

TRENDS AND DEVELOPMENTS

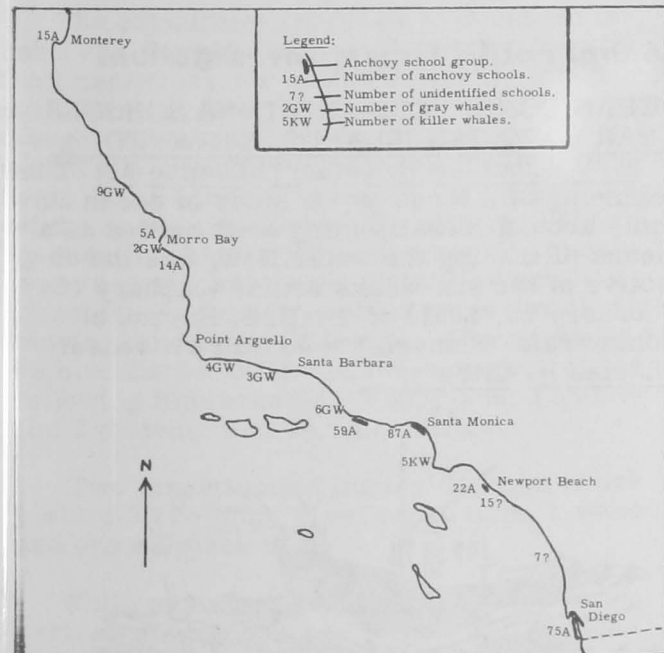
California

PELAGIC FISH POPULATION SURVEY CONTINUED:

Airplane Spotting Flight 61-2 - Pelagic Fish:

The inshore area from the United States-Mexican border to Point Arena, Calif., was surveyed from the air (February 14-17, 1961) by the California Department of Fish and Game Cessna "182" 9042T to determine the distribution and abundance of pelagic fish schools.

Fair weather generally prevailed along the California coast, but some low clouds and haze made observations difficult in parts of southern California and strong northwest winds were encountered north of Monterey Bay.



Airplane spotting flight 61-2 (Feb. 14-17, 1961.)

A total of 299 fish schools, 277 anchovy, and 22 unidentified, was tallied during the survey. Seventy-five of the anchovy schools were close to shore along the Coronado

Strand near San Diego, 22 were off the Newport Beach pier, 87 (45 on February 14 and 42 on February 17) were about two miles northwest of the Santa Monica pier, 59 were just east of Pt. Mugu, 14 at Avila, 5 off Morro Rock and 15 small fragmentary spots were located from one to two miles north of Pt. Pinos in Monterey Bay.

The 22 unidentified schools were between Oceanside and Laguna Beach.

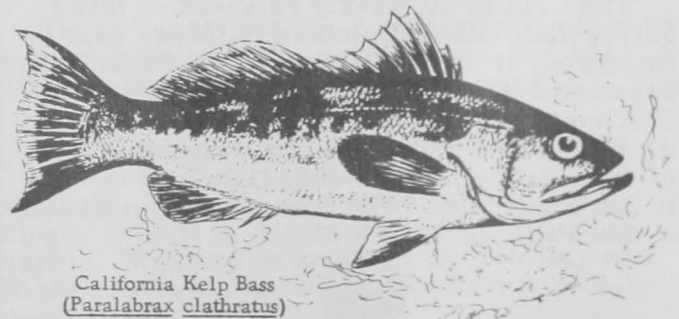
Only 24 California gray whales were seen during this flight, all traveling northward between Point Dume and Point Piedros Blancas.

During the afternoon of February 17, five large Pacific killer whales (*Grampus rectipinna*) were observed one-half mile offshore between Rocky Point and Point Vicente.

Note: Also see Commercial Fisheries Review, April 1961, p. 14.

PREPARATION FOR TUNA STUDY ON PACIFIC COAST:

M/V "Nautilus" Cruise 61-N-1-Tuna: The area along the southern California mainland from Corona del Mar to Dana Point, and off Santa Catalina Island (Whites Cove) and San Clemente Island (windward and leeward sides) was surveyed (Feb. 1-4, Feb. 7-9, 1961) by the California Department of Fish and Game's research vessel Nautilus. Objectives were to collect blood samples from kelp bass (*Paralabrax clathratus*) in order to determine if



California Kelp Bass (*Paralabrax clathratus*)

genetic serological differences existed among the fish from the three areas; and perform a reciprocal blood study to test one method of serological analysis against another, in preparation for tuna work.

Due to a scarcity of biting fish at San Clemente Island, insufficient blood samples were obtained for significant testing. Santa Catalina Island and mainland areas, however, provided enough fish for a test. The results showed significant genetic serological differences between kelp bass from these two areas. The reciprocal study revealed that a new method of blood analysis was highly inaccurate when correlated with the standard method.

* * * * *

SEAWARD MIGRATIONS OF YOUNG KING SALMON STUDIED:

The California Department of Fish and Game in March 1961 resumed its attempt to solve the mystery of what happens to king salmon on their downstream migration to the sea.



The first step will be a test of midwater trawl gear which successfully recovered fingerling salmon last year just before they entered ocean waters. The shakedown cruise was scheduled for the Carquinez Straits, March 13-17. Once the gear is in working order, cruises were planned for every other week starting March 27 and continuing throughout 1961. The purpose will be to recover previously-marked fingerling king salmon in the brackish water phase of their migrations. These numbers, compared to the numbers released, will give fisheries scientists an indication of how many fish are lost between spawning gravels and the ocean.

The first of 10 weekly releases of three 50,000-fish lots at Coleman Hatchery near Anderson, at Rio Vista and in San Pablo Bay, began on March 28. Marking at Coleman Hatchery began on March 20. Included in the marking experiment was the transportation of some lots of fish by vessel from Rio Vista to San Pablo Bay. The first lot was released at San Pablo on March 31.



Cans- Shipments for Fishery Products, 1960

Total shipments of metal cans for fishery products in 1960 amounted to 123,907 short tons of steel (based on the amount of steel consumed in the manufacture of cans) as compared with 115,479^{1/2} tons in 1959, an increase of 7.3 percent. Shipments of metal cans in 1958 amounted to 123,602 tons and in 1957 totaled 114,500 tons.



The increase in the shipment of cans for fishery products from 1959 to 1960 was due primarily to better packs of Alaska salmon, Maine sardines, shrimp, tuna, and jack mackerel. The 1960 pack of tuna set another new record. The over-all pack of principal fishery products amounted to about 675.0 million pounds, higher by about 50 million pounds than the 1959 pack.

^{1/2}Revised.

Note: Statistics cover all commercial and captive plants known to be producing metal cans. Reported in bases 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.



Central Pacific Fishery Investigations

OCEAN CONDITIONS AND TUNA SCHOOLS NEAR HAWAIIAN ISLANDS SURVEYED:

M/V "Charles H. Gilbert" Cruise 51: The beginning of a large-scale study of ocean currents around Hawaii, using drift bottles as a means of tracing the water flow, was the objective of the six-weeks cruise (January 16-February 28, 1961) of the U. S. Bureau of Commercial Fisheries research vessel Charles H. Gilbert.



Some 2,000 of the bottles were set adrift during the cruise, both to the east and west

of the main Hawaiian Islands. A few of the bottles released early in the voyage have already been picked up on the beaches of Maui, Molokai, and Oahu Islands.

The cruise covered an area greater than 5 million square miles, from French Frigate Shoal to Johnston Island. The purpose of the cruise was to study the temperature, salinity, and currents of the surface waters as related to the distribution of tuna schools and plankton organisms, and particularly to seek clues to the pattern of the annual spring migration of skipjack tuna (aku) into Hawaiian waters.

The return of the striped orange and white cards contained in the bottles will furnish information of value, not only to fishery scientists, but to all who travel on the ocean. The indications of currents given by the bottles can be used in searching for boats or life rafts drifting at sea, and the information may also be useful in planning the best locations for disposing of various types of waste materials in the ocean. Persons who find these bottles are urged to fill in the information called for on the cards and return them to the Bureau's Biological Laboratory at Honolulu.

The expedition searched at Johnston Island and French Frigate Shoals for the live-bait necessary for skipjack fishing, but found suitable bait fish very scarce. The only bait caught was a small amount of tilapia on Oahu and a few buckets of aholehole in Pearl Harbor. Tuna schools were also scarce in most of the areas covered by the survey. The only area in which a large number of schools were sighted was about 300 miles south of Honolulu, and those schools were small, fast-moving, and difficult to fish. The sighting of 59 bird flocks indicated the presence of the following fish schools: 7 skipjack, 1 yellowfin, 2 dolphin, and 49 unidentified.

Two lures trolled during daylight hours yielded 28 dolphin, 6 yellowfin tuna, 1 wahoo, and one skipjack tuna.

While at French Frigate Shoal the field party made a census of turtles and of the rare Hawaiian monk seals which inhabit that wildlife sanctuary. Several seal pups still under their mothers' care were seen, in addition to a fair number of adults.



