

# TRENDS AND DEVELOPMENTS

## Alaska

**NO FEE IN 1957 FOR NEW SALMON NET FISHERMEN'S LICENSE:** Although all salmon net fishermen in Alaska will be required to have a special commercial fishing license for the coming season, the prescribed fee of \$5 for the license will not be charged in 1957, Assistant Secretary of the Interior Ross L. Leffler announced on April 11.

The new regulatory provision, the proposal of which was published in the Federal Register on March 6, 1957, separates the registration of boats and gear from the registration of fishermen. With the exception of gill nets in Bristol Bay and Cook Inlet, under this new Federal license a fishermen will not have to report a change from one boat to another or from one form of gear to another so long as he remains in the area for which he was licensed.

The license is required only of salmon net fishermen and not of trollers. This special Federal license will be necessary in addition to any license required by the Territory of Alaska.

Announcement was scheduled to be made soon by the Service in Alaska of public places where the license may be obtained.



## California

**LANDINGS, 1956:** Landings of fish and shellfish at California ports in 1956 amounted to 663 million pounds (exclusive of imports), an increase of 64.9 million pounds over the 598.1 million pounds landed in 1955. In 1956 landings of Pacific and jack mackerel increased about 100 million pounds as compared with 1955. Lesser increases were made in 1956 in the landings of anchovies and tuna. The catch of California sardines declined sharply (55 percent) from the 144.9 million pounds landed in 1955.

San Pedro lead all other California ports with total landings of 383 million pounds, followed by San Diego with 135.3 million pounds; Monterey, 46.3 million pounds; Santa Barbara, 41.4 million pounds; Eureka, 31.6 million pounds; and San Francisco, 25.5 million pounds.

Tuna receipts by California canneries of 204,800 tons

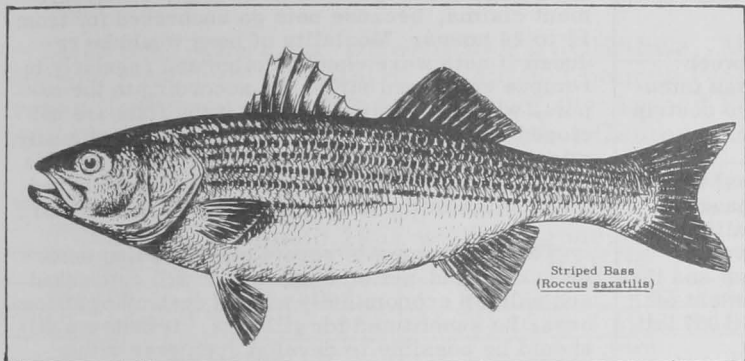
California Domestic Caught Landings of Major Species, 1955-56			
Species	1956	1955	Percentage Increase or Decrease from 1955
	.(In 1,000 Lbs.)		
Anchovies . . . . .	53,945	42,440	+ 27
Jack mackerel . . . . .	83,504	34,514	+142
Pacific mackerel . . . . .	71,630	20,608	+248
Sardines . . . . .	65,306	144,916	- 55
Tuna:			
Albacore . . . . .	34,998	24,466	+ 43
Bluefin . . . . .	12,558	13,170	- 3
Skipjack . . . . .	118,246	95,838	+ 23
Yellowfin . . . . .	153,878	112,740	+ 36
Total for Major Species	594,065	488,692	+ 22

(domestic landings and imports) and the canned tuna pack of 9.5 million standard cases set new records in 1956. The previous record tuna pack of 9.3 million cases was set in 1954. During the past ten years the California tuna pack has increased steadily from 4.5 million cases in 1946 to the record pack of 1956.

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SALMON AND STRIPED BASS GILL-NET RECOMMENDATIONS FOR SACRAMENTO RIVER: Three recommendations for minimizing striped bass destruction by commercial netters and materially increasing escapement of spawning salmon from nets in the Sacramento River were offered in a March 29 report of the California Department of Fish and Game.

At the same time the Department warned that emergency legislative action, as well as further restrictions by the Fish and Game Commission on sports fishermen, may be necessary in 1958 if the numbers of salmon spawners in the Sacramento does not approach ideal levels this fall.



The recommendations are contained in a study of commercial salmon and shad netting operations in the Sacramento River covering a two-year period.

The recommendations and the warning (a fourth "conditional" recommendation) are as follows:

"1. Eliminate gill nets from Grizzly and Honker Bay flats to effect maximum preservation of striped bass.

"2. Develop methods and gear for taking salmon and shad commercially which will not destroy striped bass.

"3. Eliminate all gill-netting in the river, except for spring shad and salmon seasons, adjusted to April 15 through May 31, and except for fall salmon season adjusted to August 10 through September 5 and September 20 through September 30. Weekend closures should be continued.

"4. If effective salmon spawning does not approach the level of 400,000 to 500,000 spawners in the fall of 1957, reduction of both commercial and sports salmon take in the ocean and further curtailment in the river should be effected by emergency action of the legislature in 1958 and by the Fish and Game Commission on sports fishing. If recovery of the salmon fishery isn't indicated in the 1958 fall salmon spawning run, still more drastic restrictions should be imposed on all segments of the fishery to preserve the species."

In the 33-page report, complete with statistical evidence supporting each finding and recommendation, the Department listed the problems of the Sacramento River migratory fisheries, summarized the facts relating to these fisheries (salmon and striped bass), drew conclusions, listed recommendations and alternate proposals, and summarized the reasons for the recommendations. The report and recommendations supersede and replace a preliminary report of the same studies issued in August, 1956. New material, not available in August, is contained in the new report and considered in the recommendations.

In order, the Department declared these are the problems of the fisheries:

1. While sports and commercial catches of salmon hit record highs, the 1956 spawning count dropped from a four-year average of about 500,000 fish to about 200,000.
2. Sacramento River and Delta striped bass are gradually declining in numbers while the sports fishing pressure increases.
3. The commercial shad gill-net catch has averaged about 670,000 pounds annually since 1945 and there appears to be a continuing abundance of this fish. . . but the present commercial methods of taking salmon and shad has a deleterious effect on striped bass.
4. Traditional conflict of interest between sportsmen and commercial gill-netters has intensified as a result of the declining numbers of stripers and spawning salmon passing upriver.

The Department says its records reveal that it requires between 400,000 and 500,000 spawners in the Sacramento River to sustain the California salmon fishery at a high level. The spawning count last year dropped under 200,000 fish and the Director warned in February that curtailment of fishing activity would be necessary if the 1957 fall count showed no substantial improvement.

Ocean and river salmon fisheries depend almost entirely on the same Sacramento River spawned fish. Since 1951, sports ocean trolling catches have increased annually from 100,000 to 200,000 fish while the commercial ocean troll fleet has increased its catch in the same period from 416,000 to 800,000 fish annually.

The Department's report says the commercial river gill-net fishery has averaged 60,000 fish annually for five years, but from 1954 to 1955 the river salmon gill-net take jumped 2.5 times to 200,000 fish. Sports salmon take in the river is estimated at 20,000 fish a year.

Most of the commercial river catch of salmon--97 percent--is taken during the August 10 to September 26 season, according to the Fish and Game report. Only 3 percent is taken during the winter and spring salmon gill-net season between November 15 and June 15.

The Department declared the destruction of striped bass by commercial fishermen netting salmon and shad is quite substantial. In 1955, the fall salmon gill nets, which took about 118,000 salmon (2,274,000 pounds) killed about 8,300 striped bass weighing 132,000 pounds.

In 1956, the spring shad gill nets took 430,372 pounds of shad and killed 13,500 striped bass weighing 117,000 pounds in doing it. Most of the striped bass were killed by nets placed in Grizzly and Honker Bay Flats. In these areas netters took their smallest amount of shad (only 81,097 pounds) but killed the most stripers--76,500 pounds.

The report declares the take of shad and salmon would not be severely curtailed by closing the flats. The flats produced about 20 percent of the total shad catch and 12 percent of the total fall river salmon catch. During the spring, there is sufficient open river area to accommodate the 15 boats of the 59-boat fleet which now fish for shad in the flats, the report said. Mortality of bass in shad gill nets on the flats is high, the Department claims, because nets go unchecked for from 12 to 24 hours. Mortality of bass would be reduced if nets were checked often and regularly to remove entrapped stripers, according to the report, which recommends that if the flats are not closed any nets used therein should be continually attached to a boat. The Department believes this would result in periodic checkups of the nets and a reduction in the number of striped bass killed.

The Department's report proposes that some form of pound-net or trap, which will catch shad and salmon economically without destroying striped bass, be substituted for gill nets. It believes it should be possible to develop such gear within three years.

The report recommends curtailing of both commercial shad and salmon seasons to reduce striped bass mortality and to enable more salmon to escape upstream to spawn. The Department admits the proposal to drop the first 10 days of the existing shad season would reduce the catch by about 6 percent, but also declares it can be made up during the remainder of the season. A two-week break (September 5-20) in the fall salmon season would permit a substantial part of the main run of Sacramento River fish to pass upstream, thus strengthening the most important segment of the resource, according to the Department. The report says the winter-spring salmon season (November 15-June 15) accounts for only 3 percent of the total river salmon catch, but believes there is a relatively large loss of striped bass to the nets during the same time.

In regard to its warning about the condition of the salmon fishery, the Department said the fishery will be in critical trouble if a second consecutive bad spawning year is recorded in the fall of 1957. Immediate protective action by the Legislature and the Commission will be necessary to protect the potential 1958 spawning class, prior to the 1958 season, the report said. The salmon fishery is based on a four-year life cycle of the fish.



## Cans--Shipments for Fishery Products, January 1957



Total shipments of metal cans for fish and sea food during January 1957 amounted to 6,900 short tons of steel (based on the amount of steel consumed in the manufacture of cans), compared to 4,842 short tons in January 1956. Fish canning in January 1957 was largely confined to tuna and oysters.

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.



