortalities and delay. Since conservation of power-producing water is important to the hydro-electric companies, another objective will be to determine the least flow that will do the job effectively.

Pacific Power & Light Co., which already contributes most of the operating funds for a salmon hatchery downstream from Merwin Dam and a smaller unit above its Yale Dam, will provide up to \$24,000 for the project. This will be matched by the Department of Fisheries out of special funds provided by the 1955 Legislature for salmon rehabilitation research in the field of water storage and downstream migration problems.

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EXPERIMENTS ON SALMON MORTALITIES AT McNARY DAM CONTINUED:

A flotilla of 15 pontoon fishing platforms is being assembled by the Washington State Department of Fisheries on the Columbia River in a renewed phase of region-wide investigations into means of reducing salmon mortalities caused by power dams.

The pontoon nets will be dispersed over 35 miles of river below McNary Dam as part of a major fisheries research program being financed by the United States Army Corps of Engineers. Its principal objective will be to determine how the dam affects the survival of young salmon bound from the Snake and upper Columbia River watersheds for the ocean. From it, and associated studies assigned to other fishery agencies, are expected to come solutions for the critical problem of safeguarding the salmon runs of the Pacific Coast and Alaska in areas where hydro-electric power is dominant or proposed.

During the winter the pontoon fishing equipment has been under repair or construction at the Fisheries Department's Yakima shop. Beginning in March, crews of biologists and others will begin the task of releasing more than 700,000 marked chinook fingerlings at McNary Dam. Some will be liberated into the spillways, others in the turbine intake system, and some into the river immediately below the dam tailrace. The recovery nets will be spaced from a point downstream from the dam to Arlington, Ore.

An unusual phase of the study will be the use of tattooing machines to mark the young chinooks. The equipment, developed by Department researchers in 1953-54, injects various colored pigments under the skin as a substitute for the usual fin-clipped mark used to trace the migration of hatchery salmon.

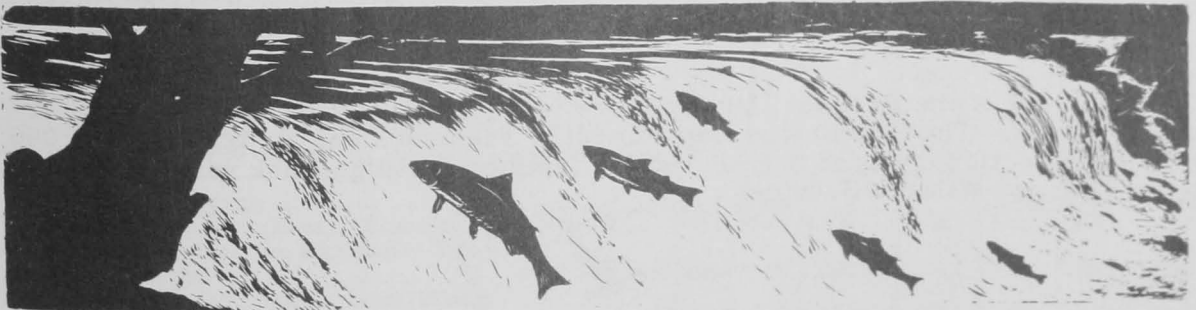
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IMPORTS OF SALMON REGULATED: In a notice to the fishing industry dated March 15, 1956, the Washington State Department of Fisheries issued the following regulation in regard to establishing certain procedures under which salmon imported from Alaska and Canada may lawfully proceed through the State of Washington in transit to out-of-state points during the closed season within the State.

"It shall be lawful for a common or contract carrier to transport, during seasons in which the taking, catching, or possession of chinook or silver salmon is unlawful in the State of Washington or in waters over which the State of Washington has jurisdiction, an original package or packages containing either silver or chinook salmon, which original package or packages both originate from and are destined for some other state, territory or foreign country provided, that for the purpose of this regulation, the term "original package" shall mean a package from which fish cannot be extracted without an opening or breaking thereof and which is accompanied by documentary proof that the original point of shipment and the point of destination is another state, territory or foreign country; provided further, that it shall be unlawful for any such carrier to open or break any such original package while the same is in his possession, except for the purpose of re-icing; provided further, that the waters of the Pacific Ocean shall not be considered a state, territory or foreign country."

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REBUILDING SALMON RUNS TO THE YAKIMA RIVER AND TRIBUTARIES PLANNED: The salmon population in the Yakima River and its tributaries may again approach those of the past if a comprehensive long-range rehabilitation plan prepared by the Washington State Department of Fisheries for the United States



Bureau of Reclamation is carried out. Completion of the plan would add nearly 2.5 million dollars a year to the value of the salmon take from the river, states a March 12 news release of the Washington State Department of Fisheries.

