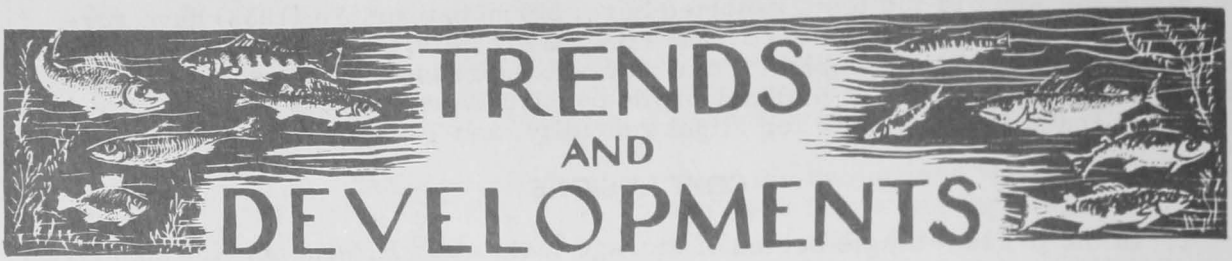


Alaska

SEA AND LAND AREAS SURVEYED FOR NEW MAPS AND CHARTS: The unheralded arrival of five ships in Seattle, Wash., in October 1958 marked the completion of six months work of gathering information on the icy waters which fringe the shores of Alaska. The Director of the Coast and Geodetic Survey, U.S. Department of Commerce, announced November 23, 1958, that the information on the northern waters would soon be converted into charts and maps for the future development and defense of our 49th State.

Probably no other place on earth has a greater need for modern maps and charts. Alaska, covering 586,400 square miles, has little more than 4,000 miles of highways and one railroad. Its commerce depends almost entirely upon water and air transportation. The familiar bush-pilot plane and interisland steamer are as common in Alaska as taxis and buses in older states.

During the past six months these five ships, equipped with sonic-sounding gear, and electronic navigation and surveying instruments have succeeded in obtaining information covering 1,500 square miles of fog-shrouded water. The ships operating as individual units filled in gaps from southeast Alaska to Atka Island, far out in the Aleutian chain.

The survey ships, which left their home port of Seattle last April, were: the Pathfinder, the Explorer, the Lester Jones, the Hodgson, and the Patton.

This year's surveys, which plumbed the depths around such places as Kasaan Bay, Clarence Strait, Sumner Strait, north shore of the Alaskan peninsula, Soda Bay, Dutch Harbor, and barren Atka Island, were a far cry from the meager beginning of the monumental task that was undertaken in 1867 while negotiations for the purchase of Alaska were still under way.

Operations have been extensive enough to survey almost 500,000 square miles of ocean, to produce more than 200 nautical and aeronautical charts covering the area, thousands of miles of geodetic surveys, and volumes of related information on tides, currents, magnetism, gravity, and special earthquake studies.

Not all operations were confined to the sea. In many cases landing parties were put ashore on the volcanic islands of the Aleutians to establish permanent geodetic control points for the offshore surveys. Thousands of similar points already had been established in the interior of Alaska by accurate geodetic surveys which allow for the curvature of the earth in determining the geographic positions needed for the preparation of large-scale topographic maps.

Most of the field surveys are preceeded by aerial photography that is done with a special 9-lens aerial camera flown in a U. S. Coast Guard aircraft as a joint Coast and Geodetic Survey-Coast Guard project. The 9-lens camera was designed for this specific task and provides much greater coverage per photograph than a single lens camera. These photographs are then used to map the land information needed on nautical and aeronautical charts. This unique photographic mission has photographed thousands of square miles of coastline in recent years and maps have been made of most of the coastline of arctic and western Alaska and of the western Aleutians.

Although the survey has come a long way since 1867, there still remains more than one-half million square miles of water composed of the Pacific Ocean, Bering Sea, and Arctic Ocean that are unsurveyed or inadequately surveyed by Coast and Geodetic Survey standards.

The present program of the Coast and Geodetic Survey in Alaska will be carried on to promote the commercial and industrial potential of Alaska. Future economic developments of the State of Alaska depends on accurate comprehensive surveys of all Alaskan waters and the 34,000-mile tidal coastline.

California

AERIAL CENSUS OF COMMERCIAL AND SPORT FISHING CONTINUED (Airplane Spotting Flight 58-18): The inshore area between Monterey and the Russian River was surveyed from the air (October 10-14, 1958) by the California Department of Fish and Game Cessna 3632C to determine the distribution and abundance of pelagic fish schools, sport fishermen, abalone pickers, and clammers within the boundaries of the area surveyed. The entire area was covered each day for shore fishermen and on two of the days a census was made of clammers and abalone pickers. Pelagic fish could not be spotted on October 11 and 12 due to fog. On both October 12 and 13, two separate counts of shore fishermen were made over a portion of the area. It was hoped a tally of clammers and abalone pickers could be made on October 14, but the low tide proved to be too late in the day for successful aerial observation.

Pelagic Fish: Fewer anchovy schools were seen on this flight than on any flight since April 1958. The largest concentrations were off Drakes Bay and Santa Cruz. Most of the schools were in deeper water farther from shore than previously noted this year. No schools of sardines or mackerel were observed.

Clammers and Abalone Pickers: The low tides on October 12 and 13 were ideal for clammers and abalone pickers. A coverage of the coast from Monterey to the Russian River was made on Octo-

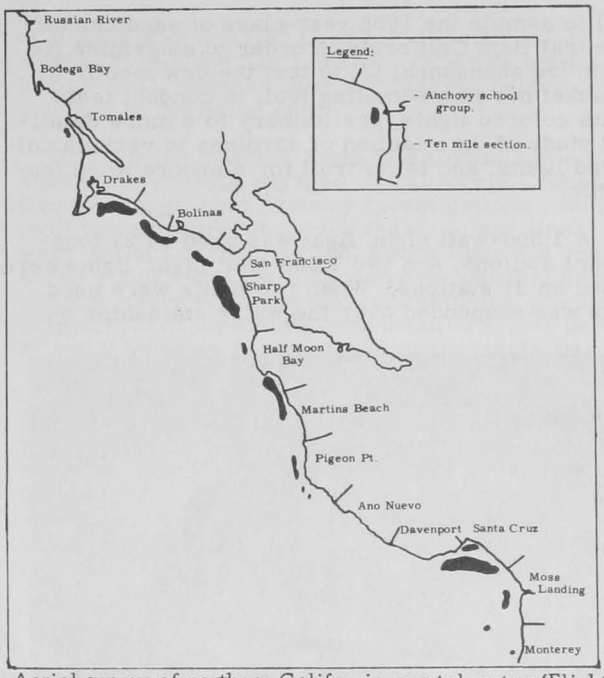
ber 12 and the area from Monterey to San Francisco was covered on October 13.

The largest concentrations of clammers were in Monterey Bay where 849 in quest of pismo clams were tallied. Most of them were at Moss Landing and Sunset Beach State Park. The 64 ocean clammers at Bolinas were seeking littleneck clams north of the jetty on the ocean side. The 48 clammers at Tomales and 60 at Bodega were digging on the mud flats inside the bays.

Over 200 abalone pickers were tallied on October 12 in the area from Monterey to the Russian River--69 at Pigeon Pt. and 50 at Montara.

Shore Fishermen: Two flights were made daily on October 12 and 13 over a portion of the coast where a striped bass "run" had attracted large numbers of shore casters to the beaches. One tally was made during high tide and the other during low tide.

Fewer shore fishermen were tallied during the low tide; however, the number of rock fishermen did not decrease as much as the number of surf fishermen. In fact, on October 12, the number of rock fishermen increased during the low tide period at Santa Cruz and at Pigeon Pt.



Aerial survey of northern California coastal waters (Flight Report 58-18, October 10-14, 1958.)

* * * * *

SALMON CATCH LOWER BUT SPAWNING HIGHER IN 1958: Catches of salmon in 1958 by California commercial and sports fishermen were down over previous years, but there were more spawning-bound salmon in the rivers than in the last two years. The California Department of Fish and Game said the spawning report is based on preliminary observations obtained from a spawning-bed census.

The lack of rain, resulting in low flows in many streams, prevented entry of salmon into the smaller tributaries. Spawning activity was moderate, but rain was needed to bring the salmon upstream and enable them to overcome barriers made impossible by the day weather.

Preliminary figures show commercial troll landings in 1958 will be less than 4 million pounds, the lowest since 1941 when just under 3 million pounds were landed. Average landings from 1941-1957 were a little more than 6 million pounds. The average since 1916 was about 5.5 million pounds, about the same total as the 1957 landings.

Sports fishing party boats reported 43,100 fish through September 1958 as compared to 44,300 for the first 9 months of 1957, and a total catch in 1957 of 44,700 fish.

The commercial salmon trolling season closed September 15, 1958, and sport fishing closed on November 16 in ocean waters and bays south of Tomales Point, except for bays in the Sacramento-San Joaquin Rivers east of Carquinez Bridge. (California Department of Fish and Game press release, November 28, 1958.)

* * * * *

SARDINE POPULATION SURVEY OFF COAST OF CENTRAL BAJA CALIFORNIA (M/V Alaska Cruise 58-A-5): The inshore area off central Baja California from Santa Maria Bay northward to Pt. Canoas was surveyed by the California Department of Fish and Game's research vessel Alaska on September 4-22, 1958. The objectives were: (1) to collect samples of the fall spawning and the spring spawning groups of sardines from central Baja California for detailed subpopulation studies;

(2) to sample the 1958 year-class of sardines off central Baja California in order to determine its relative abundance; (3) to test the new modified blanket net as a sampling tool; to conduct tests with colored lights, preliminary to a more detailed study of the reaction of sardines to various colored lights; and (4) to troll for albacore when feasible.

A 1,500-watt night light was used on 27 (one-hour) stations, and two 1,500-watt night lights were used on 31 stations. When two lights were used, one was suspended over the water amidships on

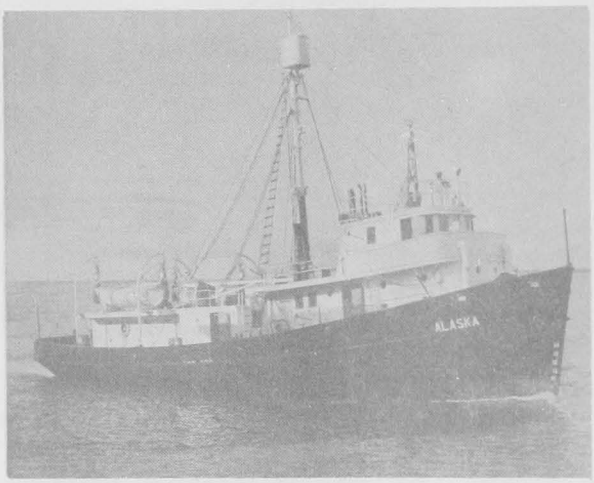


Fig. 1 - California Department of Fish Game's research vessel M/V Alaska.

the starboard side and the other placed near the stern, also on the starboard side. Both lights were illuminated for one hour, whereupon the after light was extinguished and the forward light dimmed. The blanket net was then set promptly.

Samples were obtained of at least one of the four pelagic species--sardines, Pacific mackerel, jack mackerel, and anchovies--on 24, or 41 percent, of the stations. Sardines were sampled at 20 stations (34 percent), anchovies at 8 (14 percent), Pacific mackerel at 9 (16 percent), and jack mackerel at 3 (5 percent).

Seven samples of postlarval sardines resulting from the 1958 fall spawning and 7 samples of juvenile sardines resulting from spawning in the spring of 1958 were obtained. In addition, 8 samples of adult sardines and 1 sample of very small juveniles from 65-75 mm. in length were collected.

Young sardines resulting from spawning in the spring of 1958 appear to have had a moderately successful survival off central Baja California. Fish born in 1957, which were abundant off Southern California in the summer and fall of 1957, and which are contributing heavily to the present California commercial sardine fishery, were not noticeably abundant off central Baja California. Thus it would appear that the 1957 year-class was primarily of a northern origin and the 1958 year-class may be somewhat weaker and of a more sourtherly origin.

Postlarval sardines from spawning in the fall of 1958 were more abundant in the areas in which the U. S. Bureau of Commercial Fisheries South Pacific Fishery Investigations found the heaviest concentrations of sardine eggs one month earlier. This is the area south of Cedros Island and in the lower portion of Sebastian Viscaino Bay.