## Federal Purchases of Fishery Products

**DEPARTMENT OF DEFENSE PURCHASES, MARCH 1957: Fresh and Frozen Fishery Products:** A total of 1,640,000 pounds (valued at \$885,000) of fresh and frozen fishery products for the use of the Armed Forces were purchased in March 1957 by the Military Subsistence Market Centers. This was a decrease of 2.3 per-

Table 1 - Fresh and Frozen Fishery Products Purchases by Military Subsistence Market Centers, January-March 1957 with Comparisons

QUANTITY				VALUE			
March		Jan. - Mar.		March		Jan. - Mar.	
1957	1956	1957	1956	1957	1956	1957	1956
. . . . (1,000 Lbs.) . . . .				. . . . (\$1,000) . . . .			
1,640	2,198	5,530	4,943	885	1,106	2,862	2,702

cent in quantity, but the value was higher by 9.5 percent as compared with the previous month. For the first 3 months of 1957 purchases totaled 5,530,000 pounds, valued at \$2,862,000--an increase of 11.9 percent in quantity and 5.9 percent in

value as compared with the similar period in 1956. (Data are not strictly comparable due to a change in method of reporting. Comparisons on a 3-month basis are less subject to error than are monthly comparisons.)

Average prices paid for fresh and frozen fishery products in March 1957 averaged 54.0 cents a pound, higher than the 48.2 cents paid the previous month, and the 50.3 cents paid in the same month of 1956.

**Canned Fishery Products:** Tuna was the principal canned fishery product purchased for the use of the Armed Forces during March 1957. During the first three months of 1957, purchases of canned tuna, salmon, and sardines were lower by about 7.4 percent as compared with the similar period in 1956.

Table 2 - Canned Fishery Products Purchased by Military Subsistence Market Centers, January-March 1957 with Comparisons

Canned Product	Quantity			
	March		Jan. - Mar.	
	1957	1956 <sup>1/</sup>	1957	1956
	. . . . (1,000 Lbs.) . . . .			
Tuna . . . .	573	-	841	1,396
Salmon . .	-	-	992	601
Sardines . .	8	-	19	8
Total . .	581	-	1,852	2,005

<sup>1/</sup> Unavailable.

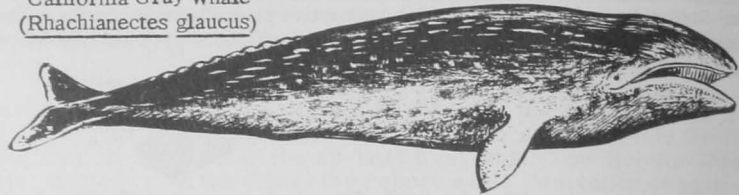
Note: In addition to the purchases of fresh and frozen fishery products reported, some local purchases are made which are not included. Therefore, actual purchases are higher than reported.



## Gray Whale Herd Moves North to Bering Sea

The gray whale in the Pacific is now heading north to its summer feeding grounds in the Bering Sea in a migration that will get little public observation. This whale, a scenic attraction on its journey south close to shore during the winter months, makes its northward migration virtually unnoticed--the thousands of migrants being spread over too wide an area in the Pacific and usually too far from shore to attract attention. On its way southward it travels in a relatively narrow corridor seldom more than three miles from shore.

California Gray Whale  
(*Rhachianectes glaucus*)



During the recent winter Fish and Wildlife observers at the La Jolla, Calif., station counted 1,782 of these animals migrating to their wintering grounds. In one period the whales were about five miles apart. Traveling at five miles an hour, that meant a whale an hour passed the observers.

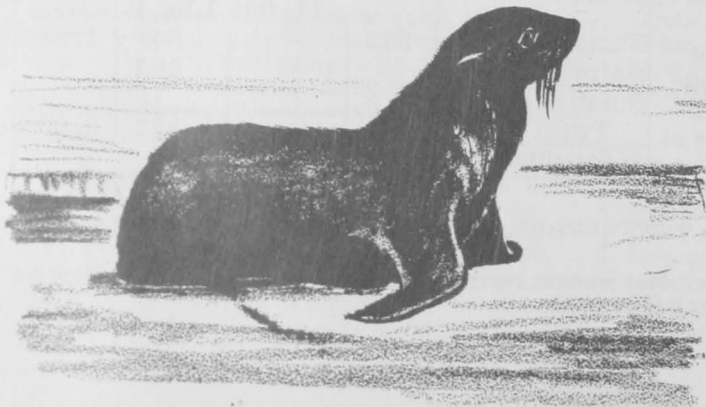
Their wintering ground is along the Coast of Lower California, and some of the whales even round the tip of the long peninsula and feed not far from the main coast of Mexico.

Once plentiful, the gray whale was harvested to the point of near extinction. Now it is protected by international agreement. Presently it is estimated there are about 4,000 adult gray whales and 500 calves, although conditions make an accurate census difficult.



## Fur-Seal Skins

PRICES DROP AT GOVERNMENT SPRING AUCTION: A decrease in prices of United States fur-seal skins marked the semiannual auction of Government-owned furs at St. Louis on April 12. The sale was well attended by United States, Canadian, and European buyers.



Alaska Fur-Seal.

A total of 27,819 skins, products of the sealing industry administered by the United States Fish and Wildlife Service on the Pribilof Islands, brought \$2,547,182. This compares with 26,890 skins sold for \$2,714,852 at the October 1956 sale. The grand average for all skins sold for the account of the United States Government was \$91.56; at the October sale it was \$100.96. The grand average at the April 1956 sale was \$93.27.

Of the Alaska skins, 11,663 were dyed "Matara" (brown), 426 were "Safari" brown (a lighter brown), 10,154 were blacks, and 5,576 "Kitovi"-processed skins were offered for the first time. Kitovi has been characterized as "an exciting new shade of midnight gray with highlights of silver and an intriguing blue cast." It is the first new shade to be offered since Matara was introduced in 1939.

The Kitovi skins brought an average of \$119.38. Matara skins sold for an average of \$81.91, a decrease of 18.3 percent under the October auction. Safari skins brought an average of \$68.97, a decrease of 10.4 percent. The black skins averaged \$88.32, a downward change of 20.1 percent as compared to the October sale price of \$109.38.

At the April sale, 117 dressed sea otter skins were sold for the account of the United States Government. These skins brought a total of \$2,677.

These sea otter pelts were accumulated as a result of salvage and other activities by the Fish and Wildlife Service on Amchitka Island, Alaska, in the Aleutian Islands National Wildlife Refuge, over the past several years. Interested bidders were advised that the Government is not considering lifting the present prohibition against the taking of sea otters.

In addition to the United States skins, 3,453 South Africa fur-seal skins were sold for the account of the Government of the Union of South Africa at an average of \$36.35, a decrease of 0.6 percent from the last sale, and 350 Uruguay fur-seal skins were sold for the Government of Uruguay at an average of \$31.04. The October 1956 average was \$48.78.

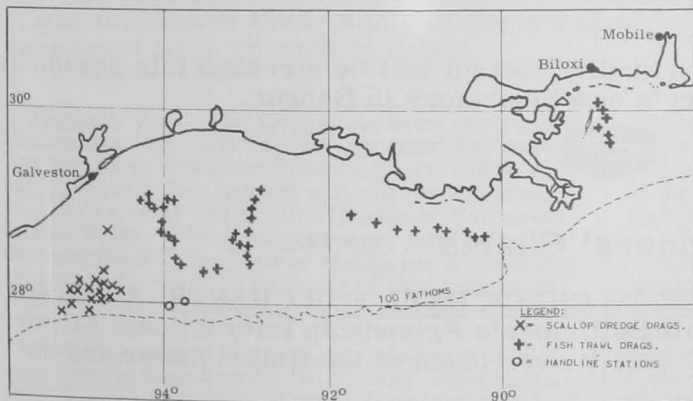
The next auction is tentatively scheduled for October 18, 1957, in St. Louis.

Note: Also see Commercial Fisheries Review, November 1956, p. 37.



## Gulf Exploratory Fishery Program

EXPLORATORY FISHING FOR SCALLOPS AND RED SNAPPER OFF TEXAS AND LOUISIANA COASTS (M/V Oregon Cruise 44): In an attempt to locate unexploited commercial stocks of scallops and red snapper in the Gulf of Mexico off the coasts of Louisiana and Texas, the Service's exploratory fishing vessel Oregon tested New England-type bottom fishing gear. Results from the experimental fishing from March 5 to 21 were poor.



M/V Oregon Cruise 44, March 5-21, 1957.

Scallop dragging, using a New England-type 8-foot scallop dredge, was carried out in an area extending from Chandeleur Island to Galveston in depths of 5 to 34 fathoms. Major attention was given to areas of predominantly sand bottom. A total of 44 one-hour drags yielded no living scallops, although large quantities of dead scallop shell (Pecten gibbus) were found in many areas.

March 13 through 17 was spent trawling off Galveston, using a New England-style otter trawl, in depths of 11 to 53 fathoms. The primary objective of this work was to trawl for red snapper in the area known as "Little Campeche." Strong winds and heavy seas during March 14-17 greatly hampered fishing operations and results were very poor. The best drag caught 118 pounds of red snapper, averaging about  $1\frac{1}{2}$  to 2 pounds each. All catches were small, with porgies and croakers making up the bulk of the catch.

On March 13, approximately 30 miles south of Galveston, extensive schools of fish were observed during the late morning and early afternoon. Visual identifica-

tions were impossible but a short drag, using a large-mesh otter trawl, through one of the schools caught about 200 4- to 5-inch anchovies (Anchoa hepsetus).



## Maine Sardines

NEW-QUALITY CONTROL AND RESEARCH LABORATORY OPENED: The formal opening of the Maine sardine industry's new and modern research and quality control laboratory at Bangor, Me., took place April 11. The new laboratory occupies a four-story building on Bangor's Exchange Street and will be fully equipped to handle a number of the industry's State tax-financed development program projects including grading, technological and biological research, new products, and quality control activities. Previously the industry had maintained research and grading facilities at the University of Maine.