Dams

STUDY ANNOUNCED OF FISH PASSAGE PROBLEM ON MIDDLE SNAKE:

A vigorous short-range attack on the problem of passing fish downstream at the proposed high dam sites on the Middle Snake River in Idaho was announced on March 15, 1961, by Secretary of the Interior Stewart L. Udall.

He said this is the first step in a comprehensive review of the Middle Snake development potential including power, water storage for river regulation, recreation, fish, and other resource uses.

In a letter to the Federal Power Commission, which currently is holding hearings on applications for construction of dams at the Nez Perce and High Mountain Sheep sites, Secretary Udall recommended that the Commission defer action on the applications until the Department's accelerated fish-passage studies have been completed.

Secretary Udall said the Department has set the end of 1964 as the target date for completion of a study program. He added, however, the scope of the studies will depend on the amount of money made available by the Congress for this purpose.

Secretary Udall said dams proposed for construction in the Middle Snake area could have a disastrous effect on anadromous fish, especially in the Salmon River which provides an estimated 50 percent of the Snake River run unless proven methods are found to protect the downstream migrants.

"We intend to learn as much as possible about which direction a sound development program should go. We believe that potential alternative sources of new power make prudent such a delay in further consideration of projects for the Middle Snake," Secretary Udall said.

He stressed that the Administration favors comprehensive basin development, but said, "We can't wait 10 or 15 more years."

Secretary Udall said the Department is "open minded" on the problem of additional storage. He said it would be a mistake to single out one particular dam in the studies, saying, "We need to know all we possibly can in the shortest possible time about full basin development."

Federal Purchases of Fishery Products

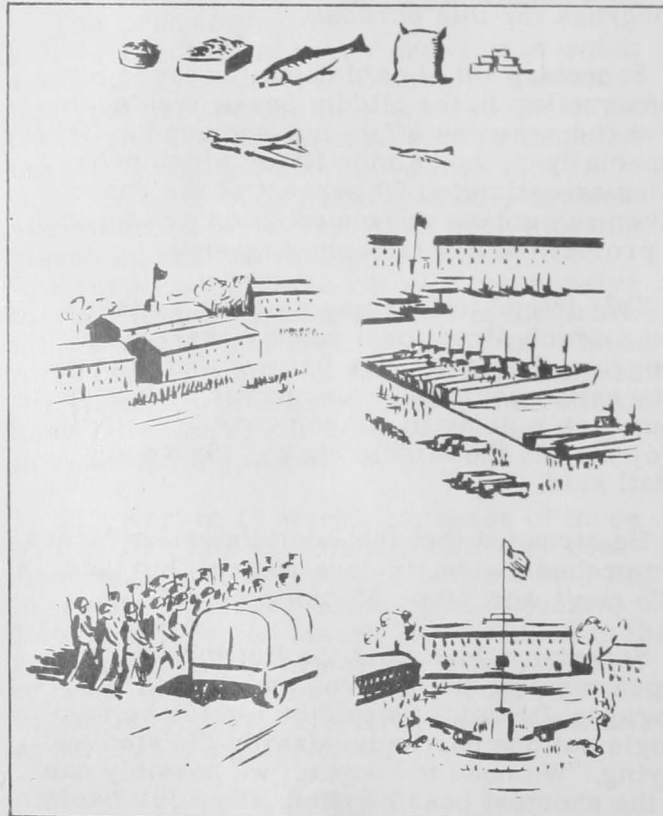
DEPARTMENT OF DEFENSE PURCHASES, JANUARY-FEBRUARY 1961:

Fresh and Frozen Fishery Products: For the use of the Armed Forces under the Department of Defense, about 1.7 million pounds (value \$921,000) of fresh and frozen fishery products were purchased in February 1961 by the Military Subsistence Supply Agency. This was lower than the quantity purchased in January by 6.1 percent and 4.1 percent under the amount purchased in February 1960. The value of the purchases in February this year was lower by 0.4 percent as compared with January but was 1.0 percent higher than for February a year ago.

Table 1 - Fresh and Frozen Fishery Products Purchased by Military Subsistence Supply Agency, February 1961 with Comparisons

QUANTITY				VALUE			
February		Jan. -Feb.		February		Jan. -Feb.	
1961	1960	1961	1960	1961	1960	1961	1960
..... (1,000 Lbs.) (\$1,000)			
1,743	1,817	3,599	3,314	921	912	1,846	1,649

During the first 2 months of 1961, purchases totaled 3.6 million pounds (valued at \$1.8 million)--an increase of 8.6 percent in quantity and 11.9 percent in value as compared with the same period in 1960.



Prices paid for fresh and frozen fishery products by the Department of Defense in February 1961 averaged 52.8 cents a pound, 3.0 cents higher than the 49.8 cents paid in January and 2.6 cents above the 50.2 cents paid during February last year.

Canned Fishery Products: Tuna was the principal canned fishery product purchased for the use of the Armed Forces during February this year. In the first two months of

Table 2 - Canned Fishery Products Purchased by Military Subsistence Supply Agency, February 1961 with Comparisons

Product	QUANTITY				VALUE			
	February		Jan. -Feb.		February		Jan. -Feb.	
	1961	1960	1961	1960	1961	1960	1961	1960
..... (1,000 Lbs.)								
..... (\$1,000)								
Tuna	363	566	1,365	1,017	161	260	603	451
Salmon	-	-	-	-	-	-	-	-
Sardine	15	25	36	31	6	10	17	14

1961, purchases were up for canned tuna by 34.0 percent and canned sardines by 16.1 percent as compared with the same period in 1960. No canned salmon was purchased during the first two months of 1960 and 1961

Note: Armed Forces installations generally make some local purchases not included in the data given; actual total purchases are higher than indicated because local purchases are not obtainable.



Fish and Wildlife Service

FORMER COMMISSIONER ACCEPTS POSITION AS FISHERY ATTACHE TO JAPAN:

The resignation of U. S. Fish and Wildlife Service Commissioner Arnie J. Suomela, effective February 11, 1961, has been accepted by the President. Suomela, who has served as Commissioner since 1956, left for Tokyo in March to take on his new duties with the State Department as Fisheries Attache in Japan. Suomela's new duties with the U. S. Embassy in Tokyo will include liaison between commercial fishing interests in Ja-



Arnie J. Suomela.

pan and those in the United States, and keeping United States interests informed of Japanese fishery trends and developments.

There are at present only three fishery posts in the United States diplomatic service. The need for special fishery representation in Japan is particularly great because of the importance of fishing in the Japanese economy and because the United States and Japanese fishing industries have many close ties through trade and common conservation interests.

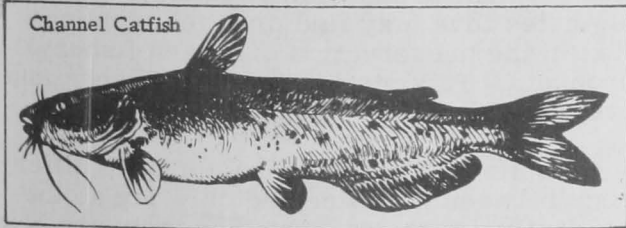
Suomela has a background of long experience in fishery administration, beginning with the U. S. Bureau of Fisheries in 1924, and was for 9 years Director of the Oregon Fish Commission. For the past 4 years he has been Commissioner of the U. S. Fish and Wildlife Service, and in that capacity has represented the United States on a number of international commissions in which Japan also takes part. He is thus well acquainted with Japan's international fishery relations and with the leading figures in Japanese fishery circles.



Fish Farming

EXPERIMENT ON STOCKING ALABAMA FARM PONDS WITH CHANNEL CATFISH:

A channel catfish stocking experiment involving some 120 farm ponds was outlined by Dr. Homer S. Swingle of Auburn University at a conference held at the University to develop a cooperative research project on channel catfish stocking in farm ponds.



The ponds will be located and checked by Alabama and U. S. Bureau of Sport Fisheries and Wildlife biologists. About 800,000 fingerlings will be furnished by the Marion, Ala., National Fish Hatchery for the proper stocking of the waters. State and Bureau biologists will examine the fish populations created to evaluate the result of the stocking. Dr. Swingle and his staff will coordinate the work of the various agencies and serve as a

collection agency for the data as they are accumulated.