Three basic requirements are necessary for the over-all rehabilitation of the Yakima River system to aid in the development of its potential fish resource, ac-

ording to a comprehensive evaluation report prepared by the State Department of Fisheries in cooperation with the State Department of Game. They are:

1. Safe and efficient passage of adult fish upstream to their spawning grounds and of juveniles to the ocean. This will require both additional fishways and guaranteed minimum flows. The latter will depend largely on additional upriver storage.
2. Adequate conditions of water depth, velocity, and temperature, and maximum development of potential spawning areas.
3. Suitable rearing water for the young salmon until they are mature enough for departure to the ocean. A corollary is continued improvement and operation of the fish-screen system.

If these requirements are met, the report states, there is good chance to restore fish production to somewhere near its former level.

At present, annual production averages 860,000 pounds as compared to a catch (before 1900) of 7 million pounds. Potential production, assuming the introduction of sockeye salmon, which are not present at all now, is estimated at more than 4.5 million pounds. One of the steps toward realization of the program is the recently-completed vertical-baffle design fishway at the Prosser diversion dam on the Yakima. In the past, chinook salmon bound for spawning grounds in the upper Yakima and Naches rivers have had to use all of their famous endurance and "instinct" to ascend the Prosser Dam. Some years, when the water was low, the barrier was more of a delay than Bonneville Dam.

The new fishway, 150 feet long and 8 feet wide, is the first of its type on the Yakima. It is on the right bank of the river, adjacent to the intake foundation of an old power dam. Removal of the old pool-type fish ladder in the center of the dam also is scheduled, and a fishway similar to the one just completed will be installed about 150 feet from the left bank.

The new fishway has 14 automatically-regulated pools, each pool one foot higher than the preceding one, and is equipped with an auxiliary water supply system arranged to aid the rapid passage of fish upstream to spawn.

The increase in the capacity of Chandler canal, which made the new fishways even more necessary, also required the installation of two additional fish screen sections in the canal. The two new screens and eight formerly used have been converted to electrical drive, replacing the familiar paddle-wheel propulsion. The screens, each 10 feet wide and 11-12 feet in diameter, divert downstream migrants from the canal back to the river. The system is exceeded in size only by those at Sunnyside and Roza dams.

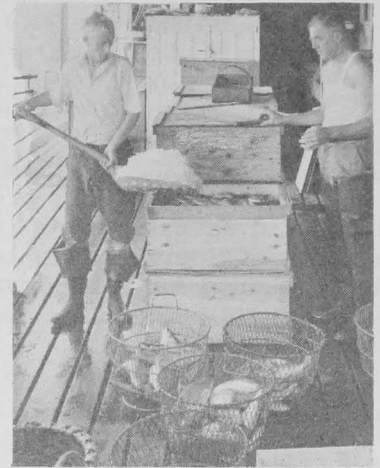
Total cost of the Prosser fish facilities to the Bureau of Reclamation will exceed \$300,000. The Washington Department of Fisheries has contributed \$15,000 to the construction cost and has shared the functional design work with the United States Fish and Wildlife Service.



Wholesale Prices, April 1956

In April 1956 the over-all wholesale index for all edible fish and shellfish (fresh, frozen, and canned) dropped 4 percent below that for March 1956 (108.6 percent as compared with 113.1 percent of the 1947-49 average), but climbed 10 percent above that for April 1955. Changes in the indexes for individual items were sharp, in some cases due to seasonal changes in supply and market conditions.

The index for the drawn, dressed, or whole finfish subgroup declined 12.3 per cent from March to April 1956 because of lower prices for all items in this subgroup except frozen halibut (up 8.4 percent). During that period haddock prices at Boston dropped 36.2 percent and fresh yellow pike prices at New York City were down 60 percent. Changes downward are to be expected at this period of the year due to seasonally-better supplies of fresh haddock and fresh-water fish from the Great Lakes. Because halibut stocks are at a record low level and because the new fishing season in the North Pacific does not begin until mid-May, prices for this product went up. Compared with April 1955, this subgroup index in April 1956 was higher by 12.8 percent.



Boxing and icing fish for the wholesale market.