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SEASON LEGALLY OPENED APRIL 15: The 1957 Maine sardine canning season legally opened on April 15, but none of the 38 plants along the coast were in operation due to the lack of fish.

The Executive Secretary of the Maine Sardine Industry said that although fish could strike anytime, veteran canners did not predict any sizable production until late in May.

The prediction is based on the failure of a sizable early spring run of fish appearing during the past 10 years.

Canners held normal inventories from last year's pack of 2, 250, 000 cases, but these stocks should be well sold out by June 1, when heavy production usually gets under way.

Added emphasis on research and quality control will be stressed this season as a result of the opening of the industry's new laboratory in Bangor.



## Mariners' Charts

COAST AND GEODETIC SURVEY TO CHECK DATA FOR CHARTS: A converted B-17 with cameras in its belly left Baltimore's Friendship International Airport early in April on a mission that will take it over much of the United States and as far as the Aleutian Islands.

On the mission, which may last through November, a party from the Coast and Geodetic Survey, Department of Commerce, will take aerial photographs of coastal lands to be used in compiling nautical charts.

The airplane and flight crew are supplied by the U. S. Coast Guard, Treasury Department, under a cooperative arrangement. The Coast and Geodetic Survey sends a photographic navigator, a photographer, and the cameras. When pictures are being made, the photographic navigator guides the plane with a Norden bomb-sight.

The principal camera is a giant nine-lens machine developed by the Coast and Geodetic Survey, which in one snap at 22, 000 feet can picture 300 square miles.

It weighs almost 500 pounds and is moved around on a wheeled dolly until it is lifted into the B-17 by a crane.

The big camera is especially valuable in mapping inaccessible areas, to which it would be very costly to send ground parties of surveyors. On the present mission, pictures will be taken first along the Gulf Coast. By May 15, the mission was scheduled to arrive in the Aleutians. Here it will work between Adak Island, in the central Aleutians, and the Alaska mainland. The uncertain weather in the Aleutians makes exact scheduling impossible, but the mission will probably return to the United States early in July and set out for Alaska again in mid-August. In all, the B-17 may fly 75,000 miles.

Prints from the nine-lens aerial negatives are made in a special transforming printer that combines the nine separate views into one composite photograph about 35 inches square.

The single-lens camera that will be part of the mission's equipment shoots an area of four square miles at 7,000 feet. It is equipped to take infrared photographs, which are effective in showing shoal areas.

The Coast and Geodetic Survey publishes charts for the country's mariners and aviators. In its geodetic work it determines the basic points on which all American boundaries depend.

Most of the Survey's fleet also left various ports early in April for summer assignments along the country's coasts.

Shorelines change over the years, shoals develop, and recent wrecks threaten navigation. These changes, as well as new lights and buoys, must be noted on the Survey's charts as they are published.

Although the Survey has mapped more than 100,000 linear miles of coast since it was founded in 1807, some of the areas to be surveyed this summer in Alaska have never been charted in detail.

Norfolk, Va.: The Cowie has been assigned to Chesapeake Bay, and will survey from Pocomoke Bay southerly along the Eastern Shore and to mid-bay offshore. The Gilbert will survey the area along the easterly and southerly side of Nantucket Island, Mass. The Hydrographer, will go to Georges Bank in the Gulf of Maine for a complete resurvey, the first to be made of this important fishing area in 25 years.

The Hilgard and Wainwright, also at Norfolk, have been assigned to do "wire drag" operations near Swan Island, Me. A wire drag is a metal cable that, when pulled through the water at a predetermined depth by two vessels, detects uncharted rocks or wrecks that may be hazards.

Punta Gorda, Fla.: The Sosbee will continue the survey of Tampa Bay, which is to be completed within two years.

Tampa, Fla.: The Scott will make an inspection of the east coast in preparation for revision of the Coast Pilots. Coast Pilots are books that contain detailed information for which there is no room on the charts.

Honolulu, T. H.: The Pioneer is now making offshore surveys in the Hawaiian Islands.

Seattle, Wash.: The Lester Jones and the Hodgson will work in southeast Alaska. The Patton will make a hydrographic survey of the area north of the San Juan Archipelago in Haro Strait, Washington State.

Three other ships will leave Seattle April 15 for Alaska. One of them, the Explorer, will survey the area between Great Sitkin Island and Kasatochi Island in the Aleutians. She will also move easterly along the south side of Atka Island. Her sister ship, the Pathfinder, will concentrate on Patton Bay, Montague Island, Bechevin Bay, and Port Heiden along the north shore of the Alaska Peninsula. The third is the Bowie which will go to Prince William Sound and chart the area south of Chenega Island, including Nassau Fjord, Icy Bay, and Bainbridge Passage.

Coast and Geodetic Survey ships may be distinguished by the Bureau's service flag, which has a blue field carrying a white circle in which there is a red triangle. The vessels are all painted battleship gray. Each carries the name, but no number. The uniforms of officers and crew resemble those of the Navy and Coast Guard, but with Survey insignia.

The four largest of the Survey ships are the Pathfinder, Explorer, Pioneer, and Hydrographer.



varying in size from 1,000 to 2,600 tons. A new modern ship is on the drawing boards.

The operations of the Survey fleet appear mysterious to some observers. The ships may be sending out boat parties, or pulling underwater wire drags, but sometimes there are no visible activities. An officer may be seen on deck taking

a "sextant fix" to determine the ship's exact location. But more often this is done by electronic instruments, such as Shoran and the Electronic Position Indicator, which was developed by the Survey. Depth is determined by the "Fathometer," an electronic device that accurately measures the time it takes a sound wave to travel to the bottom and return as an echo.



### North Atlantic Fisheries Exploration and Gear Research

EXCELLENT CATCH OF TUNA MADE SOUTH OF NANTUCKET (M/V Delaware Cruise 57-3): An excellent catch of tuna was made by the Service's exploratory fishing vessel Delaware with long-line gear south of Nantucket in the Gulf Stream during the recent four-week cruise (March 15 to April 12). The cruise, the first of its type, to explore the offshore Western Atlantic for possible latent fishery resources, has contributed to the knowledge of the Atlantic tunas as northern distribution records were noted for two of the tuna species--albacore (Thunnus alalunga) and yellowfin (Thunnus albacares)--for this season of the year.

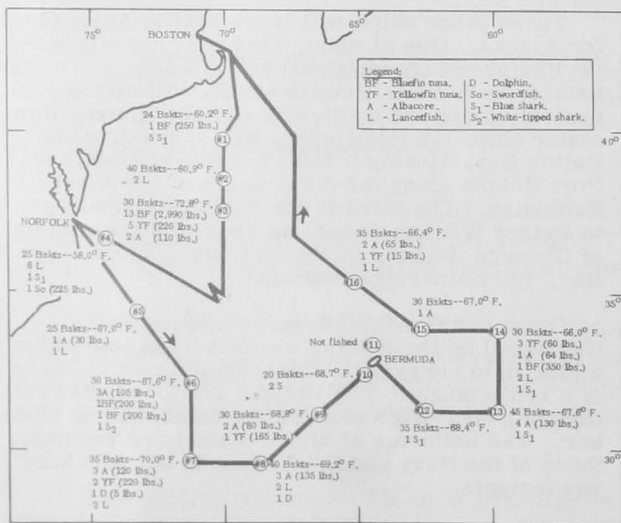
The fishing gear used in this survey was all-nylon long-line gear of a type developed by the Service for use in the Gulf of Mexico. Each 10-hook section or "basket" of gear is 828 feet long, suspended in the water with buoys with lines of 10 or 15 fathoms in length. Hooks were baited with sea herring (Clupea harengus), alewives (Pomolobus pseudoharengus), and bluebacks (Pomolobus aestivalis).



The Service's research vessel, M/V Delaware.

First indications that bluefin (Thunnus thynnus) of a large size were to be found in the northern waters of the Western Atlantic during the winter season was during the first 24 basket set 60 miles SW. by S. of Nantucket Lightship, over the edge of the Continental Shelf. One 250-pound bluefin tuna and several blue sharks were caught at this station.

Station 3, located in the warmer waters of the Gulf Stream, yielded 3,320 pounds of tuna on a 29-basket set, with a catch rate of 7.1 fish per 100 hooks. Thirty baskets were set but one basket, heavy with fish, was lost due to parting of the mainline in rough seas. The catch consisted of 13 bluefin (average 230 pounds each), 5 yellowfin (1--50 pounds, 4--15-20 pounds), and 2 albacore (55 pounds each).



M/V Delaware Cruise 57-3, March 15 to April 12, 1957.

Stormy seas halted all fishing and after resumption of fishing operations in more southern waters, albacore were taken at almost every station with occasional catches of yellowfin and bluefin (see chart). Very rough seas prevented additional fishing near the Gulf Stream on the north leg of the cruise.

Surface temperature, bathythermograph casts, and night-light collections were made at all stations in cooperation with the Woods Hole Oceanographic Institution. Technological samples for freezing tests, morphometric measurements, and stomach content samples were also taken.

The Delaware was scheduled to leave on April 23 for three weeks of scallop exploratory fishing and gear performance tests, using conventional and modified 11-foot New Bedford scallop dredges, in the Georges Bank area. Technological problems in freezing scallops at sea were to be investigated utilizing the equipment now installed aboard the vessel.



## North Atlantic Fisheries Investigations

TAGGING CRUISE BY M/V "ALBATROSS III" (Cruise 89): To test the efficacy of various tag combinations for haddock, to tag cod, and to make kinescope recordings of groundfish behavior with underwater television were the objectives of the Service's research vessel Albatross III during this cruise (March 21-April 5, 1957).