Although sardines were sampled frequently throughout the surveyed area, it was felt that the increased efficiency of the new blanket net rather than an increase in the sardine population was responsible for the high number of samples. The new net was similar to the Bevington Blanket described by Radovich and Gibbs in California Fish and Game (vol. 40, no. 4). Besides being larger and deeper the new net was made of finer-gauge black-marlon

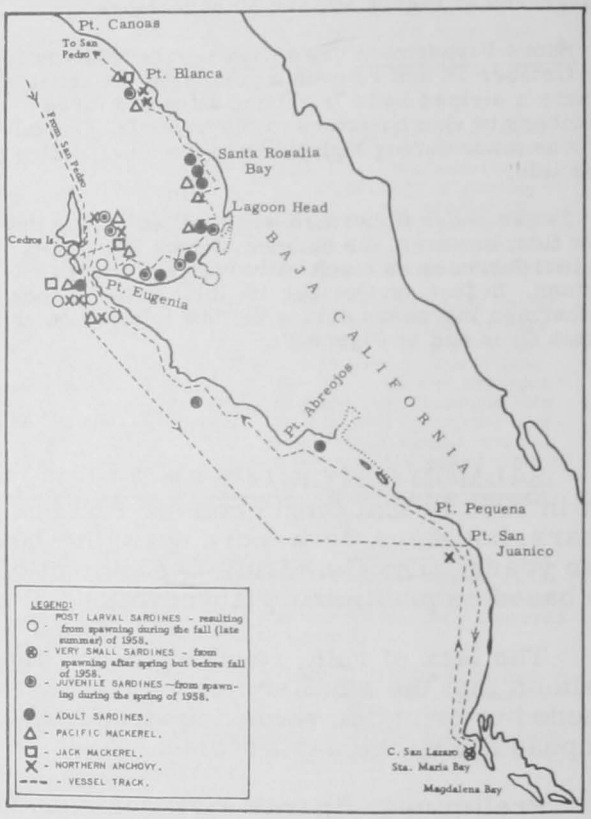


Fig. 2 - M/V Alaska cruise 58-A-5 (September 4-22, 1958).

webbing. All of the manila lines used in the construction and operation of the net were also dyed black. The black net absorbed light, making it practically invisible when viewed from above the surface of the water. From observations of the reactions of fish to the black net it seemed that they did not see it either. On many occasions sardines and other pelagic fish, actively feeding on the surface, continued to feed without any visible fright reactions after being completely impounded by the net. Fish were captured at every station at which they were present under the light at the time the net was set.

Larger pelagic fishes such as bonito, sierra, yellowtail, and barracuda were caught with ease. On many occasions these larger species were observed swimming headlong into the webbing from the outside after the net was set.

Various colored lights were tested to determine the intensity of light at different distances from the

light source. On one occasion a school of fish, mostly anchovies, attracted to white light was subjected to a red underwater light and the white light was extinguished. The illuminated area around the red light appeared spherical and was about 10 feet in diameter. The school of anchovies became very densely compacted into a ball within the spherical illuminated zone and remained in this position until daybreak, approximately an hour, when they disappeared. During the time the fish were under the red light a shark approached to within 3 feet of the lamp without the school showing any apparent reaction.

It is felt that the present blanket net will sample pelagic fish adequately provided they are attracted to the light. Further investigation is needed to determine the optimum light colors and intensities for attracting each of the pelagic species under a variety of oceanic conditions.

Sea-surface temperatures in the area surveyed ranged from 20.6° C. (69.1° F.) one-half mile east of Blanca Bay to 27.8° C. (82.0° F.) four miles southeast of Cape San Lazaro. This was between 2° and 3° C. warmer than the 1949-55 September average in the same area.

The Pacific Marine Fisheries Commission has asked that vessels engaged in California Cooperative Oceanographic Fishery Investigations cruises troll for albacore whenever feasible, and lines were put out during daylight hours when the vessel was under way. No albacore were caught. Seven dolphin, seven yellowfin tuna, one skipjack, one black skipjack, and four sierra were taken on September 7, 8, and 9 between Abreojos and Santa Maria Bay.

Approximately 2,000 live sardines were delivered to San Diego Harbor for the South Pacific Fishery Investigations and numerous samples of barracuda, black sea bass, and other species were collected for futher studies ashore. In addition, several live specimens were transported by truck to the Steinhart Aquarium, San Francisco, and to the Marineland of the Pacific.

Canned Tuna, Salmon, and Sardines Purchasing Patterns Under Study

A marketing study to point up consumer purchasing patterns for canned tuna, salmon, and sardines was started on November 6, 1958.

The study is being made by the Market Research Corporation of America, of New York City, under a contract with the U. S. Bureau of Commercial Fisheries for $43,200. The money is provided by the Saltonstall-Kennedy Act of 1954.

Data will be gathered on a nationwide basis over a period of one year. Results will be made available monthly to the fishing industry and to other interested individuals, firms, or associations. The monthly releases will be followed by an annual report containing a general summation of the monthly findings plus considerable data relative to market concentration, purchases in relation to size of the family, family income, age and employment status of the housewife, and other market information.

The data will be based upon weekly diaries of a national panel of 6,000 families which will record their purchases of a selected list of products. The monthly reports will show the number of standard cases of each type or variety of canned tuna, salmon, and sardine purchased; the number and percentage of families buying each variety or type; the average purchase; the average price paid; the type of store where purchased; and other pertinent data.

Cans--Shipments for Fishery Products, January-September 1958

Total shipments of metal cans during January-September 1958 amounted to 94,283 short tons of steel (based on the amount of steel consumed in the manufacture of cans) as compared with 94,888 tons in the first nine months of 1957. Fish canning in September for salmon and

Maine sardines was declining, but tuna and California sardine packing was at a high level.

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.

Columbia River Basin

INTERIOR DEPARTMENT URGES FURTHER FISHERY STUDIES FOR PROPOSED SNAKE RIVER DAM: No additional dam construction on the Middle Snake River below the mouth of the Imnaha River should be considered until the possibilities of providing additional water storage elsewhere have been fully explored, stated the Secretary of the Interior on October 29, 1958.

The Secretary of the Interior in a letter to the Secretary of the Army pointed out that the Middle Snake River Basin, up to and including the watershed of the Imnaha River, an Oregon tributary, is the key remaining Columbia River Basin area for anadromous fish. The letter stressed the problem of passing anadromous fish over high dams, both upstream and downstream.

He pointed out that the U. S. Department of the Interior, with help from the U. S. Corps of Engineers, has been advancing biological and engineering research on this matter; that while considerable progress has been made there remains much to learn before the problem can be successfully met; that even after solving the fish-passage problem there remains the loss of spawning and rearing areas as a result of flooding by the reservoirs.

The letter was based upon an understanding that the Corps of Engineers is presently considering a number of dams on the Middle Snake River below the confluence of the Imnaha, an area which the Interior Department regards as essential to the Columbia River fisheries and one which the Nation can not afford to sacrifice at this time.

Preliminary studies by Interior's Bureau of Reclamation show that there are storage sites above the Imnaha of considerable potential which can be developed now. These reservoirs, taken together with other projects in the general area which can be undertaken after the fish-passage problem is satisfactorily solved, will meet the objective of full comprehensive development.

The Secretary of the Interior recommended that the Department of the Army join with Interior in the adoption of a firm policy of "orienting our planning for the undoubted water-control needs of the Pacific Northwest" to areas other than this critical portion of the Middle Snake River unless specifically required by the Congress, until "we can be sure we will not needlessly harm the vital fishery resources," for "once this resource is destroyed it will be difficult if not impossible to restore it for a particular stream or river basin" even with future development of satisfactory fish-passage facilities.

Federal Purchases of Fishery Products

DEPARTMENT OF DEFENSE PURCHASES, JANUARY-OCTOBER 1958: Fresh and Frozen Fishery Products: For the use of the Armed Forces under the Department of Defense, 1.5 million pounds (value $855,000) of fresh and frozen fishery products were purchased in October 1958 by the Military Subsistence Market Centers. This amount was 9.2 percent less than the purchases made in September and 6.3 percent under the purchases of October 1957. However, the value of the purchases in October 1958 was up about 5.7 percent from October 1957.

Table 1 - Fresh and Frozen Fishery Products Purchased by Military Subsistence Market Centers, October 1958 with Comparisons

QUANTITY				VALUE			
October		Jan.-Oct.		October		Jan.-Oct.	
1958	1957	1958	1957	1958	1957	1958	1957
(1,000 Lbs.)				($1,000)			
1.5	1.6	19.4	20.3	855	809	1/	10.5

1/Not available.

For the first 10 months of 1958 purchases totaled 19.4 million pounds, a decrease of 4.6 percent from the 20.3 million pounds purchased in the same period of 1957.

Prices paid for fresh and frozen fishery products by the Department of Defense in October 1958 averaged 56.7 cents a pound, or 6.4 cents more than the October 1957 average of 50.3 cents a pound.

Part of this increase was due to the higher prices that prevailed in October 1958 and partly to purchases of more expensive fishery products like shrimp and scallops.

Table 2 - Canned Fishery Products Purchased by Military Subsistence Market Centers, October 1958 with Comparisons

Product	QUANTITY				VALUE
	October		Jan.-Oct.		October
	1958	1957	1958	1957	1958
	. . . .	(1,000	Lbs.)		($1,000)
Tuna	-	406	3,931	1,882	-
Salmon . .	1,381	1,056	2,783	2,276	761
Sardine . .	-	-	93	125	-

1/Values unavailable.

Canned Fishery Products: Salmon was the only canned fishery product purchased for the use of the Armed Forces in October 1958. Total purchases of canned tuna, salmon, and sardines for the first ten months of 1958 amounted to 6.8 million pounds--about 58.1 percent more than the 4.3 million pounds in the same period of 1957.

Note: Armed Forces installations generally made some local purchases not included in the data given; actual total purchases are higher than indicated, because it is not possible to obtain local purchases.

Florida

FISHERIES RESEARCH: The Marine Laboratory of the University of Miami carries on research on fisheries with funds provided by the Florida State Board of Conservation, the U. S. Fish and Wildlife Service, and private sources. The research of interest to commercial fisheries contained in the Laboratory's October 1958 Salt Water Fisheries Newsletter follows:

Sea Trout Tagging: The softness of the sea trout makes it hard to tag successfully with any kind of outside tag.

The solution reached several years ago on the middle Atlantic coast is to make a small cut in the belly of the trout and slip in a bright-colored plastic tag. Fishermen cleaning their catch find these inside tags and return them. One great difficulty is in getting the tags back, since many are missed, or at least are not noticed until it is too late to get good data on where and when the fish was caught.

A total of 575 tags were put in spotted sea trout on the Florida west coast in July, August, and September 1958. Most of these--374 tags--were inserted in the fish at Cedar Key and the remaining 201 at Fort Myers. The tags used in the present experiment are green in color. One side bears a number and the other side instructions for their return.

Shrimp Tagging: A total of 2,180 pink shrimp were tagged in the third quarter of 1958. The tagging was done on the Tortugas grounds in South Florida, from regular commercial trawlers.

Earlier taggings of shrimp on Tortugas resulted in an average return of about 25 percent. This is exceptionally high, and the latest returns (those from July and August taggings) have only been around 2 percent. It seems likely that reduced fishing effort, which occurs every summer, is a major reason for this decline in tag returns. Perhaps increased eating of tagged shrimp by fish is another reason, since it was noticed in some of the summer taggings that little tuna were eating many shrimp as they were tagged and released.

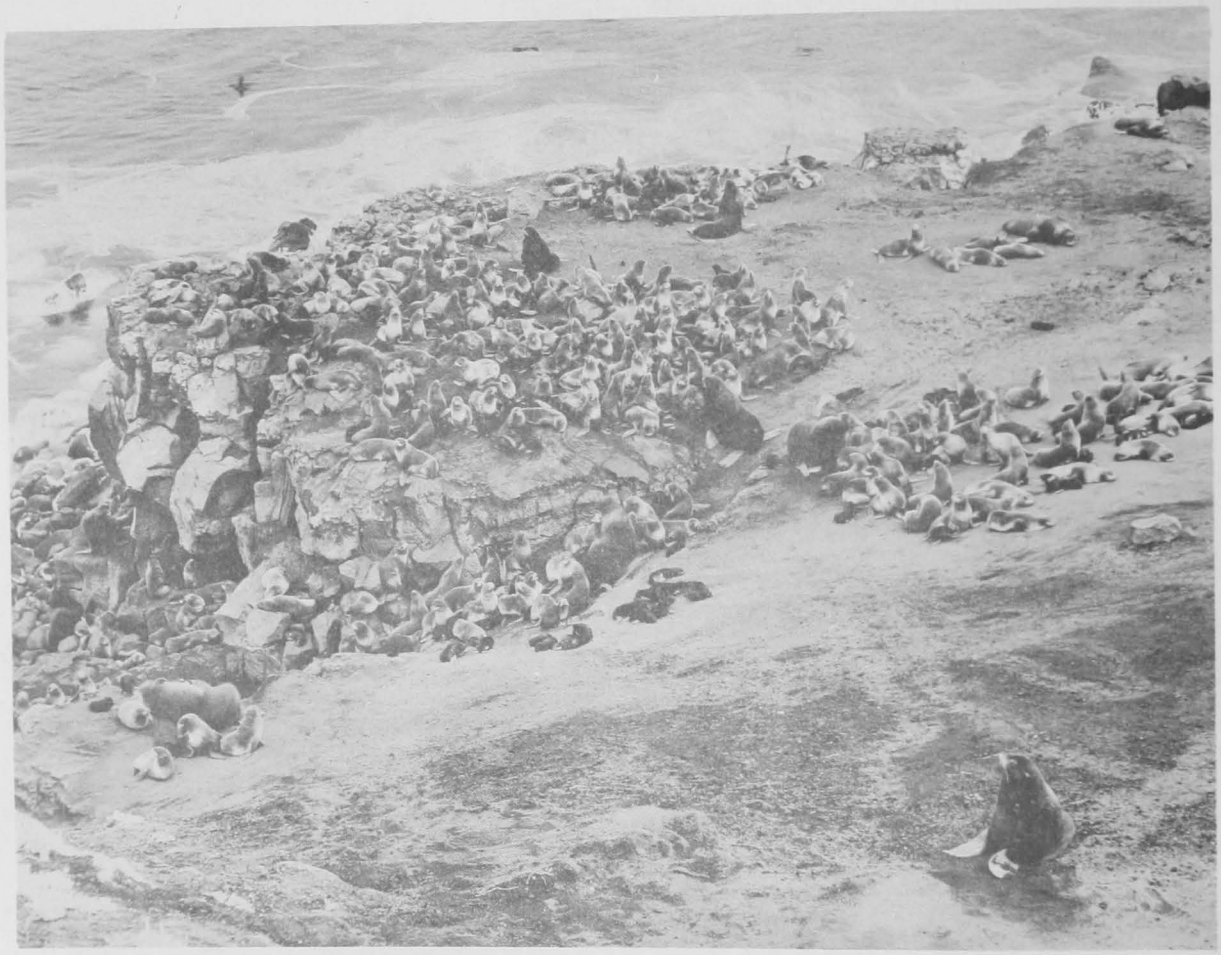
Since the shrimp sheds its shell frequently, the tag must be designed to hold in the muscle while allowing the carapace to split off. None of the commonly used tags is completely satisfactory, but the Petersen tag, consisting of two small plastic discs fastened by a nickel pin, is the one used. Despite its relatively good results with adult shrimp, it is not useful for small shrimp, being apparently too heavy. "Biological" stains, which color the gills of the shrimp but do not harm them, are being tested as a substitute by the U. S. Fish and Wildlife Service.