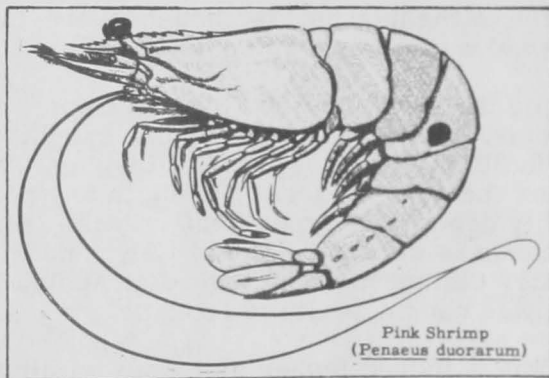


Florida

FISHERIES RESEARCH, OCTOBER-DECEMBER 1960:

The Marine Laboratory of the University of Miami is carrying on research on fisheries with funds provided by various sources, including the Florida State Board of Conservation and the U. S. Fish and Wildlife Service. The research of interest to commercial fisheries which appeared in the Laboratory's December 1960 Salt Water Fisheries Newsletter follows:

Larval Shrimp: Shrimp is Florida's most important fishery resource. About 25 million pounds of shrimp, worth approximately \$15 million, are caught each year. Almost one-half of these are pink shrimp from the Tortugas grounds northwest of Key West. Landings of Tortugas pink shrimp dropped from 24.2 million pounds in 1958 to 13.8 million pounds in 1959. This has had serious consequences for the fishing industry. Biologists at the Marine Laboratory are studying the pink shrimp in an effort to understand the reasons for these sharp fluctuations in the shrimp population.



Questions to be answered include: (1) At what season of the year is spawning most successful? (2) Is there any relation between the number of spawners and the number of offspring which are produced, or are other factors of greater importance in determining the number of offspring which survive? (3) How do the young shrimp reach the inshore nursery grounds?

The biologists hope eventually to predict the number of shrimp which will be caught.

As a first step in this program, the early life of the pink shrimp is being studied, with the support of the Bureau of Commercial Fisheries. Perhaps the most critical stage in the life of the shrimp is when it hatches from the egg. For approximately three weeks after hatching, the baby shrimp drift about in the water. They are able to swim only feebly and are at the mercy of currents which may carry them inshore to the nursery grounds or offshore to destruction.

The spawning grounds of the Tortugas shrimp extend about 30 miles north of a line drawn from Key West to the Dry Tortugas. The shrimp lay their eggs in water from 50 to 150 feet in depth. In the summer smaller shrimp, which are in the shallow southern part of this area, spawn heavily. In the winter, spawning is greater among larger shrimp, which are in the deeper northern part.

Spotted Sea Trout: In the last quarter of 1960 over 5,000 spotted sea trout were tagged on the west coast of Florida near Fort Myers, Cedar Key, and Apalachicola. Fish were tagged with a green plastic strip placed in the body cavity. This tag is found by fishermen at the time the fish is cleaned. Some tags carry a yellow plastic streamer which protrudes from the fish's body. This streamer draws the attention of the fisherman to the tag within. More than 500 fish with tags have been caught and returned. Fishermen take the tag to the nearest fish house where they are paid a reward of 75 cents.

For the most part spotted sea trout "stay at home." Some 95 percent were caught within 30 miles of the place of tagging. This means that the sea trout fishing in any community depends on how effectively the local resource is managed. A few fish wandered greater distances. One tagged at Apalachicola was caught at Grand Isle, La.

Others moved lesser distances within the State. No tagged sea trout were returned from south of Fort Myers or from the east coast of Florida.

Female sea trout grow faster than males and also live longer. A three-year-old female would be $12\frac{1}{2}$ inches long but a male is half an inch shorter. Few males were over five years old, but females live as long as eight years.

A tagging experiment has been commenced at Fort Myers to estimate the number of sea

trout in the area and the rate at which they die. A reward of 75 cents will be paid for the return of a trout tag.

Frozen Breaded Shrimp Quality: The bacteriology of breaded shrimp has progressed into the final stage of experimentation. The last portion consisting of inoculating a sample of shrimp with the pathogen Staphylococcus aureus and another sample with Streptococcus faecalis. Both these organisms are of public health significance, and have been found by many investigators to be present in frozen food products, after many months of frozen storage.

The samples of shrimp are permitted to go through three cycles of alternate thawings and refreezings. Microbiological analyses are made after each phase, in order to determine the effect of the fluctuating temperatures.

Use of Okra Powder in Preserving Fresh and Frozen Fishery Products: An experiment was made to determine the possible use of okra in fishery products preservation. Ice containing 300 and 500 parts per million okra powder was used in the storage of fresh shrimp. The shrimp were stored for 15 days, being subjected to analysis of a taste panel and bacteriological analysis. Evaluation was made of flavor, odor, and appearance (melanosis).

Further testing was made applying okra as a glaze to frozen shrimp to prevent "freezer-burn" desiccation. Present methods used in the fishing industry are water glazing and alginate glazing. The properties of okra, being similar to that of the alginates thus may find practical application in the preservation of frozen fishery products. This storage testing will continue over a period of one year.

Results thus far have shown little difference between plain ice and okra ice at the concentrations used. Further tests are being conducted. Results from the frozen storage studies are too premature to detect any differences between the variables being studied.

Nonutilized Species Incidental to Shrimp Fishing: Investigations on the utilization of nonutilized fish caught incidentally in the shrimp fishery have led to the analysis of the liquified fish and of the liquid and solid portions that were separated. The whole

Liquid fish contained about 14 percent protein, 3.4 percent minerals, and 78 percent water. The liquid portion which was skimmed off the top had 18 percent total dissolved solids, of which more than half were protein. This means that a good deal of the protein had become soluble and had concentrated in the liquid. The solid residue when dried had 52 percent protein.

The economic significance of the process is that nonutilized fish can be stored in acid at very nominal cost; in the meantime the fish autodigests and becomes a slurry, from this a liquid and solid are separated. The liquid is a source of readily available proteins which could be used as a pet-food supplement, protein concentrate, mink food, flavoring material, etc. The solid fraction can be dried into a commercial-type meal.

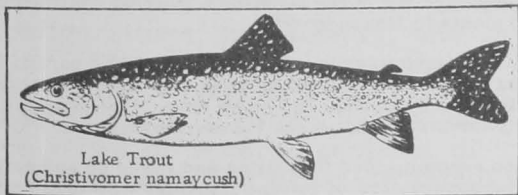
Another aspect of this investigation is to study the process of self digestion and determine which are the most favorable conditions.



Great Lakes Fishery Investigations

LAKE TROUT RESTOCKING PROGRAM GAINS MOMENTUM:

Over one million hatchery-reared lake trout were planted in Lake Superior during 1960 as part of a cooperative effort on the part of the U. S. Bureau of Commercial Fisheries, the states bordering on the Great Lakes, and Canada. By restocking the Great Lakes with hatchery-reared lake trout the biologists hope to rebuild the stocks that have been depleted by the parasitic sea lamprey.



Evidence accumulates to indicate that survival of some plants of hatchery fish is little short of sensational. An estimated 40 percent of the 1955 plant of 100,000 lake trout at Bayfield, Wis., has already been recovered by the commercial fishery. The 1959 plant of 30,000 lake trout in Lake Michigan has already yielded over 200 recoveries. Many of these fish are about 18 inches in length--growing more than twice as fast as lake trout formerly did in Lake Michigan.

Many of these lake trout were recaptured in perch gill nets in only five feet of water--something that never happened before.



Gulf Fishery Investigations

NEW CIRCULATING SEA WATER LABORATORY DEDICATED:

The new recirculating sea water laboratory housed in a remodeled building of the U. S. Bureau of Commercial Fisheries Biological Laboratory in Galveston, Texas, was dedicated in March this year. Two 29,000-gallon redwood water tanks and a series of filters, pumps, and plastic plumbing will supply the laboratory, where studies on the life history, diseases, and natural enemies of shrimp and commercial fishes will be carried out under controlled conditions.



Massachusetts

MARINE FISHERIES STUDY RECOMMENDS ACCELERATED RESEARCH AND MANAGEMENT PROGRAM:

Early in 1960 the Massachusetts Natural Resources Commissioner, acting under a directive from the Governor, appointed a 10-man Marine Fisheries Advisory Commission. The Commission, broadly representative of sport and commercial fishing, aquatic recreation, and industry interests, was to make a comprehensive study of the State's marine fisheries programs and problems. The Commission (consisted of 10 members) was charged to assist in formulating a sound, long-range State fisheries policy, to serve as a clearinghouse for marine proposals, and to submit its report and recommendations to the Governor by year's end.

A series of public hearings were held during the year, which served to bring sport and commercial factions together to discuss mutual as well as divergent interests. Upshot of the study, embodied in a series of specific recommendations, was the general proposal to strengthen the State's Marine Fisheries Division by expanding both its responsibilities and budget to permit initiation of a substantial marine fishery research and development program.

The Commissioner of Natural Resources on January 22, 1961, submitted to the Governor of Massachusetts the report (Final Report on the Studies of Massachusetts Marine Fisheries Problems by the Marine Fisheries Advisory Commission) of the State's Advisory Commission on Marine Fisheries relative to marine fisheries problems in Massachusetts.

The report sums up fisheries problems in 5 different categories and makes 16 specific recommendations to improve the sport and commercial fisheries in Massachusetts.

"Unless immediate steps are taken to accelerate the Commonwealth's grossly inadequate programs of research and management, and unless the various fishing factions along the coast learn to successfully coexist, Massachusetts will be unable to regain her standing as a leader in the marine fisheries field among States on the Atlantic Coast," the report warns.