Tagging was conducted on Georges Bank mostly east of  $67^{\circ}$  and north of  $41^{\circ}40'$ ; Browns Bank west of  $65^{\circ}50'$  and north of  $42^{\circ}41'$ . A total of 72 tows of 20 to 60 minutes duration were made in depths ranging between 24 and 56 fathoms. A standard #41 otter trawl with cod ends of  $3\frac{1}{4}$ -inch double manila and  $4\frac{1}{2}$ -inch dacron with a cover was used. Various combinations of tags were experimented with: Peterson Gill vs. plastic "spaghetti" dorsal loop; Peterson Gill vs. Peterson Gill with a "spaghetti" loop on gill cover; Peterson dorsal fastened with stainless steel wire; combination Lea Hydrostatic with internal anchor. A total of 2,117 haddock, 585 cod, and 80 halibut were tagged.

The television camera was rigged in a  $7\frac{1}{2}$ -inch cod end looking aft. Two 1,000-watt underwater lights were attached just forward of the camera housing. The behavior (including escapement) of haddock was televised and recorded in the vicinity of Cape Cod on Stellwagen Bank, and about 5 miles off Nauset Beach.



## North Pacific Exploratory Fishery Program

MIDWATER TRAWL RESEARCH (M/V John N. Cobb Cruise 30): (1) Obtaining information on the performance of a 64-foot nylon midwater trawl and the acoustic depth telemeter, (2) perfecting midwater trawl handling techniques, and (3) search for fish at midwater depths were the principal objectives of a five-week cruise by the Service's exploratory fishing vessel John N. Cobb. The first two weeks were spent in the inside waters adjacent to the San Juan Islands. The mesh sizes of the new midwater trawl net range from 5-inch stretched mesh in the wings to 3-inch stretched mesh in the cod end. A liner of  $1\frac{1}{4}$ -inch stretched mesh was inserted in the cod end to sample species of small fish such as herring.

After completion of gear testing, the vessel returned to Seattle for installation of a "Sea Scanar" recorder and minor modifications of the midwater trawl gear prior to heading for the waters off the Washington coast on March 25 to search for fish at midwater depths.

Considerable sounding with the recording "Sea Scanar" and a recording depth sounder off the Washington coast from Swiftsure Lightship to off the Quillayute Riv-

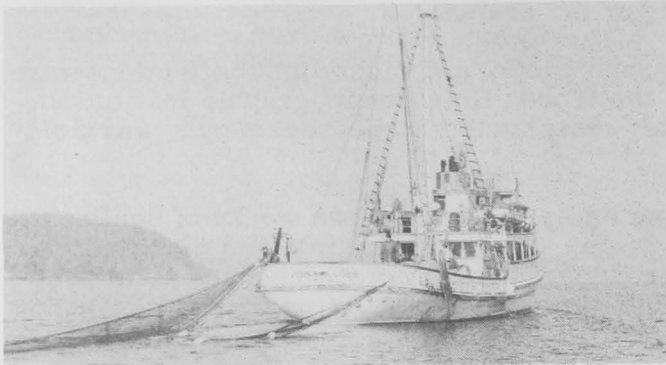


Fig. 1 - Setting nylon mid-water trawl net from the M/V John N. Cobb in the Straits of Georgia.

er at distances up to 40 miles offshore revealed only a few small and widely-separated schools of fish in midwater. Because of these conditions actual fishing operations with the midwater trawl were limited to four tows which were made to verify the identification of fish on the recorder tracings. Catches were small, with the best tow yielding 12 pounds of black rockfish, 6 pounds of herring, and 8 pounds of smelt. The "Sea Scanar" recorder and the depth telemeter worked satisfactorily.

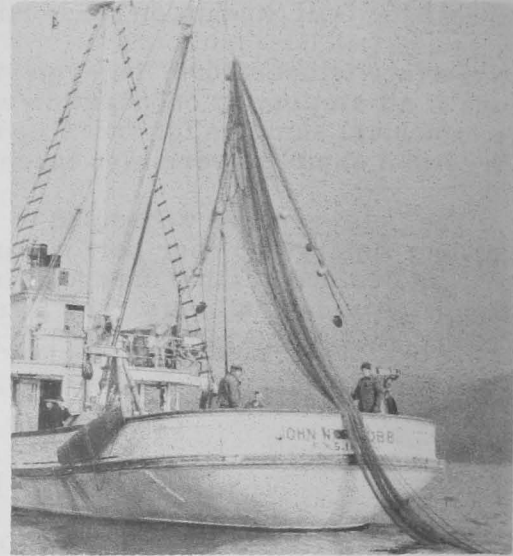


Fig. 2 - Picking up mid-water trawl aboard the M/V John N. Cobb.

This was the first in a series of midwater trawling cruises scheduled during 1957 to determine the practicability of a commercial midwater fishery for such food

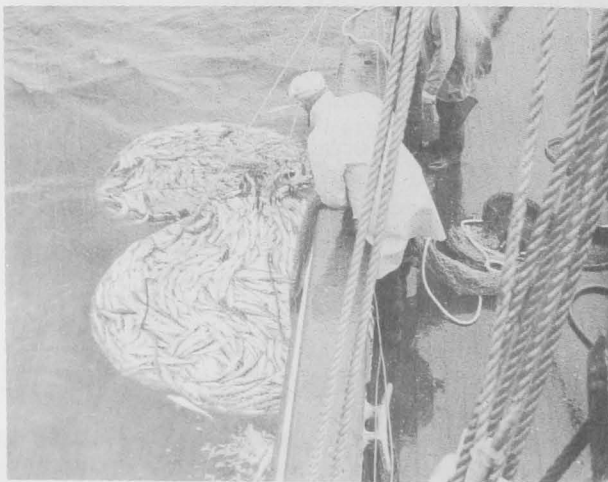


Fig. 3 - Floater of fish caught at mid-depths by the M/V John N. Cobb's mid-water trawl off the Coast of Washington in June 1956. Mostly hake were caught.



Fig. 4 - Emptying another cod end full of fish caught at mid-depths by the M/V John N. Cobb's mid-water trawl off the Washington coast in June 1956. Catch was mostly hake.

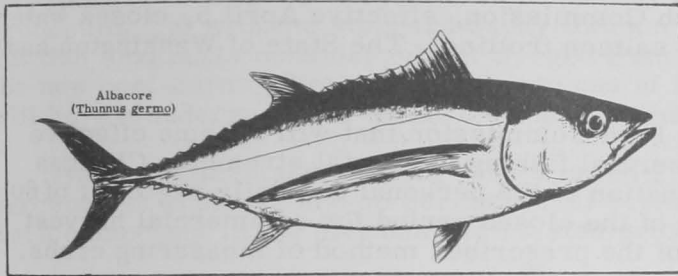
fishes as Pacific ocean perch, cod, and other species which are known to spend at least part of their time off the bottom. The cruise was originally scheduled to last seven weeks, but because of the necessity for emergency repairs to the main engine of the John N. Cobb, it was terminated one week ahead of schedule and the vessel returned to port on April 5.



## Oregon

**ALBACORE TUNA LANDINGS, 1956:** The return of albacore tuna in commercial quantities to waters off the Oregon coast in 1956 after an absence of four years resulted in landings of 3.5 million pounds of this species at Oregon ports, according to the Oregon Fish Commission (December 31, 1956).

Presence of albacore in offshore waters of the Northwest in 1956 was first confirmed by scattered catches of albacore by two research vessels, the John N. Cobb of the U. S. Fish and Wildlife Service and the Brown Bear of the University of Washington Department of Oceanography. The vessels were participating in an extensive search for tuna and were studying conditions that could possibly explain the sporadic appearance of albacore in the northeast Pacific Ocean.



Stimulated by the research vessel catches, commercial vessels joined in the search for fishable concentrations of albacore and in late August schools of albacore were located about 70 miles off Newport, Ore.

Heavy catches continued through September until a drop in price caused many boats to abandon albacore fishing. By early October, landings of locally-caught fish tapered off and the bonanza was over--at least for 1956.

The good albacore run in 1956 was no accident--daily catches per boat were higher than in 1944 when a peak catch of 22.5 million pounds was landed in the State. Had the fish appeared in July, as they formerly did, and had the market remained good throughout fall months, the 1956 catch might have been comparable to previous good years.

Whether or not albacore will return to Oregon offshore waters in 1957 is a question. Fisheries scientists who have worked on the mystery are reluctant to give explanations of the albacore's movements. There is some evidence that water temperature has an influence on albacore migration.

Some fishermen had predicted the return of albacore early last summer after observing an abundance of albacore food--principally small bait fishes--in the Northeast Pacific Ocean waters. This factor may also have a definite bearing on the appearance of albacore off the Oregon-Washington coast.

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**COMMERCIAL FISHING REGULATIONS REVISED:** The Fish Commission of Oregon announced early in April 1957 that it has adopted more stringent regulations governing commercial trolling for salmon in State waters.

Effective April 5, use of sport gear (hook and line, rod and line, reel, or any combination thereof used in angling) for commercial fishing under provisions of an Oregon troll license is prohibited and declared unlawful. Further, possession or custody of such gear aboard any boat or vessel used or engaged in trolling under the troll license or while en route to or from fishing in waters of State jurisdiction is likewise prohibited.

The State Fisheries Director stated that the new orders have been enacted to curb the activities of individuals who have been using commercial troll licenses to exceed established angling bag limits on salmon in coastal waters. He also stated that there is no intent on the part of the Commission to interfere with bona fide commercial salmon trolling by adoption of the new rules.

The revised regulation also states that there is no intent to prohibit boats or vessels normally employed in trolling from being used for charter, hire, or use in guiding when such boats are not engaged in commercial trolling.

Another action of the Oregon Fish Commission, effective April 5, closes waters of the Columbia River to commercial salmon trolling. The State of Washington had previously taken such action.

Other regulations revised by the Fish Commission that will become effective April 5 pertain to shellfish and commercial fishing in coastal streams. Changes in shellfish regulations include elimination of the personal use daily bag limit of 60 crayfish per individual; an alteration of the closed period for commercial harvest of crayfish; and a clearer definition of the prescribed method of measuring crabs.

The crayfish limit was dropped because there was no apparent biological purpose for the restriction. The commercial closed season on crayfish will now extend from November 1 to March 31, to afford more protection for female crayfish while they are carrying eggs. Measurements of crabs are to be the shortest distance through the body from edge of shell to edge of shell, directly in front of the points or lateral spines.