Artificial Crab Bait: The project to develop an "artificial" crab bait is continuing. Field experiments conducted last year with a wide variety of baits made from fish oils, fish meal, and various chemicals were unsuccessful, so a new approach is being tested. Instead of setting traps with the experimental baits, crabs are being placed in a salt-water tank containing two standard commercial traps. These are baited with the test substances and the attraction of the baits is measured in terms of the number of crabs caught in each trap. So far no bait has been shown to be equal in effectiveness to the fish now used as bait by crab fishermen.

Note: Also see Commercial Fisheries Review, September 1958, p. 36.

Fur Seals

PRICES HIGHER FOR ALASKA FUR-SEAL SKINS AT FALL AUCTION: At the semi-annual sale of Alaska fur-seal skins held in St. Louis on October 17, 1958, 20,900 dressed and dyed Alaska fur-seal skins brought $1,876,000 for the account of the United States Government. The skins are products of the sealing operations of the U. S. Bureau of Commercial Fisheries on the Pribilof Islands.



Gorbatch Rookery, St. Paul Island, Alaska. Several harems at season when harems are well knit, before pups start to move out in large numbers.

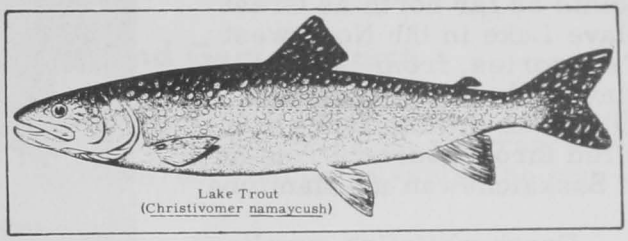
Fur-seal skins offered at this auction were 4,500 skins less than the number sold at the spring auction held on June 7, 1958, but due to the higher prices bid for the skins the total value was higher by 3.7 percent.

The black-dyed skins sold at the fall auction averaged $92.70 per skin, dark-brown (Matara) averaged $80.12, and the dark shade Kitovi averaged $88.54. Comparable prices for the spring auction were: black-dyed, $81.04; Matara, $67.84; and Kitovi, $64.26.

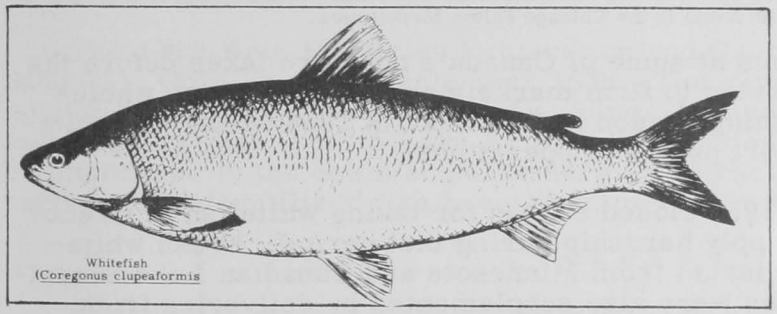
Note: Also see Commercial Fisheries Review, July 1958, p. 27.

Great Lakes

LAKE TROUT AND WHITEFISH MARKETS AT CHICAGO: Lake trout and whitefish comprise two of the more valuable and prized species from the Great Lakes commercial fishery. At the present time the United States Great Lakes fishery for these species provides only a very small percentage of the supplies demanded by Midwestern consumers who place them at the top of preferred lake fish varieties. United States Great Lakes catches of lake trout and whitefish have decreased steadily since 1951--the 1957 whitefish catch was only 51 percent and lake trout 40 percent of the 1951 yield. Whitefish catches in all of the Great Lakes have been low, but it is not known how much of the blame can be placed on the sea lamprey as whitefish are subject to random fluctuations.


Lake Trout
(Christivomer namaycush)

Fresh and frozen whitefish receipts at Chicago in 1957 totaled more than 8 million pounds--86 percent Canada-produced fish and only 14 percent from United States Great Lakes production. Chicago's 1958 whitefish receipts were especially heavy during June-September when close to one million pounds was reported for each month. The September 1958 whitefish receipts of one million pounds included 0.9 million pounds fresh whitefish, principally from Alberta and Manitoba shipping points, and less than 0.1 million pounds from the United States Great Lakes fishery.


Whitefish
(Coregonus clupeaformis

The 1958 lake trout receipts at Chicago followed about the same pattern, also reaching a high point in September when 0.7 million pounds of fresh and frozen lake trout (predominantly Canadian fish) was reported for the account of Chicago dealers.

The 1957 United States Great Lakes whitefish catch of only 1.4 million pounds brought out a number of significant changes in the catch pattern of several of the Lakes regarded as important producers. The pattern in Lake Erie indicated a small but gradual increase for several years and in 1957 landings from that Lake increased 69 percent from the previous year. This catch trend was reversed in Lake Superior--a steady decline since 1954 with a sharp 41 percent drop in the 1957 catch as compared with 1956. The 1957 whitefish yield was almost negligible in each of the other Great Lakes, dropping to a mere 33,000 pounds in Lake Michigan as compared with a catch of more than one million pounds in 1953.

The lower 1957 lake trout catch was no surprise because of greater sea lamprey infiltration in Lake Superior--the last and only stronghold of the Great Lakes lake trout fishery. The operation of electrical sea lamprey control devices was continued in 1958. More recent developments in sea lamprey control have been the experimental application of selective larvicides to streams and tributaries where lampreys spawn. These have been reported as outstandingly successful and hold promise of a highly effective control program. This could develop a more productive Lake Superior trout fishery and possibly re-establish lake trout in Lakes Michigan and Huron.

The closed season of the United States Great Lakes commercial fishery for these species invariably creates a supply shortage and higher prices at the Chicago

Wholesale Market. The closed season for taking lake trout during October was followed by a closed whitefish season in November at most Great Lakes areas. The whitefish scarcity at Chicago during November of 1958 was more pronounced because of the virtual halt in large-scale whitefish supplies from Canada's northern lakes. The Chicago Wholesale Market relies heavily on supplies from points as far north as Great Slave Lake in the Northwest Territories, from Lesser Slave Lake in Alberta, and numerous smaller lakes scattered throughout the Provinces of Saskatchewan and Manitoba.

Iced domestic and Canadian fresh-water fish stacked up inside a wholesale fish house in the Chicago Fulton Market area.

Fresh whitefish supplies at Chicago during November 1958 were very light. Deliveries of Lake Superior whitefish were only a trickle from Ontario and Minnesota producers. Supplies were limited from the International Lakes region, and spotty fishing operations at some of Canada's northern lakes before the start of winter fishing also contributed to firm markets and high whitefish wholesale prices. There was no fall fishing season at Red Lake in 1958 where the whitefish catch is sizable during the short period of operations.

As a contrast, the November 1957 closed season for taking whitefish at Great Lakes areas did not impose any supply hardship during that period. Fresh whitefish supplies flooded the Chicago market from Minnesota and Canadian Lake Superior shipping points. Market supplies were also supplemented by deliveries from Minnesota's Red Lake, the International Lakes region, and from Alberta's Pigeon Lake. A seriously oversupplied market in November 1957 caused sharp price declines, particularly for the Minnesota and Canadian varieties that were marketed at low prices.

Great Slave Lake (Chicago's foremost supplier of lake trout and whitefish covers an area of over 11,000 square miles and is the deepest lake on the North American continent) is the Continent's largest producer of lake trout and whitefish combined. This Lake is reported to support the only known large fresh-water commercial fishery studied from its inception in 1945 and regulated according to scientific findings. Informed fishery observers believe Great Slave Lake will continue for years as a producer of about 9 million pounds of fresh-water fish annually--principally lake trout and whitefish.

--By G. A. Albano, Supervisory Market News Reporter,
Market News Service,
Division of Industrial Research and Services,
U. S. Bureau of Commercial Fisheries, Chicago, Ill.

* * * * *

LAMPRICIDE TESTING EXTENDED TO CANADA: The lampricide testing program of the U. S. Bureau of Commercial Fisheries in the Great Lakes was extended in the summer of 1958 to Canada when Canadian scientists treated the Pancake River, which enters Lake Superior about 50 miles north of Sault Ste. Marie, Ontario,

with the lampricide. As has been the case when used in streams of the United States, the lampricide (trifluromethyl nitrophenol) performed well by killing sea lamprey larvae. In the Pancake River test 30,000 dead lamprey larvae were collected. The lamprey kill in the treated portion of the river was believed to be practically 100 percent.

Great Lakes Fisheries Exploration and Gear Research

NEW PROGRAM FOR GREAT LAKES STARTED: The U. S. Bureau of Commercial Fisheries Great Lakes Fisheries Exploration and Gear Research program was established in April 1958 with headquarters at Ann Arbor, Mich., to assist the commercial fisheries of the entire region.

The first project to be started by this program was begun in Lake Erie, in cooperation with the Ohio Division of Wildlife and the Ohio Commercial Fishermen's Association. Technical advice and assistance is being given by Bureau of Commercial Fisheries fishing gear specialists to fishermen who are conducting experimental trawling operations for smelt. This fish is not sought by United States fishermen in Lake Erie at the present time.

The Lake Erie Fisheries Exploration and Gear Research station was opened in Sandusky, Ohio, in early September 1958. The current program objective is experimental smelt fishing with a lampara seine. Lampara seines and other types of pelagic fishing gear, new to Lake Erie, will be tested to determine whether they may be introduced to the commercial fishery as a practical and economical means of capture of underutilized fish having commercial potential.

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LAMPARA SEINES TESTED IN SMELT FISHERY (Cruise 1, October 1-31, 1958): A systematic depth-recorder survey was made of Lake Erie between Vermilion, Ohio, and Erie, Pa., to determine whether surface schools of smelt and other schooling fish were available to lampara seine gear. A total of seven lampara seine sets were made with a 100-fathom cotton net where good fish recordings were obtained. No commerciallly-important catches were obtained. Three sets off Vermilion, Ohio, in 30- to 45-foot depths caught emerald shiners in amounts ranging between 50 and 75 pounds. Although sizable concentrations of fish had been indicated on the depth-recorder, most fish were too small for the mesh size of the net in use. One set off Fairport, Ohio, in 35-foot depths fouled on an obstruction and the catch was lost.

This is the first cruise (October 1-31, 1958) of a series to be made to test fishing gear not generally used in the Great Lakes Fisheries. The first part of this cruise was made by the U. S. Bureau of Commercial Fisheries chartered vessel Pat, a small trap-net boat. Since the boat was not available after October 15, 1958, work was continued without interruption with the chartered M/V Thelma H.

Extensive unidentified midwater tracings were found widely scattered over western Ohio waters. Tracings from eastern Ohio waters, over a large area, revealed sizable concentrations of fish near the bottom, but these were unavailable to the lampara seine. Samples taken from these schools with a 16-foot try-net trawl identified them as smelt and yellow perch.

During more than half the cruise period, operations were hampered considerably by high winds and rough waters. These conditions are not suitable to seine op-

erations for a small vessel such as the typical 40-foot trap-net boat. During the first week of operations several trials, under favorable weather conditions, demonstrated the practicability of setting and hauling the lampara-type seine using the regular trap-net reel and standard deck winch.

Great Lakes Fishery Investigations

SURVEY OF WESTERN LAKE ERIE FISH POPLATIONS CONTINUED (M/V Cisco Cruise 11): Regular trawling was continued during the October 21-31, 1958, cruise--the final cruise of the 1958 season--by the U. S. Bureau of Commercial Fisheries research vessel Cisco in 10 areas in western Lake Erie. The composition of the catches was similar to that of cruise 10 but with fewer adult sheepshead and young-of-the-year white bass and more adult smelt. Yellow pike (walleyes) continued to be scarce. Adult yellow perch usually made up the bulk of the catch. Emerald shiners, spottail shiners, trout-perch, and young-of-the-year sheepshead, yellow perch, smelt, and alewives were often numerous. Taken in smaller numbers were gizzard shad, white suckers, goldfish, carp, silver chubs, channel catfish, brown bullheads, stonecats, log-perch, johnny darters, and young-of-the-year white crappies and black crappies. A single, large sea lamprey (21.9 inches) was also caught.

Young-of-the-year fish, which now have probably completed their year's growth, have attained the following approximate average total lengths: yellow perch, 4.1 inches (3.6 inches in Sandusky Bay); alewife, 4.3 inches; sheepshead, 4.1 inches; smelt, 2.7 inches; channel catfish, 2.9 inches; gizzard shad, 3.6 inches in Sandusky Bay and 4 inches for the few taken in the open lake.