Cited are statistics indicating that some 2,000 miles of coastline and 1,800 square miles of water fall within the territorial jurisdiction of the Commonwealth. These waters have a potential productivity of double their equivalent in land area, the report continued.

The Commission estimates that 5,000 commercial fishermen, 250,000 salt-water anglers, 30,000 boat owners, and 10,000 skin divers derive their sport or livelihood directly from these waters, and contribute some \$50 million annually to the Commonwealth.



In commenting upon the commercial fishery for finfish, the Commission notes that some 528 million pounds of fish were landed in Massachusetts in 1958, but that due to problems termed both biologic and economic the industry is currently in "precarious" condition.

Responding to a request to open waters south and east of Cape Ann and on the east side of Cape Cod to commercial fishing, the Commission stated: "Whether or not dragnets are allowed in these areas is not a conservation issue, at least on the basis of information now available."

The report calls attention to the lobster industry as the State's most valuable inshore fishery for a single species (valued at \$1.5 million in 1958). It is felt that detailed investigations are needed, however, to determine if local populations can withstand additional fishing pressure from skin divers, who now constitute one-half of the licensed lobstermen and who account for 12 percent of the total catch in 1958 (0.5 million pounds).

Massachusetts inshore fisheries for shellfish have witnessed a general decline in over-all production during the ten-year period prior to 1959, the Advisory Commission report continues, but the Commonwealth is rapidly losing its position as a leading shellfish producing state for reasons that need not exist.

The Commission points to inadequate State assistance, lack of effective management by cities and towns, and the extent of coastal pollution as the reasons for this decline.

Salt-water sportfishermen now number close to one-quarter million individuals, the report goes on, with an annual expenditure of nearly \$20 million for equipment and services. Lack of access to coastal areas is cited as the prime problem confronting this fishery, but the sportfishermen's request to bar all commercial seining within territorial waters is declared "unjustified from a conservation point of view."

The report also takes note of the 10,000 active skin divers in Massachusetts and deplors the activities of a few irresponsible individuals who have encouraged criticism towards the group as a whole. The Commission urges that the talents and desires of skin-diving groups be utilized more extensively in programs of marine research and management and that their activities receive official recognition at the State level.

Pollution from boats and boat facilities was recognized as a growing problem to some local fisheries, but, the report continues, "pollution from boating is insignificant in comparison with the discharge of sewerage and industrial waste from coastal communities."

The Commission emphasizes, however, the urgent need for adequate information on the State's numerous bays and estuaries upon which a proper policy could be based.

Among the principal recommendations included in the report were the following:

1. That Massachusetts recognize the expansion of the marginal sea for fishery purposes as "inevitable" and enact legislation which would automatically extend its jurisdiction in the event of international action to this end.

2. That the present Commission be instituted as a permanent Advisory Commission on Marine Fisheries representative of commercial and recreational interests along the coast. "It has become manifestly evident that problems relating to marine fisheries must constantly occur but can often be resolved most effectively by a group representing the various interests involved," the Commission advises.

3. That the Director of Marine Fisheries, subject to certain restrictions, be given full administrative control over the fisheries. The Commission sharply criticized program or policy changes by individual legislative petition describing this method as "cumbersome, inequitable, and costly to the fishery itself."

4. That an accelerated program of research and management be authorized, particularly in the estuarine waters of the Commonwealth. The Commission declares that if such requests are not permitted, "Massachusetts may soon witness its decline as a leading producer of recreational and commercial products from the sea."

5. That the University of Massachusetts, and other institutions, place on their faculty sufficient personnel to initiate programs of research, education, and extension in the broad field of fisheries. The Advisory Commission report points to the serious shortage of professional marine biologists, the need for academic teamwork in any state estuarine program, and the desirability of effective programs of extension in order to promote unity among salt-water groups and provide technological assistance to the industry.

Other recommendations included in the Commission's comprehensive report were the following:

Urging that active and progressive measures are required to insure the future well-being of the Massachusetts fisheries, the Commission recommended a matching-fund program at the Federal-state level to assist the states in building up a competent marine fisheries research and management program.

As "study projects" for the future, the Commission recommended: Consideration of the State's coastal wetlands before they are lost irrevocably to commercial exploitation; the recodification of the State's complex marine fisheries laws and an investigation of the need for additional shellfish purification plants in Massachusetts.

The Commission further recommended, as a part of the proposed program, the establishment of a Marine Fisheries Fund, financed by license and other fees, to be expended exclusively for marine fisheries research programs.

It also recommended that cities and towns be authorized to appoint supervisors of marine fisheries with broad powers over all salt-water activities within their communities.

Among accelerated programs of research and management, the Commission suggested: marine research stations at Salem and Martha's Vineyard; a marine research and law enforcement vessel to work offshore within territorial waters; and an intensified program of applied research and management relative to all species of importance to commercial and sport fishermen.

The Commission further recommended that the Commonwealth undertake "an immediate program" of public access to the salt water because the rapid development of the coastal and shoreline areas "constitutes a liability to the recreational boating and sport fishing public."

The Commission further urged "an adequate marine fisheries budget for administration research and management," stating that \$100,000 annually is not enough for a 50-million-dollar industry.

Finally, the Commission recommended adequate programs for marine law enforcement saying that research and management are only as effective as are the means for effective law enforcement.



North Atlantic Fisheries

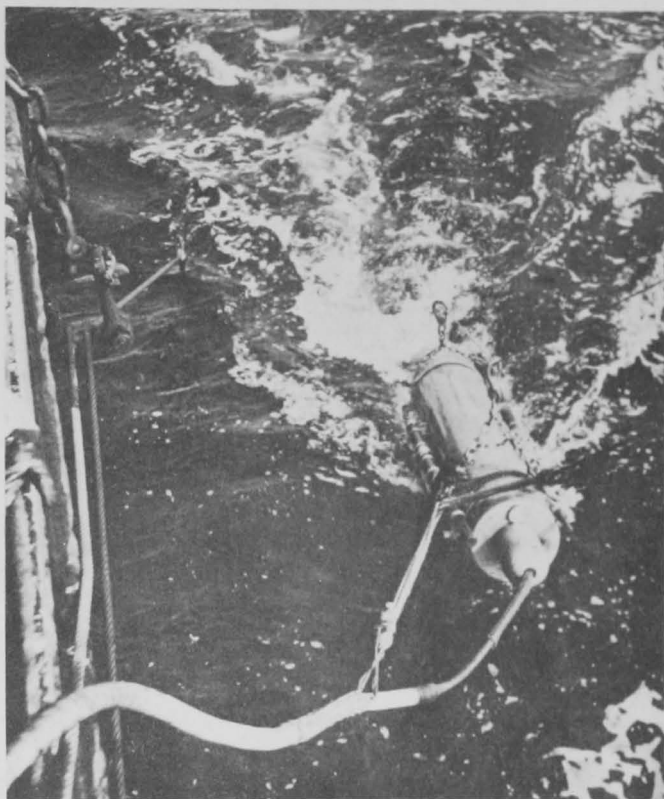
Exploration and Gear Research

UNDERWATER TV AIDS STUDIES TO IMPROVE DESIGN OF OTTER TRAWLS:

M/V "Delaware" Cruise 61-3: In order to observe the fishing action of a No. 41 standard manila otter trawl fished from the U. S. Bureau of Commercial Fisheries exploratory fishing vessel Delaware, the Bureau's underwater television unit was used during a one-week period ending March 3, 1961. This was the third in a series of cruises designed to obtain data on the otter trawl during fishing operations in support of efforts to design improved nets. Operations were conducted over the 12- to 15-fathom sand bottom on the southern part of Stellwagen Bank (42°13' N., 70°15' W.). Previous gear observation cruises, in July 1959 and in June 1960, used this same area at a time of year when planktonic turbidity severely curtailed visibility of the net. The winter schedule, while affording the advantage of lower turbidity, resulted in restriction of activity due to decreased light levels and stormy weather.

As in previous cruises, a 16 mm. motion picture camera was positioned at the shipboard television monitor to record net configurations, movements, and fish behavior. The television camera was lowered from the vessel down a trolley cable attached at various points on the headrope to give views of several sections of the trawl. When attached near the middle a composite view of the headrope bosom and footrope bosom was transmitted to the vessel. Views of the lateral parts of the trawl were obtained by fastening the trolley cable to positions on the wings. A total of 600 feet of film was taken of the headrope and wing.

Techniques in maneuvering the camera on the net were considerably improved over previous operations. Species repre-



Underwater TV camera unit entering water on cable attached to headrope of otter trawl. Conductor TV cable is in the foreground.

sented in the catches consisted of winter skates, yellowtail and winter flounders, lumpfish, ocean pout, long-horned sculpins, and the American lobster.