The passage of an initiative measure prohibiting commercial fishing for salmon in coastal streams south of the Columbia River at the last general election necessitated revision of several regulations still applicable to the coastal streams. All references to lawful commercial salmon fishing in coastal streams have been removed from the old regulations. Former provisions permitting lawful harvest of shad, striped bass, and miscellaneous other fishes, where applicable, have been re-enacted in the new order.

A continuous 30-day open season, November 1-30, for chum salmon in Tillamook Bay, as authorized in the coastal closure initiative, is also incorporated in the revised coastal order.

\* \* \* \* \*

NEW HATCHERY FISH DIET USES UNUTILIZED MARINE FISH: Credit for developing a new hatchery fish diet using unutilized marine fish is shared jointly by the Oregon Fish Commission hatchery biology section and the Oregon State College Seafoods Laboratory at Astoria. The Seafoods Laboratory staff is searching for new uses of Oregon marine fishes not now being utilized. Fish hatchery diets offer a great potential. Some two million pounds of fish food are required annually for operation of Commission hatcheries alone.

It is planned to test the new diet on a hatcherywide basis at the Klaskanine Hatchery near Astoria. Results of this experiment will help to determine whether or not the new diet will be adopted for use at all 15 Commission salmon hatcheries.

Second phase testing of the experimental production diet for hatchery salmon was initiated the latter part of March at the Oregon Fish Commission's Sandy hatchery with the release of 32,000 "marked" silver salmon fingerlings into the Sandy River.

Prior to release, 16,000 of the young fish that had been fed a normal hatchery diet for almost a year were "marked" by excision of the adipose fin and a portion of

the left maxillary or upper jaw bone. The other 16,000 fingerlings had received the newly-developed experimental diet and were distinguished from the normal-diet fish by an adipose-right maxillary mark.

This phase of the testing is being conducted to determine if the experimental diet has any delayed influence on the survival of hatchery fish after they are liberated. The fish released won't be expected back to the Sandy River as adults until late 1958. Jacks will be due back this fall.

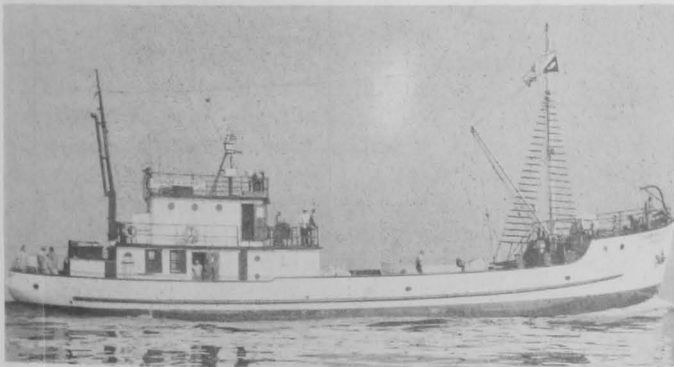
Results of the preceding 12-months feeding trial comparing the experimental production diet with the standard Sandy Hatchery diet indicate the new diet could cut fish food costs considerably at Oregon Fish Commission hatcheries. But before the new cost-cutting diet can be put into use at all Fish Commission hatcheries, it will have to undergo larger-scale testing, according to the State Fisheries Director.

The experimental diet being tested is fed in pellet form and is composed of 45 percent fish products and 55 percent meal consisting of a variety of components. Each component in the diet has been tested previously for fish-growing qualities.



## Pacific Oceanic Fishery Investigations

ABUNDANCE OF SURFACE SCHOOLS OF TUNA BY LIVE-BAIT FISHING STUDIED (M/V Charles H. Gilbert Cruise 32): The abundance and distribution of surface schools of yellowfin and skipjack tuna by live-bait fishing and the availability of Marquesan sardines on the baiting grounds of all islands in the Marquesas group were studied by the Service's research vessel Charles H. Gilbert on a 70-day cruise (January 11-March 22, 1957). Abundant schools of skipjack or striped tuna (aku) and adequate supplies of live bait were reported found. The Marquesan area some 2,000 miles southeast of Hawaii is of interest as a potential new winter (Marquesan summer) fishing ground both for Hawaii-based boats and for the West Coast tuna fleet.



The Service's research vessel, Charles H. Gilbert.

In general, skipjack tuna (Katsuwonus pelamis) were very abundant around the Marquesas throughout the period of the cruise. Yellowfin tuna (Neothunnus macropterus) were not so abundant, however.

Two surveys were made of all the Marquesas Islands area during the cruise. On the first (January 25-31) the following tuna schools were sighted: skipjack, 40; yellowfin, 4; unidentified tuna, 32; mixed yellowfin and skipjack, 4; total schools sighted--80.

On the second survey (February 23-March 1), the following schools were sighted: skipjack, 21; yellowfin, 7; unidentified tuna, 61; mixed yellowfin and skipjack, 0; total schools sighted--89. (Unidentified schools are those where tuna are seen but not identified as to species.)

It is of interest to note that a similar survey made during August 1956 (Marquesas winter) resulted in the sighting of 33 schools.

In the Marquesas area, fishing trials were made with live bait on a total of 99 tuna schools. Fish from 36 of these schools responded to the point were a catch of one or more fish was made; fish from 12 schools "bit well," and 100 or more fish were caught.

School Composition	Number of Trials	Catch of One or More Tuna	Catch of 100 or More Tuna
Skipjack . . .	68	29	12
Yellowfin . .	18	2	0
Unidentified .	7	0	0
Mixed species	5	4	0
Little tuna . .	1	1	0
Total . .	99	36	12

It will be noted from table 1 that only fish from skipjack schools can be considered to have "bitten well." Virtually all of the fish in schools identified as yellowfin were large--from 50 to 100 pounds, and they did not respond favorably to the live bait. The majority of the skipjack caught weighed from 4 to 10 pounds, with fish from a few schools weighing 15-20 pounds each.

As might be expected, fish from the schools chummed exhibited variation in favorable response to live bait. In general, the schools encountered during the first part of the cruise did not respond well. The best catches were made during the last six fishing days (March 4-9), when catches of 100 or more skipjack were made from six of the 14 schools chummed.

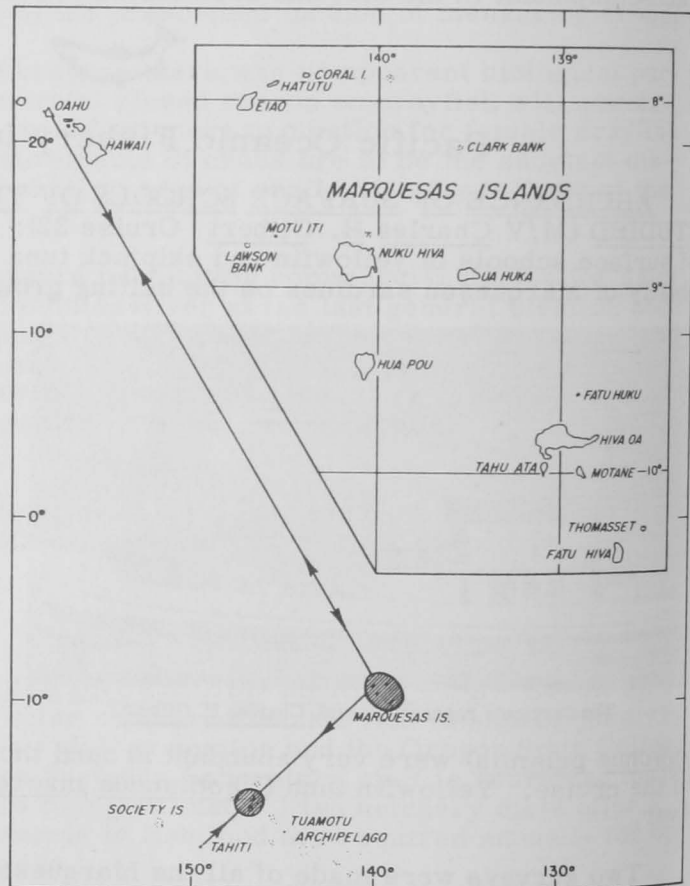
A total of 797 of the skipjack and 10 of the yellowfin tuna from the total catch of 4,838 skipjack and 53 yellowfin were tagged and released.

Two species of fish of a size suitable for live bait fishing were found in bays of the Marquesas Islands; the Marquesan sardine (*Harengula vittata*) and weke (*Mulloidichthys* sp.). The sardines schooled well around the boat when thrown as live bait, but the weke tended to scatter and dive, proving unsuitable for tuna.

Surveys were made of 13 bays of the Marquesas Islands for sardines, and varying quantities were seen or caught in 10 of them. Most of the sardines were located over sandy bottom in sheltered bays (see table 2).

It was found that sardines of all sizes were attracted to a floodlight at night and on seven occasions successful sets were made with the night net alongside the vessel.

In all 1,678 buckets of sardines were caught in 59 day sets and seven night sets, each bucket containing an average of eight pounds of sardines. The sardines ranged from 3 to 5 inches in length, with most around 3½ inches.



Charles H. Gilbert Cruise 32 (January 11-March 22, 1957).

Sixty-four buckets of sardines (approximately 12,000 individuals) were released inside Pokai Bay, Oahu, on March 22, 1957, in an attempt at introduction of the species into Hawaiian waters.

Table 2 - Bait-Fish Productivity in Six Bays in Order of Decreasing Productivity

Locality	Remarks
1. Taio Hae Bay, Nuku Hiva I.	Most reliable bait source, 1,200 buckets seen, 1/24/57. Good protection from weather. Short tow to vessel.
2. Anaho Bay, Nuku Hiva I.	5,000 buckets seen, 1/31/57. Bad surge in NE. weather.
3. Taipi Vai, Nuku Hiva I.	100 buckets caught 2/4/57. Good protection from weather. Long tow to vessel.
4. Hakiheu, Nuku Hiva I.	130 buckets caught 3/5/57. Bad surge in NE. weather.
5. Taa Huku Bay, Hiva Oa I.	40 buckets caught, 1/27/57. None seen 2/27/57. Good protection from weather.
6. Hatiheu Bay, Nuku Hiva I.	50 buckets caught, 2/8/57. Bad surge in NE. weather.