Surface water temperatures cooled steadily throughout this cruise, averaging about 11° C. (51.8° F.) at the close of the cruise. Extremes were 10.3° C. (50.5° F.) and 15.4° C. (59.7° F.).

The Bureau of Commercial Fisheries research vessels Cisco and Musky, and the SP-2 and SP-5 from the Ohio Division of Wildlife, cooperated in synoptic surveys of western Lake Erie on October 28, 29, and 30. The vessels followed essentially the courses established during the synoptic surveys of May and August (cruises 3 and 7). Water samples and surface temperatures were obtained at 2-mile intervals by each vessel. Two hundred drift bottles were released and extensive meteorological data were recorded. Bathythermograph lowerings were made by the Cisco and Musky, and analyses of water for total alkalinity and turbidity were made on these vessels. Fluorescein dye was released from the SP-2, SP-5, and Musky to gather information on the surface currents around the islands and in the littoral areas.

Preliminary analysis of 18 drift-bottle returns indicate that in the open area of the lake the surface currents were toward the south, apparently caused by the strong north winds that blew on the day of release and following release. All 18 recoveries were from the Ohio shores with the exception of one found near Monroe, Mich., and one from Middle Bass Island. It appeared from the drift-bottle returns that a current along the south shore was flowing from west to east. The fluorescein dye experiments substantiate very well the movement of the drift bottles. Offshore the dye flowed to the south, whereas at inshore areas off Ohio the dye flowed from west to east, and out the South Channel.

Preliminary analysis of turbidity, surface water temperature, and total alkalinity suggest that Maumee River water was confined to a narrow band flowing eastward along the south shore. The main flow of Detroit River water appeared to be further south than it was during the May and August synoptic surveys.

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WESTERN LAKE SUPERIOR HERRING AND GENERAL FISHERY SURVEY CONTINUED (M/V Siscowet Cruise 7): The three index stations occupied during cruises 1 and 3 were visited again (October 15-November 4, 1958) by the U. S. Bureau of Commercial Fisheries research vessel Siscowet during this cruise to obtain a measure of fishery and environmental conditions during the fall months. These stations are located (1) north of Little Girls Point, Mich., (2) southeast of Stockton Island, and (3) northeast of Bear Island (two of the Apostle Islands, Wis.). In addition to these, two additional stations were established for experimental fishing on Gull Island Shoal and just north of Rocky Island.

Fish were collected with gill nets at each index station where samples were taken for analyses of plankton, bottom fauna, and water chemistry. Bathythermograph casts were made at all stations.

Trawl tows were made in 300 feet of water between Stockton and Madeline Islands. Two species of muddlers were captured in great numbers and were tentatively identified as the slimy muddler and and deep-water sculpin (Myosocephalus quadricornis thompsonii). Several hundred ninespine sticklebacks as well as a few chubs (Leucichthys hoyi and L. zenithicus) were taken. Young-of-the-year smelt were predominant in a tow made in the same general area but in shallow water (30-60 feet).

Catches in the experimental gill nets at the three index stations were far greater than the catches made during cruises 1 and 3. At station 1, smelt, herring, burbot, and longnose suckers dom-

inated the catch. At this station during the previous cruises chubs dominated the catch. At station 2, smelt, lake trout, menominee whitefish, and longnose suckers dominated the catch. Practically no smelt were taken at this station during previous cruises, but many whitefish and menominee whitefish were taken. At station 5, 482 chubs (L. hoyi, L. kiyi, and L. zenithicus) and 37 herring were captured, compared to 273 chubs and no herring during cruise 3. This station was not fished during cruise 1.

Experimental small-mesh gill nets were set on Gull Island Shoal to determine what predation, if any, occurred on lake trout eggs. Lake trout were known to have spawned in this area a few days previous. The gang consisted of 1-, $1\frac{1}{2}$-, $2\frac{1}{2}$-, and $4\frac{1}{2}$-inch nets. These nets were lifted two consecutive days with a total catch of 172 longnose suckers, 40 menominee whitefish, 34 northern lake chubs, 11 herring, and 1 lake trout. Stomachs from each species were examined but no signs of lake trout eggs were found. No smelt were captured, although they have been suspected by some of general predation on lake trout eggs.

Another experimental set was made in the shallow waters (11-30 feet) just north of Rocky Island in an effort to capture spawning whitefish. This experimental gang consisted of $4\frac{1}{2}$-, 5-, $5\frac{1}{2}$-, and 6-inch nets. No whitefish were taken; the total catch consisted of 4 longnose suckers. This area will be visited again in further attempts to capture mature whitefish.

Surface temperatures varied from 52.7° F. at station 1 to 47.5° F. at station 27, north of Rocky Island. Bottom temperatures varied from 49.5° F. at station 1 to 40.0° F. at station 5, northeast of Bear Island.

Maine Sardines

CANNED STOCKS, NOVEMBER 1, 1958: Distributors' stocks of Maine sardines totaled 312,000 actual cases on November 1, 1958--14,000 cases or 4.7 percent more than the 298,000 cases on hand November 1, 1957, according to estimates made by the U. S. Bureau of the Census.

Canners' stocks on November 1, 1958, totaled 1,037,000 standard cases (100 $3\frac{3}{4}$-oz. cans), 300,000 cases (22 percent) less than on November 1, 1957.

The 1958 pack from the season which opened on April 15, 1958, to November 1, 1958, amounted to about 1,850,000 standard cases as compared with 2,035,000 cases packed in the same period in 1957. The 1958 season pack to November 15 was 1,967,000 cases. The pack for the entire 1957 season totaled 2,117,151 standard cases.

Canned Maine Sardines--Wholesale Distributors' and Canners' Stocks, November 1, 1958 with Comparisons

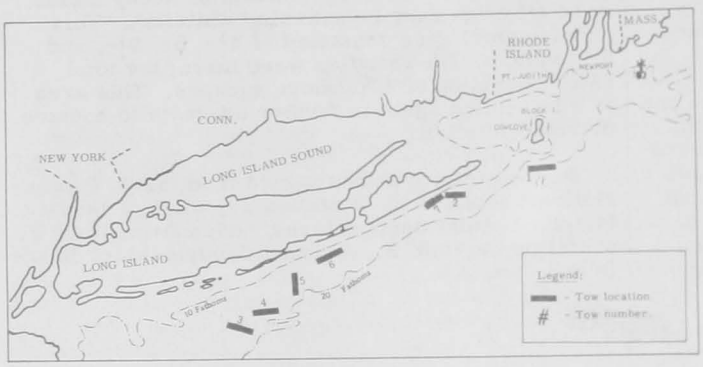
Type	Unit	1958/59 Season	1957/58 Season				
		11/1/58	7/1/58	6/1/58	4/1/58	1/1/58	11/1/57
Distributors	1,000 Actual Cases	312	184	237	293	230	298
Canners	1,000 Standard Cases 1/	1,037	386	235	476	1,111	1,337

1/ 100 $3\frac{3}{4}$-oz. cans equal one standard case.

The total supply as of November 1, 1958, totaled 2,263,000 standard cases, or 8.2 percent less than the total supply of 2,464,000 cases as of November 1, 1957. Shipments from April 15, 1958, to November 1, 1958, amounted to 1,226,000 standard cases as compared with 1,124,000 cases during the same period in 1957.

North Atlantic Fisheries Exploration and Gear Research

EXPLORATORY FISHING FOR LAUNCE OFF SOUTHERN NEW ENGLAND AND LONG ISLAND UNSUCCESSFUL (M/V Delaware Cruise 6): To assess the commercial potential of the launce or sand eel (Ammodytes americanus) off the New England coast was the aim of the second in a series of cruises (October 23-31, 1958) by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel Delaware. Seven tows, with a small-mesh 100-foot Holland launce trawl, made between Block Island and off the south coast of Long Island during the second port of the trip, failed to yield any launce. But some commercial concentrations of butterfish (Poronotus triacanthus) were found in the Atlantic Ocean area off Eastern Long Island. The pressure of butterfish in commercial quantities all over the area surveyed is to be expected during the fall months. The catch rate was 500 pounds per hour tow on one drag and 600 pounds on another drag. A No. 41 trawl, equipped with rollers and lined with small-mesh twine from the Holland launce trawl was used on these two tows. The gear used allowed towing of the small-mesh cod end by the Delaware and yielded small quantities of anchovies (Anchoa nepsetus and bone squid (Loligo pealei) of $\frac{1}{2}$-1 inch, showing that the gear fished properly for small fish.



M/V Delaware (Cruise 58-6).

The cruise was a coordinated survey of the Bureau's M/V Delaware and commercial fishing vessels from Point Judith, R. I. Prior to this cruise, the Point Judith trawler David D., using one of the Bureau's launce trawls, caught about 2,000 pounds of launce in three tows off Block Island in Cow Cove. Bad weather hindered fishing by the Delaware. No stocks of launce were found. Tows were made in moderate seas and one trawl was destroyed completely due to the vessel's surge in rough seas.

North Atlantic Fisheries Investigations

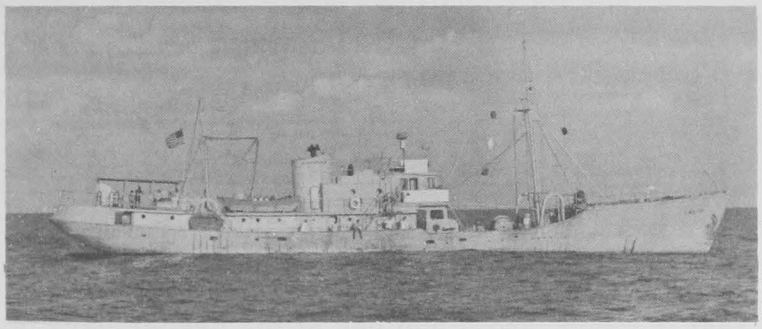
FALL 1958 HADDOCK SURVEYS INDICATE POOR CATCHES UNTIL MID-1960: There is little hope for relief in the New England haddock fishery until 1960, according to results of surveys in October-November 1958 by the U. S. Bureau of Commercial Fisheries research vessel Albatross III. During this period the vessel surveyed the areas of principal interest to the New England haddock fleet (Georges Bank, the Gulf of Maine, and Browns Bank).

The survey was planned to estimate the abundance of fish which are at present too small to be caught by commercial nets but which will be entering the catch during the next two years. The Albatross III found insufficient quantities of these to forecast any material increase in catches before the spring of 1960.

The forecast by quarters for the next two years in terms of market-size haddock on Georges Bank is: 1959: 1st quarter - fair; 2nd quarter - fair; 3rd quarter - poor; and 4th quarter - poor. 1960: 1st quarter - poor to fair; 2nd quarter - fair to moderate; 3rd quarter - moderate; and 4th quarter - moderate to good.

A haddock year brood first appears in the catches when it is two years old. The number of fish taken from any particular brood thereafter are high for three or four years and then taper off. When there is a successful spawning of haddock every year, a new group of two-year olds appear each summer, and there is a continual supply of young fish and older fish as well.

In recent years there has been a successful spawning only every other year, and the industry has come to rely more and more on scrod haddock (under 2.5 pounds) which appear in alternate years, for some reason in even-numbered years. This cycle was broken, however, this year. The 1956 year brood failed to materialize.



Service's research vessel Albatross III.

This placed the haddock fishery in the worst position it has been in for many years as far as the natural resource is concerned. Haddock landings at Boston from July-October 1958 were only 25 million pounds as compared with 37 million pounds last year for the same months. The catch per trip in those months dropped from 80,000 pounds in 1957 to 55,000 pounds in 1958.

The future of the resource now depends upon those fish spawned after 1956. There have been two broods. The 1957 brood is on the banks as one-year-old-fish. The 1958 brood has just settled to the bottom where it can be sampled and counted. The Albatross III found very few one-year olds, so there is little hope for an abundance of scrod next summer. However, some concentration of the 1958 year-class was found, so the picture is brighter for a scrod catch in the summer of 1960.

Between the summer scrod seasons the catches will hold up fairly well since the abundance of older fish on Georges Bank has not been reduced much below the average for recent years. The Browns Bank stock of older fish, which is normally fished in the winter and spring, appears to be about average also.

Diversion of the fleet to Nova Scotian and Newfoundland banks will not help as haddock are scarce on these banks also. Some relief may be gained by concentrating more upon other species such as pollock and cod. Pollock stocks appear to be good, and cod stocks appear to be recovering after a long period of scarcity.

The reason for the failure of recent haddock broods is not fully understood. There is no reason to believe that it is related to the size of the spawning stock, and there is no evidence that the fishery is responsible. The mesh regulation, of course, improves the catch from any given year brood, but it operates only on whatever quantity of small fish nature provides.

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INSTRUMENTS USED WITH TELEVISION CAMERA CALIBRATED (M/V Albatross III Cruise 121): Instruments used with the television camera and nets for measuring water temperature, depths, and currents were calibrated over a measured mile off Provincetown, Mass., by the U. S. Bureau of Commercial Fisheries research vessel Albatross III, November 4-6, 1958.

All of the instruments functioned well. Water temperature varied only 0.2° C. (about 0.36° F.) on individual tows. The current through the cod end varied from

almost no difference from the speed of the vessel through the water to a current of one half a knot less than the vessel speed through the water. The speed of the vessel towing a No. 41 trawl was approximately half its speed without the trawl.

A rough relation of cod-end mesh size and over-all size to the speed of passage of water through the cod end could be seen but further work is required to properly specify the effect of different cod ends. Preliminary data suggests that a cover somehow promotes a greater flow through the cod end.