Oceanography

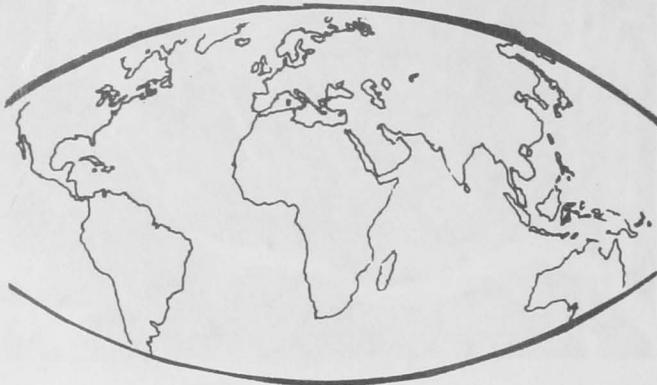
ATLAS OF NORTH ATLANTIC OCEAN PLANNED:

Drawing a detailed picture of the North Atlantic Ocean from top to bottom and from the equator to the pole will be one of the American Geographical Society's major projects in the decade ahead.

The project is a cooperative international effort that involves the production of an atlas embracing the physical, geological, geographical, and biological aspects of the ocean. The first of its kind in the United States, the project was outlined in the Society's annual report released early this year.

Preliminary phases of the program were begun early in 1960. Since then, a general

base map and 16 sectional base maps of the North Atlantic have been, or soon will be, completed. These are being distributed to scientists in a wide range of specialties here and abroad. The scientists will plot their own findings--distributions of fish and plant life, temperatures, depths, winds, currents, bottom sediments, etc.--and then return the maps to the Society for evaluation, editing, and publication. Individual maps and map series will be published as they are completed. Now called the Serial Atlas of the Marine Environment (North Atlantic and Arctic Basin), it will serve as a model for atlases covering other oceans.



The President of the Society said the atlas would provide an essential tool for basic research. "Information about the oceans is piling up at such an unprecedented rate that the individual scientist can't keep up with it, and much of it goes unpublished or unreported," he said. "The atlas will integrate this data and point up interrelationships and variables that otherwise might be undetected. It will help to indicate the most scientifically profitable directions that future research ought to take; at the same time, it will also help to guide man in wisely exploiting the seas' resources."

Financial support for the project is being sought largely through corporations and foundations in this country, a number of which already have contributed substantial sums, the Society's President stated. "Long before it is completed," he said, "the atlas should be of fundamental value to many industries, including the commercial fisheries, transportation, communications, and oil industries."

The atlas project, under the general auspices of the Society, has the guidance of an advisory panel of the National Academy of Sciences-National Research Council.

Scientific bodies in Canada, Great Britain, and Europe have endorsed it, and cooperation is also expected from Soviet scientists.

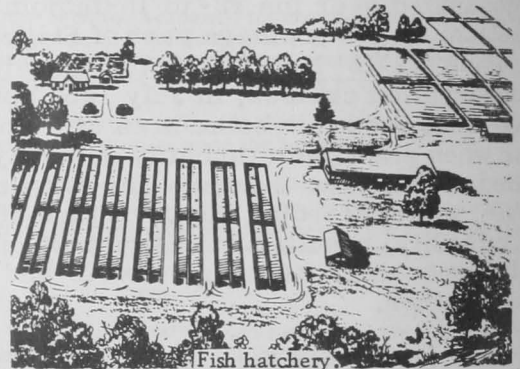
The American Geographical Society, New York City, was founded in 1852 and is the oldest geographical society in the United States.



Oregon

METHODS OF RELEASING HATCHERY-REARED SILVER SALMON STUDIED:

Between late March and early February 1961, 100,000 small silver salmon were taken by boat on the first step of the usual yearling silver's exodus down the Columbia River to the rich feeding grounds of the Pacific. The salmon were one-third of a 300,000-fish test release originating from the Oregon Fish Commission's Cascade Hatchery on Eagle Creek, a short distance above Bonneville Dam.

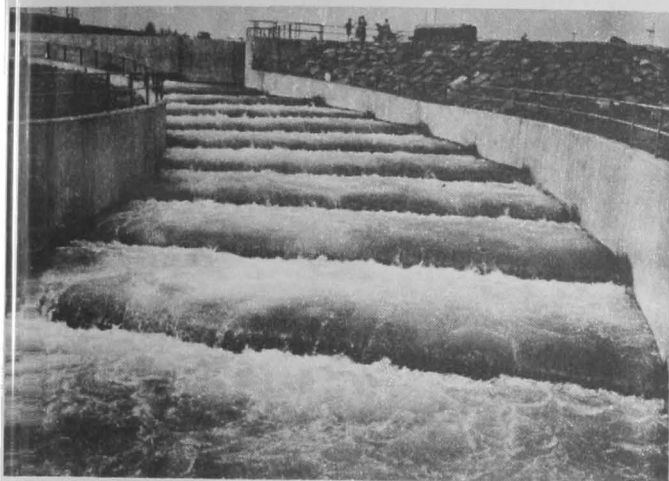


In an effort to develop better methods of releasing hatchery-reared salmon fingerlings, and to obtain additional information on the mortality of downstream migrating salmon fingerlings passing over Bonneville Dam, the 300,000 silver salmon yearlings involved were divided into three equal groups, each of which was handled in a different manner. Every fish was fin-clipped in a fashion that will identify it as to test group.

The first 100,000 fish were trucked downstream and released near the mouth of Tanner Creek immediately below Bonneville Dam. The second lot was released directly into Eagle Creek at Cascade Hatchery, the usual practice. The third lot was

transferred via tank truck into a screened-box barge designed for the purpose, and towed by boat downriver through the Bonneville locks. These fish were released into the Columbia just below the big dam.

The yearlings released at the Cascade Hatchery face the hazards of passing Bonne-



Bonneville Dam fish ladder. (A fish ladder is a series of adjoining pools to help fish get past dams or falls.)

ville Dam in addition to other dangers of the downstream trip. The fish will pass the dam by devious routes. Some will use the regular fishway designed for adult fish bound for the spawning grounds upstream. Others will go through the turbines, over the spillway, or through the locks while boats are being put through.

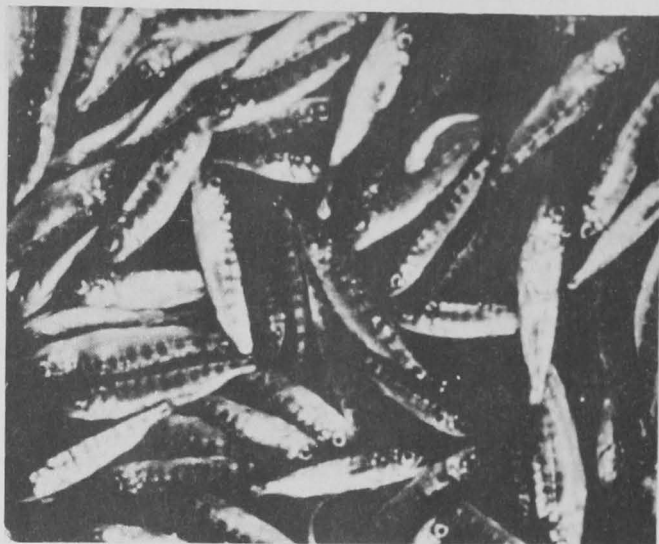
Although some of the males of this release will return as jacks this coming fall, it will be the fall of 1962 before the main body of mature fish returns to Eagle Creek. The returning adults will be trapped at the Cascade Hatchery racks during regular egg-taking operations. The numbers of fish in each of the three fin-marked test groups will be recorded at that time. Sampling by Fish Commission personnel will probably locate some of the marked fish in the catches of commercial and sports fishermen prior to the return to Eagle Creek during the 1962 spawning run.

* * * * *

SILVER SALMON REARED IN LAKES TO HELP RESTORE DEPLETED STOCKS:

Another step toward the rehabilitation of Oregon's coastal salmon runs was taken recently with the release by the Oregon Fish

Commission of 130,000 silver salmon fingerlings into the Tenmile Lakes system in northern Coos County. Hall Lake received 100,000 of the small salmon with the balance going into Schuttpeiz Lake.



Salmon fingerlings.

This is the second Fish Commission planting of silvers into the coastal lake chain. In the spring of 1960, 106,000 fingerling silvers were released into Hall Lake on an experimental basis to determine the feasibility of using the Tenmile system as an extensive natural pond rearing facility.

A Fish Commission biologist, in charge of the Tenmile operation, reported that fingerlings released into these waters in 1960 grew from about 1½ inches in length to an average of 5 inches within a period of 11 months. This rate of growth, under natural conditions and with no supplemental feeding, is an indication of the good fish-producing potential of these waters.

The Commission's director of research, has tabbed the Tenmile system as one of the bright spots in the current salmon situation. He pictures the chain as an extensive series of rich, potentially highly productive natural rearing ponds where vast numbers of salmon could be produced at little cost other than for collecting and incubating the eggs.