Three days were spent in the Tuamotus in the vicinity of Ahi, Manihi, and Raihira atolls (table 3).

A new type of plastic dart tag was used to tag skipjack and yellowfin tuna on this cruise. The fish were released alive in the hope that subsequent recaptures may shed some

light on the migrations of these fish, at present almost completely unknown. The barbed head of the new tag is simply stabbed into the tissues of the fish, obviating the time-consuming knotting that was necessary with earlier types of plastic tags. Since tuna, and particularly skipjack, die very quickly out of the water, the speed and ease of attachment of the dart tag make it a very promising new tool for tuna research.

Table 3 - Tuna Schools in the Tuamotus				
	Schools			
	Skipjack	Yellowfin	Mixed	Unidentified
	(Number of Fish)			
Sighted . .	5	1	2	21
Chummed	1	1	2	-
Catch . . .	237	17	-	-

\* \* \* \* \*

**ALBACORE TUNA PROGRAM:** Studies of the albacore catch data gathered by the Service's Pacific Oceanic Fishery Investigations research and exploratory vessels were completed during the first quarter of this year. An estimate of the catch per unit of effort of subsurface albacore by long-line and the troll catch per unit of effort was made for various temperatures.

An estimate of the catch per unit of effort at various temperatures was obtained for both fall and winter long-line catches by first computing the hook depths from the results of sounding tube studies and then using these depths to estimate the temperatures from the on-station bathythermograms. The winter estimate showed a peaking of the catch at about 56° F. to 58° F. with the majority of the catch being made between 55° F. and 63° F. Although the data are few, all sizes of albacore were taken over approximately the same range of temperature. The fall temperature ranges were too broad to provide a reliable estimate, but there did appear to be a peaking at 56° F. or at about the same temperature noted for the winter catch.

A plot of the number of troll-caught albacore versus temperature gave an extreme range of 52° F. to 66° F. The plot gave a jagged curve with a dominant peak



extending from 59° F. to 60.5° F., with a smaller peak at 63° F. and a smaller well-separated peak at 52° F. A breakdown of the data as to season (summer and fall) and area (eastern and central Pacific) showed two paramount features. First, the central Pacific albacore have the over-all temperature range described above while the eastern Pacific albacore are restricted to the center of the temperature range. Second, the peak observed at 63° F. was associated with the fall catches in the eastern Pacific.

In the field of oceanography, the processing and analysis of data collected on past oceanographic and fishing cruises have continued. Two trial plots of the surface temperature from ships' weather reports were made for the July 11-20 periods of 1955 and 1956. These trials show that there are now adequate data available for the preparation of synoptic charts over the entire northeast Pacific. The coverage is adequate to permit annual and seasonal fluctuations to be traced and the position and extent of the temperature front (Polar Front) north of Hawaii and areas of upwelling off the West Coast to be described.

The Japanese have two albacore tuna-tagging programs under way. The Kanagawa Prefecture Fishery Experiment Station is sponsoring a tagging program in the long-line albacore fishery. During the past winter about 800 tagged fish were released in the Pacific and Indian Oceans by the commercial long-line vessels. The Nankai Regional Fisheries Research Laboratory is making preparations to tag about 1,500 albacore in the summer live-bait fishery off Japan.

Plans were completed for an intensive survey of a band approximately 350 miles wide off the West Coast between Point Arguello, Calif., and Destruction Island, Wash. The plan is to have 10 commercial vessels make an intensive trolling survey of the area while two POFI vessels patrol the area collecting biological and oceanographic data. The commercial vessels will be selected on a competitive bid basis.

**BAITFISH STUDIES:** As previously reported, on October 12, 1956, adult tilapia were placed in redwood tanks at the Service's Pacific Oceanic Fishery Investigations laboratory in Honolulu, the purpose being to examine this rearing method as a means of producing young fish for tuna bait. The first young were observed on December 20, 1956. Since that date one tank has been in continuous production, with 64 females producing 14,000 young in about 100 days. In a second tank with slightly different temperature and light conditions, relatively few (2,600) young were produced.

We have learned that young tilapia can be reared to optimum bait size (1½ to 2½ inches) for skipjack fishing in two months. We have also found that even the young fish are very cannibalistic, therefore the different size groups must be segregated.

A second meeting of the Baitfish Research Coordinating Committee was held and a plan adopted for POFI and Hawaiian Tuna Packers, Ltd. to collaborate in studying the production of bait-size tilapia in two large ponds near Honolulu. Intensive seining operations were carried out and large numbers of the adults in each pond were marked by fin clipping. The fish will be fed during the spring and summer and at regular intervals the ponds will be seined, the young fish removed for tuna bait, and from the recoveries of marked fish, the total population of the ponds will be estimated. From the information obtained by the end of the summer we will have a measure of the bait fish production from a known number of adult fish, with the feeding and harvesting costs; we can then evaluate this method of tilapia culture for producing bait fish. The bait produced will be used on POFI vessels and the commercial skipjack boats.

The largest introduction of Marquesan sardines to Hawaiian waters was effected in March when 12,000 were released along the south coast of Oahu. The fish were in fine condition. Within a week after the release two were taken by Oahu bait fishermen, one near Honolulu and the other on the north coast of the island.

**BIG-EYED AND YELLOWFIN TUNA STUDIES:** The big-eyed tuna catch data from the Hawaiian long-line fishery (1948 through 1955) were summarized and the analyses completed. The results gave firm evidence that the major part of the increase in big-eyed landings for the eight-year period under study was due to a shift in fishing grounds of the larger vessels from a general localized fishing effort around Oahu to an increased amount of effort being expended in the Hana, Maui, and Hilo, Hawaii, areas. These latter areas are considered to be good big-eyed fishing grounds.

The evidence supporting this conclusion is twofold. First, an analysis of the catch per unit of effort by size of vessel showed completely contrasting results. The big-eyed catch per trip of the smaller vessels (less than 45 feet registered length) was relatively constant over the entire period studied except for minor fluctuations. On the other hand, the catch per trip for the larger vessels showed a drastic increase from the 1948/49 season to the 1951/52 season with a relatively stable catch per trip thereafter. The second bit of evidence was obtained from a study of the area fished. The results showed that during the 1948/49 season only 44 percent of the total trips during the season were made into the Hilo-Hana areas. The effort into these areas increased during the subsequent years and leveled off during the last three years at about 90 percent.

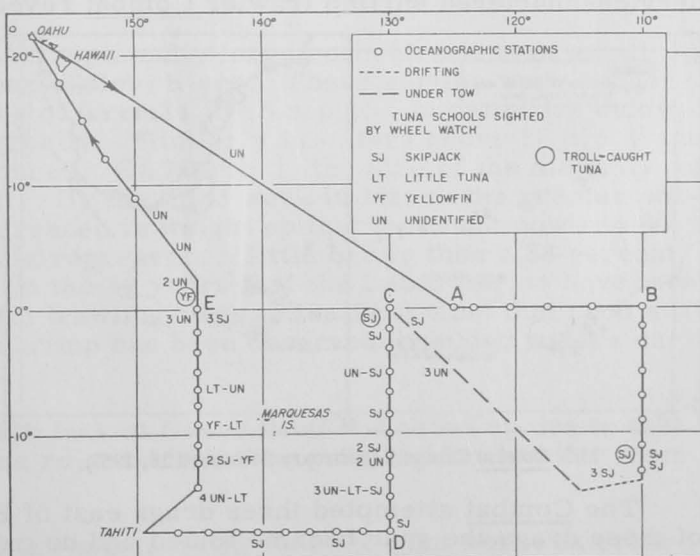
A cursory study of the yellowfin catches showed a rather constant yellowfin catch per trip for the small vessels with the only noticeable drop occurring during 1955. Contrasted to this the catch per effort of the larger vessels was uniform only up through 1952 and dropped to a lower level thereafter. A general consensus shared by fishermen is that the windward sides of the islands are better big-eyed tuna grounds than the lee, whereas for the yellowfin the reverse is true. If this can be accepted (the data does show some confirmation), then it is possible to explain the drop in yellowfin catch rate to a lower level by the shift in effort discussed above. Essentially the fleet moved from the lee of Oahu to the windward side of the islands of Maui and Hawaii.

These results are particularly interesting because earlier investigators had attributed the marked changes in Hawaiian landings to changes in the distribution and/or abundance of the fish themselves.

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**OCEANOGRAPHIC OBSERVATIONS ASSOCIATED WITH TUNA STUDIES IN CENTRAL PACIFIC (M/V Hugh M. Smith Cruise 38):** Scientific observations associated with studies of the tuna resources of the south central Pacific Ocean were completed on March 26 on an 11-week cruise by the Service's research vessel Hugh M. Smith. The vessel sailed 10,000 miles gathering detailed physical, chemical, and biological oceanographic information from an area covering more than 2 million square miles of ocean.

The primary mission of the vessel was determination of areas of high fishery potential, but an engine breakdown 3,600 miles



Hugh M. Smith Cruise 38 (January 11-March 26, 1957).

southeast of Hawaii provided an unusual opportunity to study in detail a feature of the oceanic circulation known as the Southeastern Pacific gyral.

During a 2-week drift covering almost 300 miles, daily hydrographic casts were made to 4,000-foot depths in order to gather water samples for chemical and temperature analysis. Movements of ocean currents can be determined by this technique. While drifting, the vessel crew improvised long-line fishing gear, which they launched daily in an effort to catch subsurface tunas.

Following engine repairs at sea with parts brought from Honolulu by the Coast Guard buoy tender Balsam, the Hugh M. Smith resumed her scheduled program. This included the use of radioactive carbon to determine the primary productivity of the marine algae upon which the ocean food chain depends, net hauls to capture small marine animals known as zooplankton, and special plankton hauls to secure fish larvae to provide data on the distribution of young tuna.