Oysters

DEEP-WATER CHESAPEAKE BAY OYSTER LOSSES DUE TO OXYGEN DEFICIENCY: During the fall of 1958, oystermen from a number of areas in Maryland reported finding most of the oysters dead on the deeper portions of certain bars. At the same time oysters on the shallower parts of the bars were thriving and in good condition. Fortunately, most Maryland oysters are caught in water less than 20 feet in depth, and a number of the deeper bars occur where strong currents prevent the stagnation of bottom water that may cause oyster deaths. The unusually large extent of water areas that were "stagnant," or lacking in oxygen during the summer of 1958, was most evident in August at the time that many crabs were found dead in crab pots and dead fish observed at several points along the Bay shore. The fact that oysters in deep water might also be expected to show an unusually high death rate was pointed out following these August observations.

Scientists at Maryland's Chesapeake Biological Laboratory about 20 years ago first noted that large masses of deep water without oxygen occur in many mid-Chesapeake Bay areas during the summer months. Through continuing research, the causes of this condition are now known. The oxygen dissolved in water comes mostly from the air at the water's surface. Wave action and currents tend to mix surface water with the layers of deeper water so that for much of the year sufficient oxygen for fish oysters, crabs, and other animals is found even in the deepest part of the Bay. In the summer, however, the surface water becomes considerably warmer than bottom water and this makes it lighter in weight so that it tends to remain floating at the surface. Also, fresh water from rain and streams is lighter than salt water and tends to float above it. The result is that a two-layered system is formed with warm, fresher water near the surface and cool, saltier water near the bottom. The division between the layers may be quite distinct with very little mixing. Decomposition of animal and plant remains and respiration by animals and plants soon consume the dissolved oxygen present near the bottom, and inability to mix with surface water cuts off a renewed supply. The result during most summers is that the dissolved oxygen becomes exhausted at depths of about forty feet or more in certain portions of the bay and tributaries. This limits the depth at which oysters can grow and in which oysters or crabs can remain at this season. Winds can cause unusual and exceptional local conditions.

In the summer of 1958 an unusually extensive oxygen deficiency or stagnation was found in the Chesapeake Bay. It extended over a wide area from the mouth of the Rappahannock River north to the waters near Kent Island. The mouth of the Bay and the head of the Bay, for reasons which are known, but are somewhat complex, did not show severe depletion. Many locations in the Bay and in the mouth of the Potomac River were totally lacking of oxygen in all waters more than 20 feet below the surface. Observations by the Chesapeake Bay Institute, the Virginia Fisheries Laboratory, and the Chesapeake Biological Laboratory indicated that the past season produced the most extensive low oxygen mass in the Chesapeake Bay during the last ten years of careful study.

Because of the enormous area involved, it is not possible to know how long any one group of oysters was exposed to this dangerous condition. It is probable that all oysters in the Potomac River and the middle of the Bay, in water deeper than 20 feet, were in danger and that some of them were killed.

The combination of heavy rainfall and lack of strong winds during this summer contributed much to this condition. The heavy rains during the spring and summer brought unusually large quantities of nutrient salts and of plant and animal debris into the Bay. The nutrient salts stimulated extensive blooms of tiny plants that discolor the water and added their material to the bottom layers as they died and settled. A type of bacteria, that grows when oxygen is lacking, flourished upon the plant and animal debris at the bottom and released into the water a poisonous gas known as hydrogen sulphide. Samples of deep water in the affected areas smelled strongly of this gas. It may have been the direct cause of many of the deaths of fish, crabs, and oysters, but its presence was due to the chain of natural occurrences described. In some cases this year winds caused the lethal water to be pushed unusually far over more shallow areas for, in at least one instance, crabs were reported to have been killed in pots set at 12 feet along both the Eastern Shore and the Western Shore.

Fortunately most fish and crabs are able to move out of the affected water so that crabs confined in pots were the chief sufferers. Dead fish were not abundant and were mostly bottom dwellers, such as hogchokers and toadfish. Probably less than 5 percent of the State's oysters grow in the deeper water so that losses among them were limited and chiefly of local concern. Nevertheless, this represents an additional drain upon our already too low reserve supply of oysters. Little can be done by man to prevent losses of this kind except through such measures as removing crab pots from deep water at times of oxygen deficiency, and concentration of oyster cultural practices upon bottoms that are unaffected. In many areas of the world far more disastrous natural kills have occurred than have thus far been seen in the Chesapeake Bay (Maryland Tidewater News, September-October 1958).

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DIVERS STUDY BEHAVIOR OF STARFISH AND INDUSTRY CONTROL METHODS: The lack of good oyster sets since 1945, the repeated destruction of oyster beds by hurricanes, and the presence of a large number of oyster drills in many areas have led to a serious decrease in the production of oysters in Connecticut waters. The tenfold increase in the number of starfish in Long Island Sound, which occurred in 1957, placed the Connecticut oyster industry in a precarious position.

In anticipation of a long and difficult struggle against hordes of starfish, the U. S. Bureau of Commercial Fisheries Biological Laboratory at Milford, Conn., included in its program of assistance to the oyster industry a series of studies to evaluate the methods now employed in fighting starfish, offer suggestions to make these methods more effective, and develop new methods. The biologists decided that, simultaneously with observations on the performance of different types of starfish-destroying apparatus, studies should be conducted on the behavior of the starfish themselves. These studies were initiated in the summer of 1958 and were carried on underwater by SCUBA divers, all biologists of the Bureau,

The program was planned to study the efficiency of regular oyster dredges, suction dredges, the turtle dredge, starfish mops, and the methods of spreading quicklime on the surface and bottom of oyster beds. The studies were made with the cooperation of the Connecticut and New York oyster industries and the Connecticut Shell Fish Commission.

Since the studies were only of short duration and, in many respects, of a pioneering nature, conclusions drawn from the studies may not be final. These studies will be extended considerably in 1959 by carrying them out under a more diverse set of conditions and for a longer period. Underwater television cameras will also be used. As a result of these studies, the biologists hope to offer a more comprehensive and accurate evaluation of the starfish predator problem.

Observations made in the summer of 1958 showed that every device used is now, or can easily be made, quite effective in clearing starfish from the path the device actually covers. But in each case, a certain percentage of starfish was pushed around the leading edge of the dredges and were not picked up. For example, the 30-inch dredge of the Bureau's research boat, Shang Wheeler, left a path almost free of starfish, yet it picked up only about 53 percent of those encountered. The low percentage of catch was due, in part, to the starfish being pushed around the leading edge of the dredge, and partly because the dredge cables removed some of the starfish from the path. This type of loss was apparent with each piece of equipment tested, but the percentage of loss seemed to decrease as the width of the dredge increased. The loss of starfish

increased and the efficiency of the dredge decreased as the dredge filled up with sand, shells, and starfish, which obstructed the passage of water through the dredge bag. Obviously, certain improvements in the design of the dredges are needed to increase its efficiency. Some of these changes will be based on the design of a special starfish dredge used on the oyster and mussel grounds of Holland.

Another defect noticed in connection with the use of standard oyster dredges was the large mesh of the bag which allowed small and, sometimes, medium starfish to pass through meshes. It was demonstrated in one instance that by using smaller mesh such a loss would be virtually eliminated.

In observing the action of suction dredges, it was noticed in one case that the dredge dragged too flat on the bottom and, therefore, the suction base in the front part of the suction head pushed approximately 50 percent of the starfish aside and out of reach of the suction intake. However, in the case of two other dredges which had suction heads inclined at an angle of about 30 degrees, the bottom ahead of the suction opening was not appreciably disturbed. Only a few starfish were pushed around the leading edge of these suction dredges, and most of them were captured.

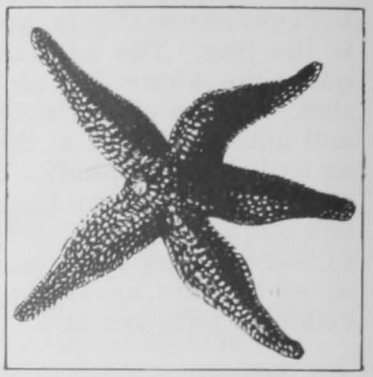
The divers reported that each of the suction dredges tested was powerful enough to utilize a water head, or "wings," to funnel the starfish into the suction opening, thus picking up many more starfish per unit of effort.

In studying the action of starfish mops, it was noticed that the bar to which the mops are attached often bounced along the bottom and only from 20 to 40 percent of the surfaces of the mops were on the bottom at times. However, almost all the starfish that were disturbed by the mop action on the bottom were caught by entangling in the mops. Only those at the end of the bar were pushed outward and lost. Again, as in the case of mechanical and suction dredges, certain improvements in the design and structure of the mops suggest themselves and should be incorporated in the newly-designed mops. Studies of the effectiveness of these mops will be made in 1959.

The effectiveness of quicklime in killing starfish depends, to a very large extent, upon the proper method of application and the concentration used. When the lime was spread on the surface at the rate of $\frac{1}{4}$-ton per acre, the divers could observe the particles settling through the water and estimated that about 85 percent of the starfish were hit by them. These lime particles were about $1\frac{1}{2}$ inches apart on the bottom. Since during the liming process the tide was running at almost 2 knots, it is obvious that such a strong current could carry many lime particles, especially the finer ones, far away from the point where they first entered the water.

When the lime was spread on the bottom by a boat belonging to an oyster firm, one particle of lime was found per quarter-of-an-inch of bottom surface. About 95 percent of the starfish were hit by the lime. The observers believed that the industry liming boat performed this operation very efficiently.

It is believed that to achieve more effective results with lime the mechanical aspects of the method should be further developed and perfected. In principle, it is an excellent and cheap means of fighting starfish and this has been demonstrated on many occasions under laboratory and field conditions. By misusing it, because of a lack of the necessary facilities for uniform and proper spreading, too light or too heavy concentrations, using inferior grades, or spreading the lime when the tide runs too swiftly, the method may be discredited. In 1959, with the cooperation of several oyster companies, Bureau biologists hope to conduct further studies on the application and effectiveness of lime as a method of fighting starfish.



While studying various aspects of the performance of the devices used in fighting starfish, the divers had the opportunity to make extensive observations on the behavior of starfish under normal conditions. Starfish were seen feeding on oyster spat, clams, moon snails, several other species of mollusks, and dead crabs. A large starfish was observed with its stomach pressed to a shell covered with oyster spat. When the starfish was pulled away by the diver, all the small oysters which had been under the stomach of the starfish were killed, while those outside this area were alive and apparently normal. This observation shows that a single large starfish can feed on several small oysters simultaneously.

Another rather important observation was that starfish can protrude their stomachs into the siphon hole of hard clams (Venus mercenaria) and consume them. This ability of starfish to kill clams that are dug in may account for the unexplained mortality of thousands of medium and large hard clams noted in New Haven Harbor while observing the operation of the suction dredge Quinnipiac.

The divers also studied starfish movements. They reported that if the current is less than one knot, starfish glide along in any direction, with only their tube feet at the tips of the rays touching the bottom. The observed rate under these conditions was about 6-8 inches a minute, or somewhat less than the maximum that we reported by our earlier experiments. Since starfish are so nearly neutral in buoyancy and seem to be firmly attached only when feeding, any spurt of current can carry them for several feet if they become detached. A current of about two knots is strong enough to accomplish this. When the current reached this strength or exceeded it, the starfish were observed floating parallel to the bottom singly, in two's and three's, and sometimes in larger groups. Some individuals were seen tumbling along "end over end." In some instances, usually when the current was very strong, starfish were seen with the tips of their rays curled, forming an open ball, and were readily rolled along by the current.

The observations showed that the movements of starfish by currents can result in distribution over a large area in a comparatively short time This was sustained by another observation that within 15-30 minutes after the passage of dredges or mops, the path which was almost completely clean of starfish would sometimes again contain just as many starfish, which had been brought into the cleared zone by the current. Because of such rapid movements of starfish from adjacent areas, evaluation of the killing effect of lime may not always be accurate if only comparatively narrow areas are covered. For example, in some instances, starfish showing effects of lime were found outside the limed area in about the same numbers as were within the limed zone. Obviously, starfish from the limed area which had been hit by particles of lime were scattered over the adjacent areas, while starfish in the untreated areas had entered the limed zone.

The actual number of starfish on the bottom varied from 2 individuals per 50 square yards on Lot 152 in the New Haven, Conn., area, where energetic measures for fighting starfish were employed, to 681 individuals per 50 square yards in some Milford areas, where no control measures were applied.

Lot 152, New Haven, was selected to determine the effectiveness of intensive efforts to control starfish. This lot was intensively dredged and mopped from about the middle of June to the middle of July, the period prior to the planting of cultch. The mopping was followed by liming of the areas surrounding this lot. Moreover, outside the limed zone, the bottom was continuously mopped to reduce the number of starfish. On August 22 the divers examined this lot and found three starfish per 50 square yards. In the limed areas surrounding the lot, they found six healthy starfish and a few with lime lesions per 50 square yards. In the mopped area outside of the limed zone there were 12 starfish per 50 square yards. Thus, it appeared that the intensive efforts mentioned above had kept Lot 152 and adjacent bottom comparatively free of starfish.

On August 26, a large number of starfish was again found on the lot, making it necessary to move the oyster set from that area. The heavy invasion would probably have occurred much sooner if the lot had been less actively protected. Its occurrence indicates the virtual impossibility of keeping a relatively small lot free of starfish without reducing their number within adjacent areas so as to create a wide safety zone around the cultivated oyster bed. Biologists and practical oystermen realized this in the past, and we recommended this approach many years ago. However, a much larger oyster fleet than the present one is needed to fulfill this task.