Jack salmon (early maturing males) from last spring's release are expected to appear this fall, but it will be the following year before the main body of surviving adults return to the outfall below Hall Lake.

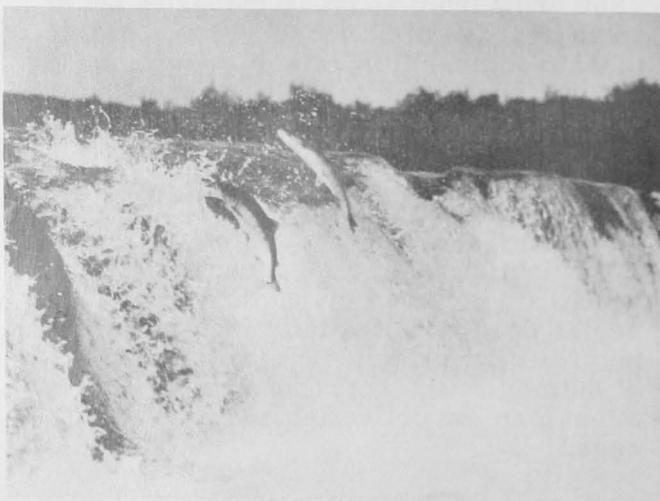
A trap will be constructed by the Commission at the lower end of Hall Lake where the outlet, flumed by the State Highway Department to stabilize the channel, offers an obstruction to ready passage. There returning adults will be captured and examined for identifying fin clips; also eggs will be taken for incubation to provide a continuous supply of fingerlings to keep the Tenmile Lakes stocked.

A screen located at the outlet below Hall Lake was recently positioned to prevent the young silvers from escaping until such time that water levels drop sufficiently to allow replacement of a downstream migrant trap damaged by recent floods. This trap is used to collect for fin clipping for future identification the yearling fish moving downstream to the ocean. It also provides for checking the rate of growth, physical condition, and the survival of fingerlings, so that more and better quality fish can be produced at lower cost.

* * * * *

SUCCESSFUL POND REARING MAY HELP REBUILD RUNS OF SILVER SALMON:

Nearly 80,000 young silver salmon were making their way down Oregon's Millicoma and Coos Rivers toward the sea following their release early in March 1961. The plant represents the successful climax to the second year of cooperative effort between the Oregon Fish Commission and a private lumber company in pond rearing of salmon at Millicoma Pond in Coos County.



Salmon jumping falls.

The 10-acre pond was formed when an oxbow-shaped section of the Millicoma River

was cut off by a logging road fill constructed by the lumber company. Inlet and outlet structures were positioned to allow water control, creating an excellent fish-rearing pond behind the fill at a minimum of cost.

The Oregon Fish Commission's Director of Fish Culture indicated that survival of the fingerlings in the rearing pond was high--about 80 percent of the 101,000 small silver salmon placed in the pond during the latter part of June 1960. Between that time and the release date in March this year the young silver salmon had grown from about 3 inches in length to an average of 6 inches. The fish were reared from eggs taken from Coos River system silver salmon. The 79,900 fingerlings released were in excellent physical condition, the natural food supply in the pond having been supplemented by regular feeding with the Commission's Oregon pellet, a nutritionally-complete fish ration developed in cooperation with Oregon State College scientists.

This is the second season Millicoma Pond has been used to rear salmon. Last year 211,000 fingerlings were held in the pond but a flood-damaged screen at the outlet allowed many of the fish to escape before they could be marked and counted. At least 80 jacks from this first brood of silvers returned to the pond outlet last fall. Both mature males and females are expected in numbers this fall as a result of the first year's release. Also scheduled to appear are numbers of jacks from the March 1961 release. All fish were fin-clipped for identification.

The Millicoma River is part of the Coos River system, the confluence of the two streams being about six miles above the Coos River's mouth on Coos Bay. By building up Millicoma River salmon runs, it is believed that sufficient eggs can be obtained from a proposed Millicoma fishing rack to provide adequate numbers of pond-reared fish to stock both the Millicoma as well as the South Coos River. Under such circumstances it would be possible to remove the Commission's rack from the South Coos, allowing natural spawning to take place in the limited suitable spawning area above the rack site, thus supplementing the proposed releases into this stream of yearling silver salmon reared at Millicoma Pond.

During 1957, splash dams on the South Coos above the rack were removed by the

owners. The company undertook this stream clearance project not only to give anadromous fish access to upstream spawning areas but also to halt the scouring of stream bed spawning gravels by splashing operations.

Plans for the 1961 season call for placing 0.5 million young silvers into the rearing pond, the most ambitious rearing project yet undertaken at this impoundment. This fall will see the return of mature fish from the first year's operation plus jacks from this year's release. There were encouraging returns last fall of jacks from the first brood reared in Millicoma Pond.



Salmon in hatchery pool.

In addition to increasing the numbers of fish to be reared at the Coos County pond this season, the Commission plans to establish a modern incubation station in the vicinity. Here eggs taken from adult silvers returning to Millicoma Pond will be handled to provide successive crops of young fish for stocking the impoundment. In view of the success of pond-rearing efforts at Millicoma, the Commission plans to concentrate efforts there and restrict present activities at the Coos Hatchery. This plan provides for the most productive use of the available fish and facilities.

The Oregon Fish Commission is fully aware of the need to rebuild the coastal salmon runs, its Director emphasized. The Millicoma development is part of the overall plan. Another step that has been taken in this direction includes the release of silver salmon in the Hall-Schuttpelz Lakes section of northern Coos County's Tenmile Lakes chain. Research has shown this lake

system possesses a high potential, presently unused, for natural rearing of silver salmon fry to yearling size at no additional cost.

Restoration of spawning areas through the removal of log jams from debris-choked coastal streams and a comprehensive program of research involving the use of coastal lakes as natural rearing waters are among other Fish Commission activities directed toward the restoration of salmon production in Oregon's coastal waters.



Preservation

RADIATION OF FOODS SAFE:

A Stanford Research Institute team in Menlo Park, Calif., searching for hazards inherent in the sterilization of foods by irradiation, has concluded that radioisotope activation is not harmful.

The scientists said, "The quantity of radioactivity in treated food is small compared with natural environmental radioactivity, and food preservation can proceed safely."

The U. S. Army Quartermaster Food and Container Institute suggested the study.

An Institute spokesman said, "When food is subjected to high-energy radiation, radioactive isotopes may be produced in the food. Some isotopes have a half-life of only a few seconds; others emit radiation for years.

"It was essential to know if isotopes are produced by radiation sterilization of foods and in what quantity, and if they remained radioactive for significant periods," the spokesman said.

To find the answers, the researchers irradiated a variety of separate elements present in foods and examined them for induced radioactivity. This was repeated with whole foods--beef, bacon, shrimp, chicken, and green beans.

Container materials were irradiated and measured for induced radioactivity. A variety of radiation sources was used in each case, including cobalt-60, cesium-137, spent reactor fuel elements, X-rays, and high-energy electrons.

The research team pointed out that almost all "clean" food has trace amounts of radioactivity. This results from the naturally-occurring isotopes, potassium-40 and carbon-14.

The object of the project was to find radioactivity above these traces.

Small quantities of sodium-22 and rubidium-84, produced by high-energy X-rays and electron irradiations, were the only induced radioactivity found in the irradiated samples of whole food.

Many of the irradiated food elements, however, showed low levels. Almost all were from isotopes that have short half-lives (minutes to hours) and are not common food elements.

In no case were levels found above the recommended limits for drinking water by the team of scientists from the Institute.

All forms of containers were tested and found safe by the research team. (Food Field Reporter, March 13, 1961.)



Salmon

ALASKA'S BRISTOL BAY RED SALMON RUN FORECAST FOR 1961:

It is estimated that the total red salmon return to Bristol Bay in 1961 will be within plus or minus 30 percent of a most probable total of 22 million fish. This estimate assumes no Japanese fishing on the returning mature salmon in 1961 and average Japanese fishing on the immature salmon in 1960.

About two-thirds of the return of red salmon to Bristol Bay in 1961 will have spent three years in the ocean and thus will be large fish. The over-all average size will be about 12 fish to pack a case of 48 one-pound cans of salmon.

A very poor return of about 1.3 million fish is indicated for Nushagak district; a good return of about 15 million fish to the Naknek-Kvichak; a good return of over 2 million fish to the Egegik, although the cycle analysis upon which this is based is relatively weak; and an excellent return of over 3 million fish to the Ugashik, although in this instance, also, the margin of error is considerable and alternative analysis indicates reason for consideration of a 2-million figure.

There is a slim chance that the young fish which went to sea in the spring of 1959 did not visit the central Aleutian area in the summer of 1960. If that is the case, it would be a behavior pattern not experienced in the preceding five years of fishing. But it remains a possibility which may be checked by further fishing near the Aleutian Islands in the spring of 1961.

This is a forecast prepared jointly by the Alaska Department of Fish and Game, the Bureau of Commercial Fisheries, and the Fisheries Research Institute of the University of Washington. Scientists from these three agencies have exchanged and studied all pertinent data and believe that the forecast is the best that can be made.