Some 2,400 miles southeast of Honolulu the vessel encountered large patches of yellow discolored water in an area about 10 miles in width. The patches were probably similar to the so-called "red tide," caused by a minute marine organism, which has occurred off California and Florida coasts. Samples of the discolored water were preserved for microscopic study at the Service's Honolulu Laboratory.

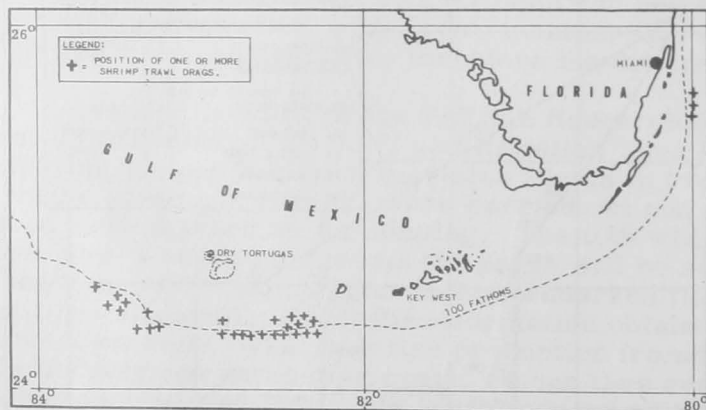
Other special water samples were taken just north of the equator at 145° W. longitude for a Norwegian marine biologist who is studying the phytoplankton (drifting marine algae) of the central Pacific.

A total of 48 tuna schools were sighted about 1,800 miles south of Hawaii--19 of the schools were skipjack (aku), 4 were little tunny (kawakawa), 2 were yellow-fin (ahi), and 23 were unidentified.



## South Atlantic Exploratory Fishery Program

SOUTHEASTERN FLORIDA COAST DEEP-WATER SHRIMP SURVEY (M/V Combat Cruise 8): Deep-water shrimp trawling activities in March along the southeastern Florida coast from off Miami to Dry Tortugas by the U. S. Fish and Wildlife Service-chartered shrimp trawler Combat revealed no bottom where consistently



M/V Combat Cruise 8 (February 24-March 16, 1957).

good catches of red shrimp (Hymenopenaeus robustus) could be made.

Twenty-nine drags were made in the Key West-Dry Tortugas area in depths of 185 to 230 fathoms. Catch rates varied from 0 to 265 pounds of red shrimp per 3-hour drag. Various combinations of fishing gear were used, including 40-, 56-, and 100-foot flat trawls and an 80-foot balloon trawl. The 80- and 100-foot nets were fished with two warps, and the smaller nets were fished using a single warp and bridle.

The Combat attempted three drags east of Fowey Rocks Light (Miami). On two of these drags the gear became fouled and no catch was obtained. On the third drag the trawl, doors, bridle, and 100 fathoms of warp were lost when the trawl hit a bottom obstacle.

Considerable time was lost due to strong winds and mechanical difficulties.



## South Carolina

### FISHERIES BIOLOGICAL RESEARCH PROGRESS, JANUARY-MARCH 1957:

Oyster Research: Two other companies have indicated interest in producing seed oysters for commercial export. Past experimental shipments indicated the possibility of exporting seed oysters from South Carolina to other waters, but final proof of the practicability would depend on successful export and successful growing of seed oysters on a much larger scale than our experimental plantings, Progress Report No. 31 (January-March 1957) of the Bears Bluff Laboratories points out.

Regular monthly studies on growth and mortality of individual oysters in trays at the Laboratory dock were begun again after a five-month recess due to a lack of personnel. Measurements and inspection of the individual oysters showed a 5.8-percent mortality of all oysters from July to January. Since January, the number of oysters dying has been very small and the percentage of mortality totaled only 1.4. Growth of oysters from January through the end of the first quarter has been about normal.

Shrimp Research: A total of 33 experimental drags off the southern part of South Carolina out to the 50-fathom curve were made during January, February, and March. Rock shrimp (Sicyonia) continued to be found in small amounts in from 20 to 40 fathoms of water. One trawl haul made in 20 fathoms at night on March 14 yielded 710 porgy in 30 minutes of dragging with a 20-foot net. However, all these fish were quite small, ranging from 5 to 6 inches only in length. Other fishes were not taken in commercial quantities.

In February the Laboratories' offshore research vessel served as a "quarter" boat for several days while shrimp fishing was carried on from an 18-foot launch in the shallow waters of Bull Bay. Trawling in Bull Bay yielded a few white shrimp (Penaeus setiferus), but only one spotted shrimp (Penaeus duorarum).

During the period covered by this report both research vessels kept tabs on the population of white shrimp which usually are found during the winter months from the beach out to about 4 fathoms. In January the relative abundance of white shrimp under the beach appeared to be slightly greater than usual for the past three years. Small white shrimp were also fairly numerous in this area in February but seemed appreciably less in March. No small white shrimp could be found more than three miles off the beach.

In late February and in March, exceptionally large concentrations of small white shrimp were located in the South Edisto River. These shrimp were concentrated in waters with a salinity range of from 14 to 18 p.p.t. In salinities below 14 p.p.t. the numbers diminished greatly. Similarly in waters above 18 p.p.t. the density of shrimp was markedly reduced. On March 2, the size of the majority of the shrimp was 130 count (heads off). By the third week in March the greater portion of the catch in this area had increased in weight so that the count now ran 80 shrimp to the pound (heads off). This represents a little better than a 38-percent increase in weight in three weeks. In the 4½ years that the Laboratories have been continually carrying out experimental trawling, this is the first time that such a large concentration of small white shrimp has been observed in inland waters during the winter months.

Pond Research: The fresh-water lake at Bears Bluff had dried up due to the long extended drought. The lake was re-established by pumping fresh water from a deep well.

During the period covered by this report, a 535-foot six-inch well was drilled in the yard of the Laboratories and a deep-well jet pump was installed. In January the Department of Public Works of Charleston County removed more than 7,500

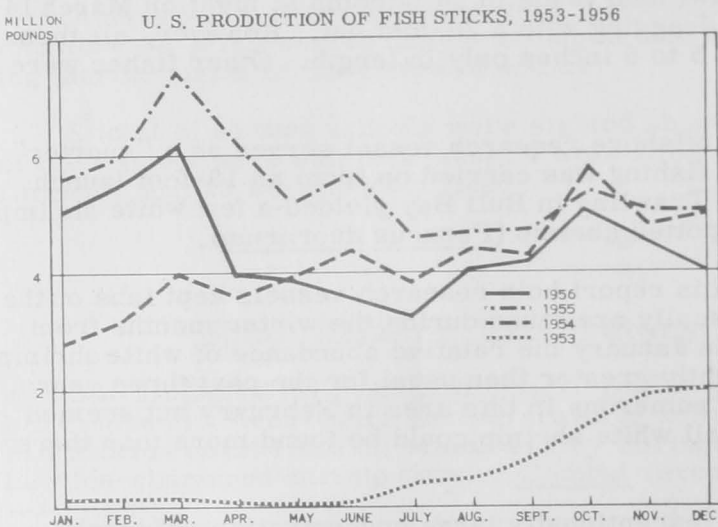
cubic yards of material from the lake bed and rebuilt and strengthened the dam separating the lake from one of the salt-water experimental ponds. At the end of March the deep well supply, augmented by rainfall, has resulted in the accumulation of over a million gallons of fresh water. Within a short time it will be possible to pump from the fresh-water lake and "irrigate" one of the salt-water ponds. Thus one one-acre salt-water pond can be kept at high salinity while in the other one-acre experimental pond the salinity can be lowered to almost any desired amount, and thus the influence of salinity both high and low, on shrimp, crab, fish, and oysters can be studied without fear of interruption from further drought. The salinity conditions found in low country creeks and rivers in periods of heavy rainfall or drought can be simulated.

Note: Also see Commercial Fisheries Review, January 1957, p. 47.



### U. S. Fish Stick Production

**1956 PRODUCTION:** The United States production of fish sticks amounted to 52.6 million pounds in 1956. This was a decrease of 20 percent as compared with the amount manufactured in 1955. Precooked fish sticks accounted for 87 percent



Month	1956	1955	1954	1953
	(1,000 Lbs.)			
January . . .	4,862	5,601	2,771	115
February . .	5,323	5,954	3,180	133
March . . . .	6,082	7,393	4,003	148
April . . . . .	3,771	6,249	3,841	35
May . . . . .	3,873	5,169	3,941	22
June . . . . .	3,580	5,687	4,381	31
July . . . . .	3,153	4,587	3,810	417
August . . . .	4,166	4,671	4,364	454
September . .	4,085	4,703	4,272	809
October . . . .	5,063	5,356	5,637	1,435
November . . .	4,585	5,042	4,803	1,902
December . . .	4,019	4,972	4,959	2,001
<b>Total . . . .</b>	<b>52,562</b>	<b>65,384</b>	<b>49,962</b>	<b>7,502</b>

of the 1956 total while the remaining 13 percent consisted of uncooked sticks. Plants located in the Atlantic Coast States produced 81 percent of the total. Firms in the interior of the country and in the Gulf States manufactured 12 percent while the remaining 7 percent was produced in the Pacific Coast States.

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**JANUARY-MARCH 1957:** Preliminary statistical data indicate that the United States production of fish sticks during the first three months of 1957 amounted to 14.8 million pounds. This was a decrease of 11 percent as compared with the 16.6 million pounds produced during the first quarter of 1956.

Month	Cooked	Uncooked	Total
	(1,000 Lbs.)		
January . . . . .	3,774	493	4,267
February . . . . .	4,680	599	5,279
March . . . . .	4,727	413	5,140
<b>Total 1st. Quarter 1957 .</b>	<b>13,181</b>	<b>1,505</b>	<b>14,686</b>
<b>Total 1st. Quarter 1956 .</b>	<b>14,700</b>	<b>1,900</b>	<b>16,600</b>
<b>Total 1st. Quarter 1955 .</b>	<b>16,500</b>	<b>2,500</b>	<b>18,900</b>

Production in the Atlantic Coast States accounted for 81 percent of the total followed by the

interior and Gulf States with 10 percent. The remaining 9 percent was manufactured in the Pacific Coast States.