The starfish do not complete their life cycle in a single year but may live for a long time. This has been demonstrated by keeping adult starfish in our laboratory for several years after they had become fully mature. Some of them were marked with vital stains and, therefore, their identity was unmistakable. European biologists have kept closely related starfish species in aquaria for five and six years. Observations on distribution and occurrence of starfish in Connecticut waters also indicated that it takes several years before a year-class shows a decided decrease in its numbers. This suggests that the oyster industry cannot hope that the large number of starfish now present in Long Island Sound will soon disappear. On the contrary, it is expected that the starfish will remain in Long Island waters for several years and oystermen should be prepared to combat them most energetically to save the remaining oyster beds. With such a purpose in mind, the Milford Laboratory will continue to work on the development of better methods of starfish control (Bulletin No. 4, Fisheries, Biological Laboratory, Milford, Conn.).

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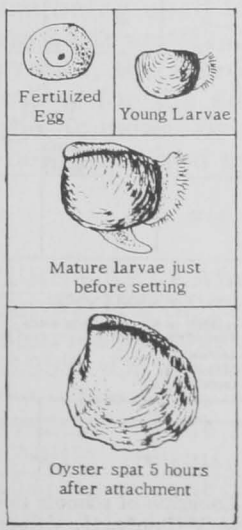
MARYLAND'S CHESAPEAKE BAY OYSTER SET POOR IN 1958: A complete picture of 1958 oyster setting in Chesapeake Bay waters of Maryland must await the end of the 1958 setting season and completion of counts throughout the State, according to biologists of the Maryland Chesapeake Biological Laboratory. There are early indications, however, that the Maryland set in 1958 was poor in many areas. Up to late September 1958 there had been little or no setting in most of the Patuxent River, the adjacent Chesapeake Bay, the St. Marys River, and upper Fishing Bay. Preliminary reports show a similar condition in the Eastern Bay area. A below-average set was observed in Smith Creek, Honga River, Tar Bay, and the Manokin River area. The best set observed was at Holland Straits, where a good but not exceptionally heavy set was indicated. These statements are based upon test-shell findings compared with similar observations during previous years. The final picture may be altered by poor survival of the spat observed, or by unexpectedly late setting which is possible up until about mid-October.



Many factors may cause great variations from year to year in oyster spawning, the survival of oyster larvae, and the attachment of spat. Among these are: abundance of brood stock, salinity of the water, temperature conditions, food for larvae, scattering of larvae by tides and currents, chemical conditions, cleanliness of "cultch" or shells, presence of diseases that affect larvae and spat, abundance of enemies that feed upon larvae and spat, silt deposits on shells, smothering by fouling growths, and many others. A favorable combination of all these factors seldom occurs. Few of them can be changed by man except the abundance of brood stock and the presence of clean shell as cultch in places where oyster larvae tend to concentrate naturally. By providing these two, however, the average amount of set can be increased under most conditions.

At least three unfavorable factors were apparent in 1958:

(1) Adult oysters or brood stock were too thinly scattered in many areas for most effective spawning. The spawn of one sex in the water will stimulate spawning by the opposite sex. Oysters close together in beds tend to spawn completely while widely-scattered oysters may spawn very little. A good oyster market in recent years has increased the drain on the oyster beds.

(2) Extensive areas of bottom water have been deficient in oxygen. This not only has killed some oysters in deep water and affected the amount of spawning, but has offered a great hazard to the survival of oyster larvae during the two weeks that they drift with the tide before setting.

(3) Exceptionally low salinity has existed this spring and summer throughout the Chesapeake area. It always has been noted that setting is more abundant towards the lower bay and that setting generally is better in the saltier areas if other conditions are favorable. Recent and important research upon the survival and growth of clam and oyster larvae at different salinities has been conducted at the Milford Biological Laboratory of the United States Bureau of Commercial Fisheries. This research demonstrated effectively that even oysters which live in low salinity water (Hodges Bar) required a salinity of between 10 and 15 parts per thousand for best development of their eggs. Oysters grown in more salty water needed a higher salinity. Over most of the Maryland portion of the Chesapeake, salinities during the spring and early summer of 1958 were generally below the above figure and it is probable that this may have been the principal reason for the poor setting that occurred over most areas. It seems significant that the setting thus far observed occurred in the higher salinities represented (Maryland's Tidewater News, Sept.-Oct. 1958).

* * * * *

OYSTER-SETTING EXPERIMENT IN ARTIFICIAL POND SHOWS PROMISE: Experiments in an artifical pond on Long Island, N. Y., show that one of the successful methods for obtaining an oyster set is to release large numbers of oyster larvae which are about to set. These experiments are being made by U. S. Bureau of Commercial Fisheries shellfish biologists. By this method a set of native oysters was obtained which grew well under local conditions.

The experiments indicate that this method may be the simplest one for obtaining a commercial oyster set in artificial ponds or tanks. This is due to the difficulties encountered in maintaining a proper balance of temperature, salinity, chemical balance, food content, and other factors in artificial ponds long enough to permit normal development of oysters from the egg stage to the setting stage.

Pacific Oceanic Fishery Investigations

TUNA FEEDING BEHAVIOR IN LINE ISLANDS AREA STUDIED (M/V Charles H. Gilbert Cruise 42): The feeding behavior of skipjack and yellowfin tuna to chumming with bait and water sprays was studied during the October 9-November 17, 1958 cruise of the U. S. Bureau of Commercial Fisheries research vessel Charles H. Gilbert.

The first half of the cruise was spent in the vicinity of the Hawaiian Islands, but because of the scarcity of tuna schools little was accomplished. This led to the decision to continue the cruise in the vicinity of the Line Islands where, as was expected, schools of tuna were found.

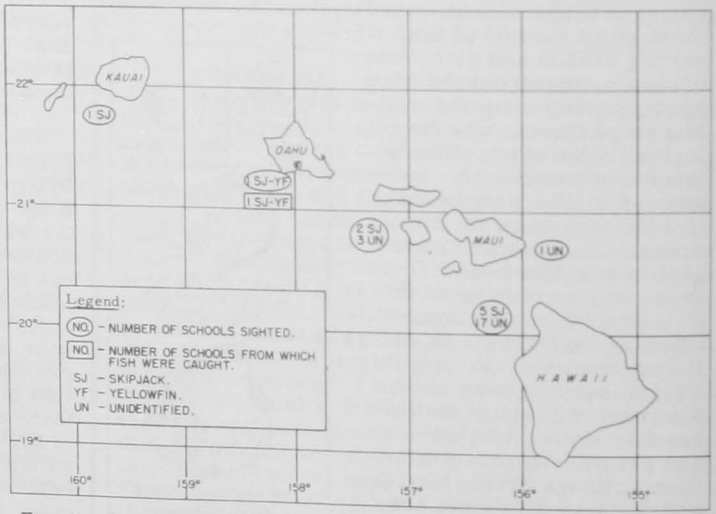


Fig. 1 - Location of schools sighted and fished in the Hawaiian Islands. M/V Charles H. Gilbert Cruise 42 (October 8-November 17, 1958).

During 9 days of active pole-and-line-bait fishing in the Line Islands area, 69 fish schools were sighted. Of these 38 schools were positively identified as skipjack or yellowfin; and at least 6 of those identified were large schools estimated at 10 to 15 tons of fish each.

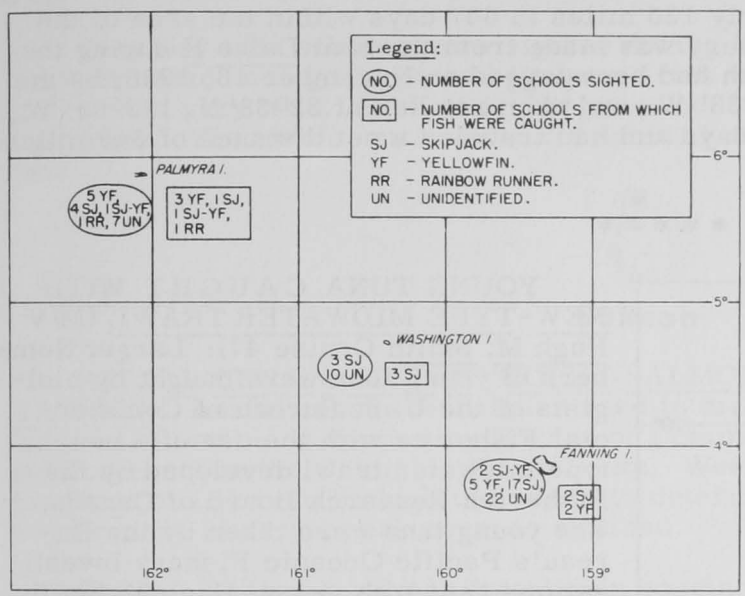


Fig. 2 - Location of schools sighted and fished in the Line Islands. M/V Charles H. Gilbert Cruise 42 (October 8-November 17, 1958).

Observations were made from a submerged caisson or chamber and the behavior of both skipjack and yellowfin to lamp black dye solutions in the water, to chumming with tilapia and mullet, and to water sprays was studied. This was the first opportunity the biologists have had to observe yellowfin tuna and to compare their behavior with that of skipjack.

In general, the reactions were similar for both species except that the yellowfin swam below the skipjack, at about a depth of 10 feet, and made dashes upward to feed upon the tilapia or mullet bait.

Two days were spent bait fishing in the Line Islands, one day each at Fanning Island and Palmyra Island. The bait was predominantly 3-8 inch mullet. Sixty-six buckets were caught at Fanning Island and 133 buckets (40 of which were released) at Palmyra Island.

The successful fishing in the Line Islands area emphasizes the seasonal nature of the Hawaiian fishery. In Hawaii, surface schools of skipjack are not abundant enough to support a satisfactory fishery during 4 or 5 months of the year. Due to high capital investments associated with tuna fishing, this seasonal pattern can never furnish a fully satisfactory basis for a prosperous fishery. It's equally obvious that during the Hawaiian off-season fish are fairly abundant in reasonably nearby areas.

At the moment the principal reason why these areas cannot be fished from Hawaii is the lack of a bait fish sufficiently hardy to withstand a 3-5 day journey at sea. Two approaches are being used to break this bottleneck: (1) the intensive production of tilapia as tuna bait; and (2) the introduction of other bait species to Hawaii. One of these programs, the introduction of the Marquesan sardine to Hawaii, has shown great promise, for the sardine has definitely spawned in Hawaiian waters and may well become abundant over the next few years. The other, the culture of tilapia, is already being utilized by the industry to a limited extent.

* * * * *

TUNA TAGGING RETURNS REVEAL GROWTH RATES AND MOVEMENTS: Skipjack tuna from Hawaiian waters tagged with the dart tag developed by U. S. Bureau of Commercial Fisheries biologists during 1957 and 1958 continued to be recovered during October 1958. Of the total of 12 recoveries, 11 showed random movement within the fishery. The other recovery was of particular interest in that it provided additional information on the rate of growth of these tuna. This fish was tagged and released off Hilo, Hawaii, early in September 1957. When captured near the end of October 1958, its weight had increased from about 4 to 18 pounds, a growth rate of about a pound a month. There has been at least one recovery of tagged skipjack each month since the release of the 3,200 tagged fish in September 1957.

Two albacore tuna tag recoveries were reported during October 1958, bringing the albacore tag recovery total to 16 (1.3-percent recovery rate). The 15th recovery was made by the California albacore boat Mable on July 21, 1958, at 34°00' N., 122°10' W. This fish had been tagged on November 21, 1956, by the M/V Charles H. Gilbert of the U. S. Bureau of Commercial Fisheries at 35°21' N., 123°57' W. Thus, this fish made a net movement of only 130 miles in 607 days within the area of the west coast fishery. The 16th recovery was made from the boat Daiho II during the trip of August 12-29, 1958. This fish had been tagged on November 16, 1956, by the Charles H. Gilbert at 36°48' N., 127°33' W., and when retaken at 32°38' N., 123°00' W., it had been at liberty for about 640 days and had traveled a net distance of 345 miles within the West Coast fishery.