* * * * *

NORTHWEST PACIFIC STATES PROPOSE COORDINATED REGULATION AND MANAGEMENT:

A "Summit on Salmon" meeting was held by the Governors of Washington, Oregon, and Idaho on February 6, 1961, in Boise, Idaho. Editorial comments in a Pacific Northwest newspaper indicated agreement was reached on:

(1) The establishment of a Governors' Columbia River Fisheries Management Committee.

(2) The State fisheries agencies have been directed to develop a joint program of regulation and management of the fishery resource.

(3) Putting additional "pressure on Congress and the Federal agencies for maximum protection for the fishery. Additional Federal research money and greater activity on the part of the states in regulation of the international deep-sea fishery."

The Governors also took under consideration the proposal for a Columbia River Interstate Salmon Commission, which apparently would be the outgrowth of an interstate compact between the three States for the purpose of regulating the fisheries as a unit and to obtain revenues from utilities, State general funds, foundations and grants, and from Federal appropriations.



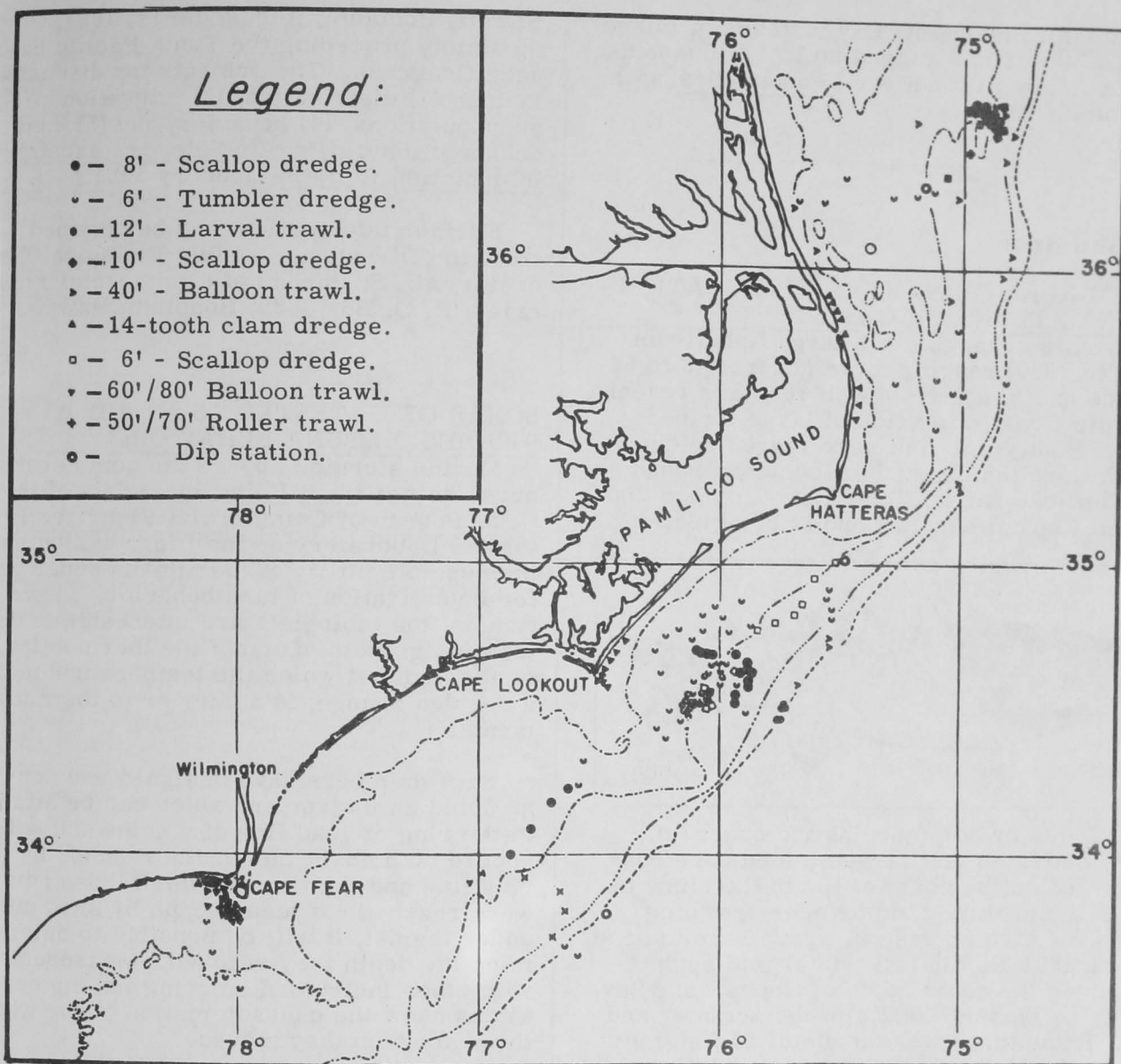
South Atlantic

Exploratory Fishery Program

FISH AND SHELLFISH RESOURCES OFF NORTH CAROLINA COAST SURVEYED:

M/V "Silver Bay" Cruise 29: On March 22, 1961, the M/V Silver Bay completed a 24-day exploratory fishing cruise along the Continental Shelf and Slope off North Carolina. A 6-foot tumbler dredge, 14-tooth Fall River clam dredge, 12-foot larval fish trawl, 8- and 10-foot modified Georges Bank type scallop dredges and shrimp and fish trawls were used at 176 exploratory stations.

SCALLOPS: Calico scallops (*Pecten gibbus*) were relocated in 21 to 25 fathoms off Core Banks where catches of up to 16



M/V Silver Bay Cruise 29 (Feb. 27-Mar. 22, 1961).

shells per half hour tow and yielding $4\frac{1}{2}$ pints of meats per bushel were made with a 4-foot tumbler dredge. A marker buoy was placed in the area and direct notification was made to the North Carolina fleet. These vessels started fishing within a few days and later reported catches of up to 400 bushels per 12 hours of fishing. Dredging was continued north of Cape Hatteras where calico scallops disappeared from the catches at about latitude $35^{\circ}47'N$. Sea scallops (Pecten irradians) appeared in the catch at about latitude $36^{\circ}30'N$, where catches of up to $2\frac{1}{4}$ bushels per 30-minute tow were made. These scallops averaged $5\frac{1}{2}$ inches (greatest diameter) and yielded 4 pints of meats per bushel (20 count).

HARD CLAMS: Catches of medium-size hard clams ($2\frac{1}{2}$ to $4\frac{1}{2}$ inches) off the Cape Fear River ranged up to 44 individuals per 15-minute tow. One live clam and dead shell were taken north of Cape Lookout Shoals. Dredging in 4 to 6 fathoms north of Cape Hatteras produced only dead shells.

FISH: Fish trawling north of Cape Hatteras produced small catches of summer flounder (Paralichthys dentatus) up to 90 pounds per hour tow and a few silver hake or whiting (Merluccius bilinearis). One 60-minute tow in 23 fathoms with a 40-foot net produced 5,000 pounds of sea robins (Prionotus sp.) and one in $4\frac{1}{2}$ fathoms produced 2,785 pounds of spiny dogfish (Squalus

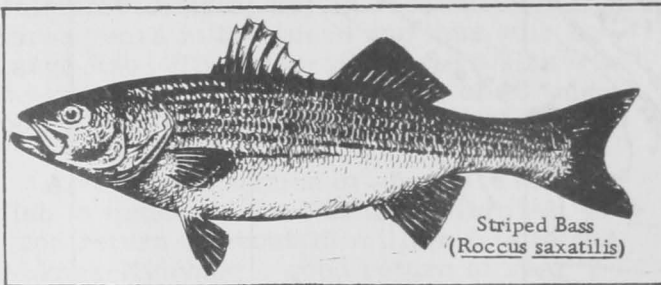
acanthias). In Onslow Bay, catches of mixed fish in 20 fathoms ranged up to 1,966 pounds per hour tow with puffers (*Sphaeroides* sp.) predominant.



Striped Bass

TAGGING RETURNS REVEAL MIGRATIONS ALONG ATLANTIC COAST:

Results of tagging 478 large fish (from 1955 to 1959) ranging in weight from 6 to 54 pounds and in age from 3 to 18 years reveal Atlantic Coast migration of large striped bass. Eighty-one fish were tagged on the North Carolina coast, in Albemarle Sound, and Roanoke River, North Carolina, and 300 fish in Chesapeake Bay and tributaries.



Striped Bass
(*Morone saxatilis*)

Catches by commercial and sport fisheries indicated that large striped bass concentrated on the coast of North Carolina in late fall and winter, on or near spawning areas for striped bass in North Carolina and Chesapeake Bay in late winter and spring, and along the coast north of Chesapeake Bay as far as Massachusetts in the summer and fall. Recaptures were made of 19 fish tagged on the North Carolina coast; 23 tagged in Albemarle Sound and the Roanoke River, North Carolina; 27 tagged in Chesapeake Bay and its tributaries; and 1 tagged in the Thames River, Connecticut. Some fish were recaptured near the tagging location but most of them migrated along the coast and were caught in other concentration areas during the season of greatest fishing pressure, according to U. S. Bureau of Commercial Fisheries biologists.