The fresh processed fish and shellfish subgroup index in April 1956 was about unchanged from March 1956, but was 16.9 percent higher than in the same month a year ago. Fresh haddock fillet prices at Boston declined 20 percent from March to April 1956, and were 7.3 percent lower than in April 1955. To offset this, fresh

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

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices ^{1/}		Indexes (1947-49=100)			
			(\$)		Apr. 1956	Mar. 1956	Feb. 1956	Apr. 1955
			Apr. 1956	Mar. 1956				
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					108.6	113.1	113.7	98.7
Fresh & Frozen Fishery Products:					115.2	120.6	121.7	98.1
Drawn, Dressed, or Whole Finfish:					100.5	114.6	114.1	89.1
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.05	.08	50.1	78.5	86.9	64.2
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.34	.32	106.2	98.0	97.5	68.1
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.61	.61	137.1	137.6	134.3	112.4
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.69	.82	171.0	204.5	181.0	179.7
Whitefish, L. Erie pound or gill net, rnd., fresh	New York	lb.	.60	.80	121.3	161.8	131.4	151.6
Lake trout, domestic, No. 1, drawn, fresh	Chicago	lb.	.54	.82	110.6	168.0	150.6	141.4
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.21	.52	49.3	123.1	129.0	64.5
Processed, Fresh (Fish & Shellfish):					126.6	126.5	127.6	105.2
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.24	.30	81.7	102.1	110.6	88.5
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	.79	.77	124.8	120.9	121.7	101.1
Oysters, shucked, standards	Norfolk	gal.	5.62	5.62	139.2	139.2	139.2	114.4
Processed, Frozen (Fish & Shellfish):					114.3	112.3	116.5	95.3
Fillets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.40	.39	103.4	102.1	102.1	110.0
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.29	.29	91.0	91.0	92.6	86.3
Ocean perch, skins on, 1-lb. pkg.	Gloucester	lb.	.29	.29	114.8	114.8	114.8	111.8
Shrimp, lge. (26-30 count), 5-lb. pkg.	Chicago	lb.	.76	.73	116.5	113.0	119.6	84.1
Canned Fishery Products:					99.2	102.4	102.4	99.4
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	case	21.27	21.27	120.0	120.0	120.0	109.6
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/ cs.	Los Angeles	case	10.70	11.80	77.1	85.1	85.1	91.6
Sardines, Calif., tom. pack, No. 1 oval (15 oz.), 48 cans/cs.	Los Angeles	case	7.38	7.12	86.1	83.2	83.2	85.2
Sardines, Maine, keyless oil, No. 1/4 drawn (3-1/4 oz.), 100 cans/cs.	New York	case	8.45	8.45	89.9	89.9	89.9	76.6

^{1/}Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.

shrimp prices increased about 3.2 percent between March and April 1956 and were 24 percent higher than in April 1955.

The April 1956 index for the frozen processed fish and shellfish subgroup was up slightly (1.8 percent) when compared with the previous month and also higher by 20 percent compared with April 1955. The rise between March and April 1956 and from April 1955 was due mainly to higher frozen shrimp prices. Frozen shrimp prices in April 1956 at Chicago were 38.5 percent higher than in April 1955.

The canned fishery products subgroup index in April 1956 experienced its first decline in several months almost entirely due to a drastic cut in canned tuna prices because of liberal stocks of the light-meat grade. The index for this subgroup from April 1955 to April 1956 was about unchanged. However, April 1956 prices for canned pink salmon and Maine sardines, because of a very light supply, were substantially higher than in April 1955. On the other hand, April 1956 prices for canned tuna were significantly lower than in the same month a year ago.

CORRECTION: In the April 1956 issue of Commercial Fisheries Review, page 27, in "Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, February 1956 with Comparisons," the second column under the heading "Avg. Prices" should have been headed "Jan. 1956" and the second column under the heading "Indexes (1947-49-100)" should have been headed "Jan. 1956."

The same table in the May 1956 issue also had the same type of error-- the second column under the heading "Avg. Prices" should have been headed "Feb. 1956" and the second and third columns under the heading "Indexes (1947-49-100)" should have been headed "Feb. 1956" and "Jan. 1956," respectively.



DANISH EXPERIMENTS ON ELECTROLYTIC TIN-PLATE CANS

Experiments carried out at the Danish Ministry of Fisheries Research Laboratory, Copenhagen, Denmark, on electrolytic tin plate cans have shown that none of the Danish fish packed in the unlacquered cans had good keeping quality. The tin plate tested contained 0.25, 0.50, and 0.75 pound of tin per base box (5.6, 8.4, and 16.8 gm. of tin per m² of the surface). Sardine and mackerel in oil can be packed in lacquered cans, but fish in tomato sauce and other corrosive products cannot be packed in cans lacquered with lacquers available in Denmark.

--Konserves, Nov. 1953.