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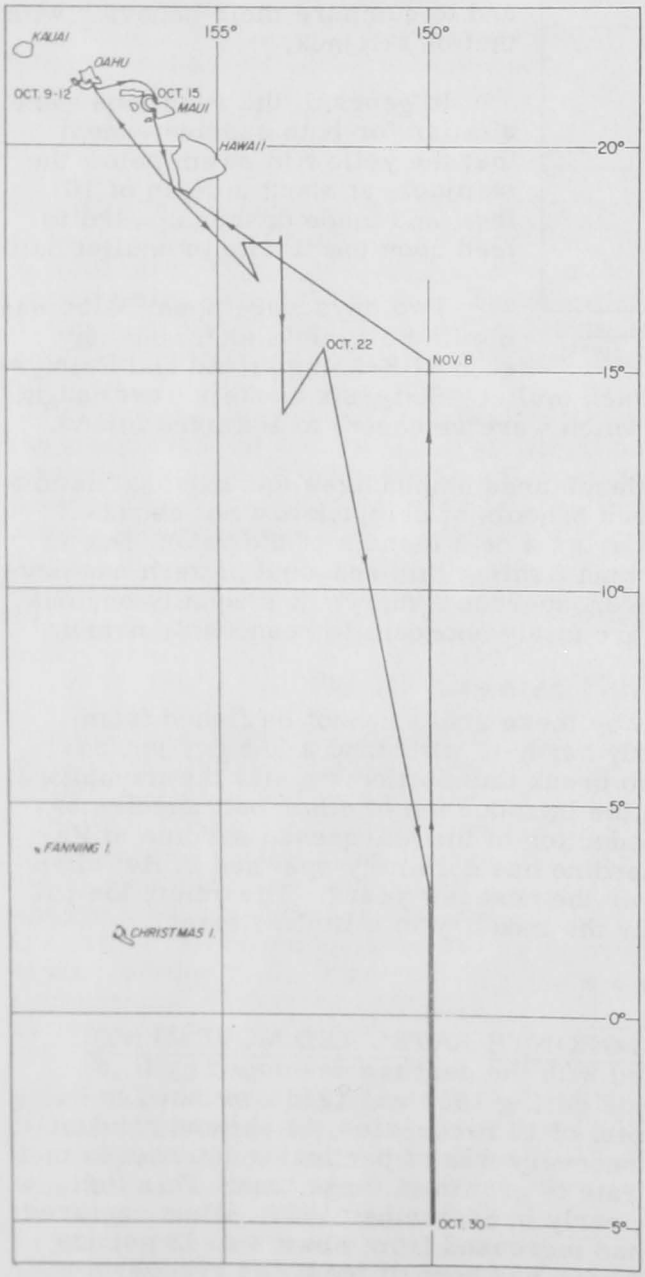


M/V Hugh M. Smith cruise 47 (October 9-November 11, 1958).

YOUNG TUNA CAUGHT WITH NEW-TYPE MIDWATER TRAWL (M/V Hugh M. Smith Cruise 47): Larger Numbers of young tuna were caught by biologists of the U. S. Bureau of Commercial Fisheries with the use of a new-type midwater trawl developed by the Fisheries Research Board of Canada. The young tuna were taken by the Bureau's Pacific Oceanic Fishery Investigations research vessel Hugh M. Smith during an October 9-November 11, 1958, cruise from Hawaii to a few degrees south of the Equator. Collection of young tuna is of special interest because they are rare in collections.

In addition to the young tuna, a great many varieties of fish of importance as tuna forage were taken. The comparative abundance of tuna forage from place to place is of importance in the study of the distribution of tuna since the abundance of available food influences distribution.

This cruise marks the first time the new-type midwater trawl has been used in the central Pacific. The trawl is about 40 feet across the mouth and was towed at speeds up to 4 knots at depths ranging from the surface down to 800 feet. Other than the collections of young tuna and of tuna forage obtained through the use of the trawl, the catches included large numbers of rare fishes.

In addition to the fishing with the trawl, oceanographic observations were made during the cruise in the extension of the California Current southeast of Hawaii and in the newly-discovered undercurrent flowing east along the Equator as a follow-up to studies made in the spring of 1958.

Contrary to expectations, no tuna schools were sighted in the region of the California Current so plans for live-bait fishing and stomach sampling were not accomlished, and unfavorable weather prevented the use of the Canadian midwater trawl. Hauls were made with the Isaacs-Kidd trawl, however, and with the 1-meter plankton net.

Very few tuna schools were sighted during the cruise. Five skipjack schools were chummed using tilapia as bait but no fish were caught. The schools were small in size and very wild. Surface trolling was conducted with two lines during the daylight runs. The catch consisted of 7 dolphin, 1 wahoo, 1 skipjack, and 1 yellowfin tuna.

Salmon

AERIAL CENSUS USED TO COUNT SALMON EGG NESTS IN COLUMBIA RIVER BASIN: Aerial census techniques used in making counts of game animals and birds also are being applied by Bureau of Commercial Fisheries biologists to count salmon nests in the Columbia River Basin. Weekly surveys were made by Washington State and Bureau biologists in 1958 to determine the peak of spawning. One survey is made after the peak count is attained.

Spawning chinook salmon females in gouging out a nest overturn brown algae-covered gravel and small rocks exposing fresh, light-colored surfaces. The "redds" (salmon nests) appear as bright spots in the gravel and are readily seen from the air. Biologists in small light planes count the number of nests in a river system as an index of the number of fish utilizing a spawning area. These surveys are repeated annually (since 1948) for comparison of changing abundance in salmon spawning populations.

Information obtained from the aerial surveys is used to determine the size of a spawning area and how many spawners are involved in the region of each proposed dam. The count is made for each section of the river. For example, for the Priest Rapids Dam this information was sought--what is the extent of spawning in the vicinity and how much spawning area will be lost when the hydroelectric project is completed?

With the facts at hand, biologists seek to work out programs for the conservation of the salmon runs whether it be artificial spawning areas as is being tried at McNary Dam on the Columbia River, additional hatcheries for rearing salmon, or other projects.

Plane surveys of salmon nests are also made by the Idaho Fish and Game Department and the Oregon Fish Commission, the state agencies charged with the protection and wise utilization of the fisheries resource. The actual fish--pink, red, and chum salmon--are counted in aerial surveys by fisheries scientists in Alaska.

* * * * *

NEW OREGON SALMON HATCHERY COMPLETED: The new Cascade $500,000 salmon hatchery, located on Oregon's Eagle Creek just above Bonneville Dam on the Columbia River, was opened officially by the Oregon Fish Commission late in October 1958.

"Nine million fall chinook eggs obtained from fish returning to Eagle Creek are scheduled for rearing at the new hatchery next spring," the Commission's Director of Fish Culture stated.

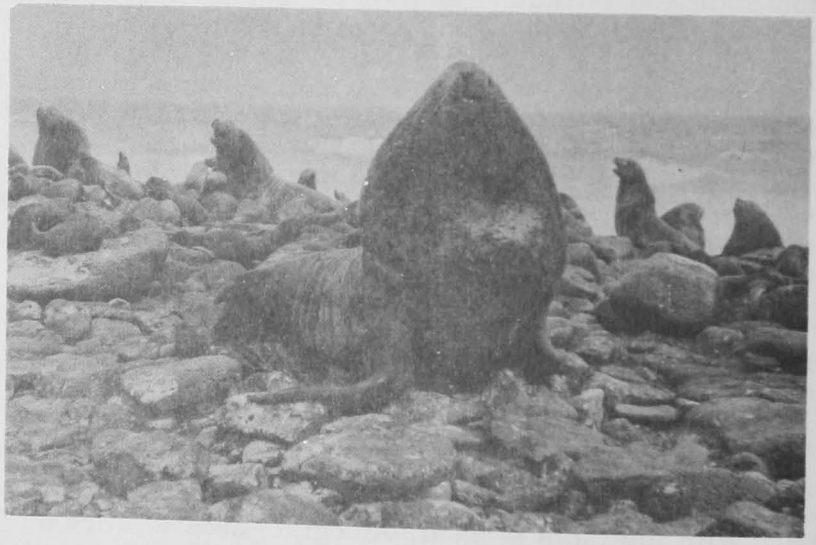
"Cascade hatchery can rear about 11 million salmon annually," he reported, "and its activation brings to 16 the number of Commission-operated units in the State, producing at the present time an average of 25 million salmon and 3 million steelhead each year to provide fish for both commercial and sport fishermen."

The hatchery was constructed under the Federally-financed Columbia River fisheries development program--a program started in 1948 to offset losses of migratory fish runs resulting from Federal dam construction of the main Columbia River. Cascade is the second completely new hatchery constructed for Commission use under the Columbia River program. The first is located at Sandy, Ore. Four other hatcheries have been renovated under this program.

Sea Lions

POPULATION OFF CALIFORNIA COAST INCREASES: The sea lion population off the California coast increased from 8,700 in 1947 to 19,700 in 1958, according to the California Department of Fish and Game. At least 10 percent of the increase, and possibly more, is due to the fact that pups were counted for the first time this year.

In 1947, photographic census takers, who made the count from a slow-moving blimp on loan from the United States Navy, were able to distinguish between pups and adults. But only adults were enumerated due to uncertainty as to how many pups survived the hazardous early days ashore or until able to swim. Many of them are crushed to death by the ponderous and careless adults.



Sea lions on rookery about one week before height of breeding season.

In 1958 the census was made by a fast plane, which was more efficient because the entire count took only 3 days, compared to 3-4 weeks in 1947. Since adults and pups could not be distinguished one from the other on the photos, all were counted as sea lions.

Most of the population increase occurred in the channel islands of Southern California where 12,450 were counted, compared to 2,680 for the same area in 1947. The increase in Northern California over the 11-year period was only 2,000, or from 5,000 in 1947 to 7,000 in 1958.

The three channel islands which had the heaviest populations are: San Miguel, 5,190 (650 in 1947); San Nicolaus 3,070, (660 in 1947); and San Clemente, from zero to 1,500.

In addition to the sea lions, the Department counted 444 sea elephants, all of them on San Miguel Island.

Tuna

CALIFORNIA PACK AND CANNERY RECEIPTS SET NEW RECORD: The California 1958 canned tuna pack passed 10 million standard cases during the week of November 10-15, 1958. An estimated 10.3 million standard cases of tuna were packed through November 15 from 207,200 tons of tuna received by the canneries. This sets an all-time annual record and was 700,000 cases above the California annual 1956 pack of about 9.6 million cases.

California cannery tuna receipts for January-October 1958 totaled 201,000 tons--an all-time record, exceeding the previous high ten-months receipts in 1956 by 22,000 tons or 12 percent. Record-high frozen tuna imports of 60,663 tons and a record-high tuna purse-seine catch of 39,000 tons accounted for the new record in cannery tuna receipts in 1958. Cannery tuna receipts during the first 10 months of 1958 also exceeded any previous full year's total except for 1956 and 1954.

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UNITED STATES CLIPPER SURVEYS TUNA RESOURCES OFF WEST AFRICAN COAST: The United States tuna clipper Chicken of the Sea, owned and operated by a Pacific Coast cannery, arrived at Accra, Ghana, on November 8, 1958, for a tuna fishing survey off the West African coast to determine the feasibility of operating in that area.

The arrival of the tuna clipper was preceded by preparatory arrangements to permit the vessel to fish for live bait in Ghana's territorial waters and obtain port amenities in return for an agreement to make available to the Ghana Government the results of the survey and take a Government fisheries officer as observer aboard the survey vessel.

The tuna clipper, which arrived in African waters in October, is surveying the tuna and bait fisheries from the Senegal coast to Ghana. Most observations are made beyond the territorial waters of the countries concerned. The vessel's captain stated informally that tuna fishing grounds in the West African area are very promising in general and that those off the coast of Ghana are particularly impressive. Fishing trials made 20-30 miles off Ghana's Cape Three Points on November 7 produced a catch of about 30 tons of tuna. Fishing had to be suspended due to lack of live bait. Bait supplies off the Ghana coast were not promising during this period, according to the clipper's captain. Fisheries officers confirmed the fact that the continental shelf bait fisheries are highly seasonal, while the off-shelf supply has not been firmly established.

Following the visit to Ghana, the tuna clipper planned to replenish live-bait supplies by fishing within territorial limits and to proceed with the tuna survey well out to sea. The clipper will land in Puerto Rico as soon as it is capacity-loaded. The Pacific Coast cannery that owns the clipper also has a cannery in Puerto Rico.

Assuming that both tuna and bait fisheries are suitable for commercial fishing, the United States cannery may draw up plans to fish off the African West coast and land catches on the United States east coast and, concurrently, to establish a fishing, cold storage, and canning industry in Ghana.

United States Fishing Fleet [1/] Additions

AUGUST 1958: A total of 58 vessels of 5 net tons and over was issued first documents as fishing craft in August 1958. Compared with the same month of 1957, this was a decrease of 1 vessel. The Gulf States continued to lead with 20 vessels, the South Atlantic area was second with 18, and the Chesapeake third with 10.

Table 1 - U. S. Vessels Issued First Documents as Fishing Craft by Areas, August 1958

Area	August		Jan.-Aug.		Total
	1958	1957 [2/]	1958 [2/]	1957 [2/]	1957
	(Number)				
New England	-	2	10	15	19
Middle Atlantic	2	1	11	19	23
Chesapeake	10	7	65	67	104
South Atlantic	18	13	94	84	130
Gulf	20	22	198	103	166
Pacific	5	9	89	87	102
Great Lakes	-	1	5	5	8
Alaska	3	4	27	40	48
Puerto Rico	-	-	-	1	1
Virgin Islands	-	-	1	-	-
Total	58	59	500	421	601

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

Table 2 - U. S. Vessels Issued First Documents as Fishing Craft, by Tonnage, August 1958

Net Tons	Number
5 to 9	19
10 to 19	11
20 to 29	16
30 to 39	8
40 to 49	3
90 to 99	1
Total	58

Fishing craft that were issued documents as fishing craft during the first eight months of 1958 totaled 500 vessels--an increase of 79 vessels as compared with the same period of 1957. Of the vessels documented for fishing, 40 percent were reported from the Gulf States.

1/Includes both commercial and sport fishing craft.

United States Fishery Landings, January-October 1958

Landings of fish and shellfish in the United States and Alaska during the first ten months of 1958 were over 5 percent below those of the same period of 1957. At the end of September 1958, landings were only one percent below those for last year; however, during October 1958 the catch of menhaden was much smaller than in October 1957.

Sardine landings in California were 148 million pounds greater through November 25 this year than for the same period of 1957. Salmon landings on the Pacific Coast including Alaska during the 1958 season were up 41 million pounds. Tuna landings in California for the first ten months of 1958 were over 15 million pounds higher than for the same period in 1957. Ocean perch landings in New England were up 15 million pounds over a year ago.