Table 2 - U. S. Production of Fish Sticks by Areas, Jan.-Mar. 1956-57

Area	January-March			
	1957		1956	
	Number of Firms	Thousands of Pounds	Number of Firms	Thousands of Pounds
Atlantic Coast States . . . . .	26	11,887	27	13,060
Interior and Gulf States . . . . .	4	1,520	7	2,283
Pacific Coast States . . . . .	11	1,279	10	1,259
Total . . . . .	41	14,686	44	16,602

Precooked fish sticks (13.3 million pounds) accounted for 90 percent of the first-quarter total production while uncooked fish sticks accounted for 10 percent of the total.

Note: Also see Commercial Fisheries Review, Feb. 1956, p. 34; June 1956, p. 44; Aug. 1956, p. 50.



## United States Fishing Fleet<sup>1/</sup> Additions

**MARCH 1957:** A total of 41 vessels of 5 net tons and over were issued first documents as fishing craft during March 1957--24 more than during the correspond-

Table 1 - Vessels Issued First Documents as Fishing Craft, by Areas, March 1957 with Comparisons

Area	March		Jan.-Mar.		Total 1956
	1957	1956	1957	1956	
	(Number)				
New England . . . . .	-	1	3	5	15
Middle Atlantic . . . . .	5	2	10	7	26
Chesapeake . . . . .	5	4	22	12	138
South Atlantic . . . . .	8	1	19	11	119
Gulf . . . . .	12	5	22	15	100
Pacific . . . . .	9	1	14	4	76
Great Lakes . . . . .	-	2	-	2	6
Alaska . . . . .	2	1	8	3	40
Hawaii . . . . .	-	-	-	1	1
Total . . . . .	41	17	98	60	521

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

Table 2 - Vessels Issued First Documents as Fishing Craft, by Tonnage, March 1957

Net Tons	Number
5 to 9 . . . . .	17
10 to 19 . . . . .	7
20 to 29 . . . . .	3
30 to 39 . . . . .	10
40 to 49 . . . . .	2
120 to 129 . . . . .	1
130 to 139 . . . . .	1
Total . . . . .	41

ing month of 1956. The Gulf area led all others with 12 vessels, followed by the Pacific Coast area with 9, the South Atlantic area 8, the Chesapeake and Middle Atlantic areas 5 each, and Alaska 2.

<sup>1/</sup> Includes both commercial and sport fishing craft.



## U. S. Foreign Trade

**EDIBLE FISHERY PRODUCTS, JANUARY 1956:** Imports of edible fresh, frozen, and processed fish and shellfish in January 1957 were higher by 29.5 percent in quantity and 18.4 percent in value as compared with the previous month. Compared with January 1956, the imports for January this year were up 0.4 percent in quantity and 4.0 percent in value. Imports for January 1957 averaged 28.2 cents a pound as compared with 27.2 cents a pound for the same month in 1956.

Item	Quantity			Value		
	Jan.	Year	Year	Jan.	Year	Year
	1957	1956	1956	1957	1956	1956
	(Millions of Lbs.)			(Millions of \$)		
<b>Imports:</b>						
Fish and shellfish: Fresh, frozen & processed <sup>1/</sup> . . .	73.0	72.7	786.3	20.6	19.8	231.6
<b>Exports:</b>						
Fish and shellfish: processed <sup>1/</sup> only (excluding fresh and frozen) . . .	9.2	10.9	82.8	1.8	2.1	19.2
<sup>1/</sup> Includes pastes, sauces, clam chowder and juice, and other specialties.						

pounds. Compared with the 11.8 million pounds imported during the same month of 1956, this was a decrease of 2.5 million pounds or 22 percent. Reduced imports from Iceland and no imports from Norway, France, and West Germany were primarily responsible for the decrease in the total imports for March 1957.

Imports of groundfish fillets and blocks into the United States during the first three months of 1957 totaled 35.2 million pounds as compared with 38.1 million pounds during the same period of 1956. Canada led all other countries exporting fillets to this country with 24.9 million pounds, followed by Iceland with 7.6 million pounds, and Norway with 1.9 million pounds. These three countries accounted for 98 percent of the total imports for the first three months of 1957.

Note: See Chart 7 in this issue.



## Wholesale Prices, March 1957

Catches of many of the major East Coast varieties were good and on the increase during March. Spring-run species moved inshore and the New England groundfish fishery was nearing its annual peak. Gulf shrimp fisheries were active, but catches were below normal. The Southern California tuna fishery was enjoying a healthy market, and the Great Lakes fisheries for whitefish and yellow pike were beginning to improve as the ice left the lakes.

In March 1957 the over-all edible fish and shellfish (fresh, frozen, and canned) wholesale price index (119.4 percent of the 1947-49 average) rose 3.6 percent over the previous month and 5.6 percent over the index for March 1956. Except for drawn large haddock, price changes at wholesale during March for all items were slight. The price trend was generally upward or unchanged as compared with February 1957 and March 1956.

The increase of 9.2 percent in the drawn, dressed, or whole finfish wholesale prices from February to March this year was due to higher prices for large drawn haddock at Boston and for the fresh-water species. Wholesale prices for halibut (down 8.5 percent) and salmon (down 2.4 percent) showed signs of weakness because of liberal stocks on hand, but after an initial price drop the market appeared to stabilize at the lower price level. The March 1957 drawn, dressed, and whole finfish subgroup index was 7.7 percent higher than in March 1956 due to a price increase of 28.0 percent for large drawn haddock and of 41 percent for yellow pike. On the other hand, frozen halibut and whitefish were 2 to 4 percent lower this March than in the same month last year.

Exports of processed edible fish and shellfish in January 1957 increased about 17 percent in quantity as compared with the previous month, but were 15 percent below the same month in 1956. The January 1957 value of the exports was higher by 12.5 percent as compared with December 1956 but lower by 14.3 percent from the same month a year ago.

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**GROUND FISH FILLET IMPORTS,  
MARCH 1957:** During March 1957, imports of groundfish (including ocean perch) fillets and blocks amounted to 9.2 million

The prices of the processed fresh fish and shellfish subgroup items in March 1957 increased by 7.6 percent as compared with the previous month and were higher by 12.8 percent than in March 1956. Higher fresh haddock fillet prices (up 32.6 percent) and fresh Florida shrimp prices (up 10.3 percent) were largely responsible for the increase between February and March this year. Both of these items sold higher this March (prices were up 15 percent for haddock fillets and 18.9 percent for shrimp) than in the same month in 1956.

Between February and March 1957 prices for the processed fish and shellfish subgroup decreased 3.5 percent due to a 10-percent drop in frozen haddock fillet prices at Boston and a decline of about 2 percent in frozen shrimp prices at Chicago. As compared with March 1956, the prices for the items in this subgroup in March 1957 were higher by 6.9 percent due almost entirely to higher frozen shrimp prices (up 14 percent).

Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, March 1957

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices <sup>1/</sup> (\$)		Indexes (1947-49=100)			
			Mar. 1957	Feb. 1957	Mar. 1957	Feb. 1957	Jan. 1957	Mar. 1956
<b>ALL FISH &amp; SHELLFISH (Fresh, Frozen, &amp; Canned)</b>					119.4	115.3	121.8	113.1
<b>Fresh &amp; Frozen Fishery Products:</b>					132.0	124.9	136.2	120.6
<b>Drawn, Dressed, or Whole Finfish:</b>					123.4	113.0	134.1	114.6
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.10	.06	100.5	60.7	143.6	78.5
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.31	.34	95.9	105.2	108.3	98.0
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.62	.64	139.3	142.7	143.8	137.6
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.79	.69	195.8	171.1	146.3	204.5
Whitefish, L. Erie pound or gill net, rnd., fresh	New York	lb.	.90	.75	182.0	151.7	141.5	161.8
Lake trout, domestic, No. 1, drawn, fresh	Chicago	lb.	.79	.70	161.8	143.4	116.8	168.0
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.74	.65	173.5	152.4	140.7	123.1
<b>Processed, Fresh (Fish &amp; Shellfish):</b>					142.7	132.6	140.3	126.5
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.34	.26	117.4	88.5	158.2	102.1
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	.91	.83	143.8	130.4	128.8	120.0
Oysters, shucked, standards	Norfolk	gal.	6.00	5.875	148.5	145.4	151.6	139.2
<b>Processed, Frozen (Fish &amp; Shellfish):</b>					120.1	124.4	122.7	112.3
Fillets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.40	.40	103.4	103.4	103.4	102.1
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.28	.31	87.9	97.3	94.2	91.0
Ocean perch, skins on, 1-lb. pkg.	Boston	lb.	.29	.29	114.8	114.8	114.8	114.8
Shrimp, lge. (26-30 count), 5-lb. pkg.	Chicago	lb.	.84	.85	128.9	131.2	130.0	113.0
<b>Canned Fishery Products:</b>					101.5	101.5	101.5	102.4
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	22.65	22.65	120.0	120.0	120.0	120.0
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	11.20	11.20	80.8	80.8	80.8	85.1
Sardines, Calif., tom. pack, No. 1 oval (15 oz.), 48 cans/cs.	Los Angeles	cs.	9.00	9.00	105.0	105.0	105.0	83.2
Sardines, Maine, keyless oil, No. 1/4 drawn (3-1/4 oz.), 100 cans/cs.	New York	cs.	7.95	7.95	84.6	84.6	84.6	89.9

<sup>1/</sup>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.

Wholesale prices for canned fish remained steady during March 1957 at February levels and were less than 1 percent below March 1956 levels. As compared with March 1956, lower wholesale prices this March for canned Maine sardines and canned tuna were just about offset by a 26-percent increase in California sardine prices.