Menhaden landings were 203 million pounds behind 1957 at the end of October. Jack mackerel landings were better in October but were still 65 million pounds under the ten-month total for 1957. Herring landings in Maine (134 million pounds) were slightly above those of last year for nine months. Herring production in Alaska, however, was short by 37 million pounds. Anchovies in California were down around 31 million pounds. Whiting in New England continued to fall behind last year's catch, although there was some improvement in October.

Table 1- United States Fishery Landings of Certain Species for Periods Indicated, 1958 and 1957 1/

Species	Period	1958	1957	Total 1957
		.....(1,000 Lbs.).....		
Anchovies, Calif.	10 mos.	6,922	37,514	38,408
Cod:				
Maine	9 mos.	2,494	2,058	2,352
Boston	10 "	14,244	16,064	17,487
Gloucester ...	10 "	2,530	1,582	2,020
Total cod ..		19,268	19,704	21,859
Haddock:				
Maine	9 mos.	3,310	3,809	4,667
Boston	10 "	75,562	85,300	93,617
Gloucester ...	10 "	8,872	8,035	8,898
Total haddock		87,744	97,144	107,182
Halibut 2/:				
Wash. & Ore...	10 mos.	15,626	15,430	15,430
Alaska	10 "	19,972	20,733	20,733
Total halibut		35,598	36,163	36,163
Herring:				
Maine	9 mos.	133,963	129,194	153,621
Alaska	Year	80,828	118,290	118,290
Industrial fish, Maine & Mass. 3/	10 mos.	116,294	118,029	130,275
Mackerel:				
Jack	10 mos.	11,042	75,976	86,300
Pacific	10 "	15,710	39,788	55,200
Menhaden	10 mos.	1,369,266	1,572,405	1,681,600
Ocean perch:				
Maine	10 mos.	63,770	56,864	64,723
Boston	10 "	2,106	3,322	3,819
Gloucester....	10 "	68,032	58,598	65,389
Total ocean perch		133,908	118,784	133,931
Salmon:				
Wash. 4/	9 mos.	46,276	39,871	43,273
Oregon 4/.....	9 "	7,736	10,839	11,354
Alaska	Year	248,000	203,437	203,437
Sardines, Pacific	to Nov. 25	178,912	30,462	45,800
Scallops, sea, New Bedford	10 mos.	12,973	14,324	16,461
Shrimp (heads-on), South Atlantic and Gulf States ...	7 mos.	82,862	96,229	166,737
Wash.	9 "	5,465	1,392	2,458
Oregon	8 "	1,392	286	403
Squid, Calif. ...	9 mos.	4,862	10,670	12,449
Tuna, Calif. ...	10 "	280,696	265,456	291,234
Whiting:				
Maine	9 mos.	23,319	15,727	15,810
Boston	10 "	506	976	1,002
Gloucester ...	10 "	44,775	74,952	76,521
Total whiting		68,600	91,655	93,333
Total all above items		2,948,317	3,127,612	3,449,768
Others not listed		568,178	586,772	1,329,232
Grand Total		3,516,495	3,714,384	4,779,000

1/Preliminary.
2/Dressed weight.
3/Excluding menhaden.
4/Landed weight.

Table 2- United States Fishery Landings by States for Periods Indicated, 1958 and 1957 1/

Area	Period	1958	1957	Total 1957
		.....(1,000 Lbs.).....		
Maine	9 mos.	255,747	240,353	290,528
Massachusetts:				
Boston	10 mos.	108,391	118,287	135,072
Gloucester ..	10 "	204,735	228,284	248,928
New Bedford .	10 "	96,482	90,617	104,334
Provincetown .	10 "	21,959	22,709	25,109
Total Mass.		431,567	459,897	513,443
Rhode Island 2/	8 mos.	70,405	86,450	121,273
New York 2/...	9 "	31,005	31,551	40,223
New Jersey 2/..	9 "	36,301	40,036	50,541
North Carolina 2/	10 "	49,111	60,185	64,634
South Carolina 2/	9 "	11,586	10,585	24,316
Georgia	8 "	11,217	10,734	18,584
Florida 2/	9 "	104,410	96,690	140,698
Alabama	8 "	6,875	8,436	11,882
Mississippi 2/..	8 "	10,063	15,354	19,991
Louisiana 2/...	7 "	32,571	38,203	63,332
Texas 2/.....	8 "	35,463	44,453	77,156
Ohio	9 "	15,042	22,815	22,844
Oregon 3/	9 "	50,556	49,855	57,694
Washington:				
Salmon 3/....	9 mos.	46,276	39,871	43,273
Other	7 "	63,399	61,926	99,478
California:				
Certain species 4/	10 mos.	498,144	459,866	529,391
Other	6 "	42,524	43,922	86,862
Total Calif.		540,668	503,788	616,253
Rhode Island, Middle Atlantic, Chesapeake, South Atlantic, and Gulf States (menhaden only)	10 mos.	1,365,433	1,550,742	1,661,480
Alaska:				
Halibut 5/.....	10 mos.	19,972	20,733	20,733
Herring	Year	80,828	118,290	118,290
Salmon	Year	248,000	203,437	203,437
Total all above items		3,516,495	3,714,384	4,280,083
Others not listed		6/	6/	498,917
Grand Total		6/	6/	4,779,000

1/Preliminary.
2/Excludes menhaden.
3/Landed weight.
4/Includes catch of anchovies, jack and Pacific mackerel, Pacific sardines, squid, and tuna. Data on sardines are through November 25.
5/Dressed weight.
6/Data not available.
Note: Data principally represent weight of fish and shellfish as landed except for mollusks which represent the weight of meats only.

U. S. Foreign Trade

EDIBLE FISHERY PRODUCTS, AUGUST 1958: Imports of edible fresh, frozen, and processed fish and shellfish into the United States during August 1958 were down 9.9 percent in quantity and 11.0 percent in value as compared with July 1958. The drop was due to sharply lower imports of frozen groundfish fillets, and to a lesser degree, a drop in the imports of sardines and lobsters. These declines were partly offset by a 5.3-million-pound increase in the imports of frozen tuna.

Compared with August 1957, the imports this August were higher by 4.0 percent in quantity and 5.9 percent in value due to higher imports of groundfish fillets, shrimp, and tuna. Compensating, in part, for the increases was a drop in the imports of canned salmon.

United States exports of processed fish and shellfish in August 1958 were higher by 28.1 percent in quantity, but were 10.0 percent lower in value as compared with July 1958. Compared with the same month in 1957, the exports in August 1958 were down by 56.8 percent in quantity and 52.4 percent in value. The exports this August as compared with the same month in 1957 continued the trends of the past year resulting from the very light packs of California sardines, mackerel, and anchovies.

United States Foreign Trade in Edible Fishery Products, August 1958 With Comparisons

Item	Quantity			Value		
	August		Year	August		Year
	1958	1957	1957	1958	1957	1957
	(Millions of Lbs.)			(Millions of $)		
Imports:						
Fish & shellfish: Fresh, frozen, & processed 1/. . .	91.0	87.5	837.0	25.2	23.8	248.4
Exports:						
Fish and shellfish: Processed only 1/ (excluding fresh & frozen)	2.5	5.7	69.7	0.9	2.1	16.8

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

* * * * *

GROUNDFISH FILLET IMPORTS, OCTOBER 1958: United States imports of cod, haddock, hake, pollock, cusk, and ocean perch fillets (including blocks) during October 1958 totaled 19.9 million pounds--an increase of 784,000 pounds, or 4 percent, compared with the same month of last year. Although shipments from Canada dropped 3 percent below October of 1957, it still ranked first in volume as supplier with 15.7 million pounds.

During the first ten months of 1958, imports of groundfish fillets (including blocks) amounted to 130.9 million pounds. This was still a gain of 5 percent compared with the same period of 1957. Imports from Canada accounted for 73 percent of the total, followed by Iceland with 13 percent, and Denmark with 7 percent. Imports from nine other countries made up the remaining 7 percent.

The quota of groundfish and ocean perch fillets and blocks permitted to enter the United States at $1\frac{7}{8}$ cents per pound in calendar year 1958 is 35,892,221 pounds, divided into a quarterly quota of 8,973,055 pounds. The quota for the calendar year 1957 amounted to 37,375,636 pounds. Imports during any quarter in excess of the established quarterly quota enter at a duty of $2\frac{1}{2}$ cents a pound.

Note: See Chart 7 in this issue.

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IMPORTS OF CANNED TUNA IN BRINE UNDER QUOTA: The quantity of tuna canned in brine which may be imported into the United States during the calendar year 1958 at the $12\frac{1}{2}$-percent rate of duty has been established as 44,693,874 pounds. Any imports in excess of this established quota will be dutiable at 25 percent ad valorem.

Imports from January 1-October 31, 1958, amounted to 42,349,036 pounds, according to data compiled by the Bureau of Customs. This leaves a balance of 2,344,838 pounds of the quota which may be imported during the balance of 1958 at the $12\frac{1}{2}$-percent rate of duty. Last year from January 1-November 2 a total of 34,923,285 pounds had been imported.

Wholesale Prices, November 1958

Wholesale prices for selected edible fishery products in mid-November 1958 continued to fall off slightly from the two preceding months, but remained higher than for the same month in 1957. The November 1958 edible fish and shellfish (fresh, frozen, and canned) wholesale price index (128.6 percent of the 1947-49 average) was down by 0.8 percent from the previous month, but was up 6.1 percent from November a year ago.

October 1958 prices for the drawn, dressed, and whole finfish subgroup were down 2.3 percent as compared with a month earlier. From October to November prices rose for large drawn haddock (up 2.2 percent) and Lake Superior whitefish (up 11.5 percent). These increases were offset by lower prices for the other fresh-water varieties and frozen halibut and salmon. When compared with November 1957, the subgroup index in November 1958 was higher by 19.6 percent due to higher prices for all the subgroup items except fresh whitefish at New York City.

The fresh processed fish and shellfish subgroup index for November 1958 was down by 1.5 percent from October due to lower prices for fresh haddock (down 4 percent) and fresh shrimp (down 2.4 percent). The index in November 1958 as compared with November 1957 was lower by 2.5 percent due to a 7.4-percent drop in fresh shrimp prices at New York. Higher prices for fresh haddock fillets (up 3.2 percent) and fresh shucked oysters (up 2.1 percent) failed to offset the lower shrimp price.

The November 1958 index for the frozen processed fish and shellfish subgroup was the only one to show a slight increase (1.8 percent) over the preceding month, and it was due to the rise in frozen shrimp prices at Chicago. From November 1957 to November 1958 prices for selected frozen processed fish and shellfish increased 8.3 percent. All the items were priced higher (haddock up 22.7 percent) in November 1958 than in the same month a year earlier.

Canned fishery products primary broker prices in November 1958 were down slightly (0.7 percent) from October, but were higher by 1.1 percent than for November 1957. From October to November this year lower prices for canned pink salmon and California sardines were responsible for the over-all decline. As compared with November 1957, wholesale canned fish prices were higher in November 1958 for Maine sardines (up 27.6 percent from abnormally low prices in November 1957) and for tuna (up 4.0 percent), and prices were lower for pink salmon (6.5 percent) and California sardines (3.5 percent). The market remained firm for the below-average pack of Maine sardines and for salmon. But a heavy pack and imports of tuna and a large pack of California sardines continued to depress the market for these two products. The prospects for the market for the relatively large pack of California sardines (about 2.1 million cases) was poor.

Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, November 1958 With Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices1/ ($)		Indexes (1947-49=100)			
			Nov. 1958	Oct. 1958	Nov. 1958	Oct. 1958	Sept. 1958	Nov. 1957
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					128.6	129.6	130.1	121.2
Fresh & Frozen Fishery Products:					147.9	149.2	150.0	136.1
Drawn, Dressed, or Whole Finfish:					156.5	160.2	158.1	130.8
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.15	.15	152.3	149.0	151.9	142.4
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.34	.34	105.2	106.2	113.2	96.4
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.78	.81	177.0	182.6	174.2	143.8
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.73	.65	179.7	161.1	161.1	142.5
Whitefish, L. Erie pound or gill net, rnd., fresh	New York	lb.	.75	.90	151.7	182.0	200.2	156.7
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.50	.59	117.3	138.4	140.7	114.9
Processed, Fresh (Fish & Shellfish):					138.7	140.8	143.8	142.2
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.48	.50	163.3	170.1	158.2	158.2
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	.81	.83	128.0	131.1	138.2	138.3
Oysters, shucked, standards	Norfolk	gal.	6.00	6.00	148.5	148.5	148.5	145.4
Processed, Frozen (Fish & Shellfish):					135.5	133.1	134.7	125.1
Fillets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.42	.42	108.6	108.6	107.3	100.8
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.41	.41	127.1	127.1	124.0	103.6
Ocean perch, skins on, 1-lb. pkg.	Boston	lb.	.30	.30	120.8	120.8	116.8	110.8
Shrimp, lge. (26-30 count), 5-lb. pkg.	Chicago	lb.	.86	.83	132.7	128.5	133.5	130.0
Canned Fishery Products:					101.1	101.8	101.9	100.0
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	21.50	21.75	112.2	113.5	109.6	120.0
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	11.95	11.95	86.2	86.2	86.2	82.9
Sardines, Calif., tom. pack, No. 1 oval (15 oz.), 24 cans/cs.	Los Angeles	cs.	4.15	4.30	96.9	100.4	123.7	100.4
Sardines, Maine, keyless oil, No. 1/4 drawn (3-3/4 oz.), 100 cans/cs.	New York	cs.	8.22	8.22	87.5	87.5	87.5	68.6

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.