Tuna

PACIFIC TUNA BIOLOGY CONFERENCE:

An informal conference on the biology of Pacific tuna will be held at the University of

Hawaii, Honolulu, August 14-19, 1961, immediately preceding the Tenth Pacific Science Congress. The subjects for discussion include (1) distribution, (2) migrations, (3) subpopulations, (4) behavior, and (5) tuna oceanography. (*Pacific Science Association Information Bulletin*, January 1961.)

Further information may be obtained from the Director, Honolulu Biological Laboratory, U. S. Bureau of Commercial Fisheries, P. O. Box 3830, Honolulu, Hawaii.

* * * * *

SONAR GEAR TESTED AS AN AID TO STUDIES ON TUNA BEHAVIOR:

During a cruise aboard the commercial purse seiner *West Point*, biologists of the U. S. Bureau of Commercial Fisheries Biological Laboratory at San Diego evaluated the possible utility of the Simrad sonar gear for investigation of tuna behavior. In particular, the biologists are interested in determining whether or not the thermocline, or the plane at which the temperature makes a decided change, is a barrier to their movements.

Staff members have designed and constructed an instrument which can be attached to the ring or lead line of a seine and will record on a chart the depths reached by the ring line and the time at which those points were reached. If tuna escape by swimming under the net, it will be possible to determine the depth they reached. Measurements with other instruments during fishing operations show the characteristics of the water through which they moved.



United States Fishing Fleet^{1/}Additions

FEBRUARY 1961:

A total of 21 vessels of 5 net tons and over were issued first documents as fishing craft during February 1961--a drop of 5 vessels as compared with the same month of 1960. The Gulf area led with 7 vessels;



^{1/}Includes both commercial and sport fishing craft.

The New England and Pacific areas followed with 4 each; the South Atlantic, Puerto Rico, Chesapeake, and Great Lakes areas accounted for the remaining 6 vessels.

Table 1 - U. S. Vessels Issued First Documents As Fishing Craft By Areas, February 1961

Area	February		Jan.-Feb.		Total 1960
	1961	1960	1961	1960	
	(Number)				
New England	4	1	7	2	34
Middle Atlantic	-	3	-	4	13
Chesapeake	1	4	4	9	76
South Atlantic	2	7	3	10	45
Gulf	7	3	18	7	85
Pacific	4	7	9	9	138
Great Lakes	1	1	1	1	17
Puerto Rico	2	-	2	-	-
Total	21	26	44	42	408

Note: Vessels assigned to the various areas on the basis of their home ports.

Fishing craft issued first documents

Table 2 - U. S. Vessels Issued First Documents as Fishing Craft By Tonnage, February 1961

Net Tons	Number
5 to 9	8
10 to 19	3
20 to 29	1
30 to 39	4
40 to 49	3
50 to 69	1
70 to 79	1
Total	21

during the first two months of 1961 totaled 44--2 vessels more than were reported during the same period of last year. Vessels documented in the Gulf area comprised 41 per-

cent of the total during the 1961 two-months period.



S. Foreign Trade

EDIBLE FISHERY PRODUCTS, JANUARY 1961:

Imports of edible fresh, frozen and processed fish and shellfish into the United States during January 1961 increased by 9.3 percent in quantity and 10.5 percent in value as compared with December 1960. The increase was due primarily to higher imports of groundfish fillets (up 9.4 million pounds) and frozen albacore (up 3.1 million pounds), and to a lesser degree, an increase in the imports of canned sardines in oil. The increase was partially offset by a 2.9-million-pound decrease in the imports of frozen tuna other than albacore and a 1.6-million-pound drop in canned tuna in brine.

Compared with January 1960, the imports in January this year were up by 4.2 percent in quantity and 10.5 percent in value due to higher imports of frozen albacore tuna (up

2.9 million pounds), groundfish fillets (up 8.9 million pounds), and frozen shrimp (up 3.7 million pounds). Compensating, in part, for the increases was a drop of about 7.2 million pounds in the imports of tuna other than albacore and canned salmon (down 4.5 million pounds).

Item	QUANTITY			VALUE		
	Jan. 1961	Year 1960	Year 1960	Jan. 1961	Year 1960	Year 1960
	(Millions of Lbs.)			(Millions of \$)		
Imports:						
Fish & shellfish:						
Fresh, frozen, & processed 1/	85.1	81.7	1,011.2	27.4	24.8	304.8
Exports:						
Fish & shellfish:						
Processed only 1/ (excluding fresh & frozen)	2.5	6.6	48.7	1.1	1.8	19.2

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

During 1960, about 1,011 million pounds (valued at about \$305 million) of edible fresh, frozen, and processed fish were imported. Imports in 1960 as compared with 1959 were lower by 5.5 percent in quantity and 1.6 percent in value from the 1,071 million pounds valued at \$310 million imported in 1959. From 1959 to 1960 imports of groundfish and other fillets dropped 33.1 million pounds, all frozen and canned products derived from tuna and tuna-like fishes were down 10.7 million pounds, and fresh, frozen, and canned salmon imports were down about 28.3 million pounds. In 1960 an increase in the imports of fresh and frozen American and spiny lobsters of 5.0 million pounds and a 6.8-million-pound increase in the imports of shrimp partially offset the drop in imports of other fishery products.

United States exports of processed fish and shellfish in January 1961 were lower by 47.5 percent in quantity and 45.0 percent in value as compared with December 1960. Compared with the same month in 1960, the exports this January were down by 61.7 percent in quantity and 38.9 percent in value. The lower exports in January this year as compared with the same month in 1960 were due mainly to sharply lower exports of California sardines and squid. Exports of edible fishery products in 1960 amounted to 48.7 million pounds valued at \$19.2 million, a drop of 28.4 percent in quantity and 15.8 percent in value as compared with 1959.

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 1961 at the 12½-percent rate of duty is limited to 57,114,714 pounds. The quota for 1960 was 53,488,330 pounds. Any imports in excess of the quota are dutiable at 25 percent ad valorem.

Imports from January 1-March 4, 1961, amounted to 7,475,964 pounds, according to data compiled by the Bureau of Customs.

Imports in 1960 for the period January 1-February 27 amounted to 5,168,179 pounds.



Virginia

ROOFING TILE TO TRAP OYSTER DRILLS:

"Roofing tile commonly used in some parts of the world to protect houses against weather, may prove useful in protecting oysters from screwborers," a biologist of the Virginia Fisheries Laboratory reported on March 31, 1961. Screwborers or oyster drills, as they are sometimes called, have for many years been considered the number one enemy of oysters on Eastern Shore's (between Cape Charles and Maryland State line) vast planting grounds. Oystermen on that peninsula have spent much time and money to control this predatory snail which makes holes through the shells of small oysters and consumes the meat.

Eastern Shore planters frequently spend as much as 10 years to build up a good seed rock. This involves getting a firm crust of shells to support the seed oysters and to defend the young oysters against screwborers and other predatory animals. The most efficient device for protecting the grounds from creeping animals has been the drill traps, made of chicken wire and baited with young oysters. In recent years the cost of making these traps, baiting them, and fishing them has risen so high that many oystermen have debated whether to give up the whole idea.

Scientists from the Virginia Fisheries Laboratory are bringing to the Eastern Shore a new type of trap, which was developed in England. It is extremely simple and cheap, consisting merely of roofing tiles spaced at short intervals around and over the oyster beds. Planters estimate that wire-bag traps

baited with seed oysters cost about 63 cents each, and must be fished each week, otherwise the drills will eat up all of the bait. Roofing tiles, on the other hand, cost approximately 12 cents each and require no baiting. Furthermore, it is not necessary to fish tile traps at such frequent intervals. Although two-week intervals is recommended, the oysterman will lose nothing if he finds it impossible to fish them that frequently. They also make it easier to destroy more drills.

"The use of tiles for trapping oyster drills is based on information scientists have gained about these predators," the biologist stated. "They seem to need an elevated, shaded position for depositing their spawn, and during the spawning period they tend to gather together in large numbers. Curved roofing tile is ideal for these purposes, and the drills make good use of them.

He pointed out that it is necessary for the tiles to age in the water several months before they are most efficient, but they will begin attracting drills within a few weeks after placing them on the bottom. Besides the economy and ease of handling tile drill traps, they are more efficient than wire-bag traps because they collect large numbers of drill egg cases which can also be destroyed. Since egg cases contain around 12 eggs per capsule and the capsules are thickly placed in a small area, the destruction of egg cases is more effective, actually, than the destruction of the larger drills.

It will be 2 or 3 years before the success of using tiles for controlling drills can be evaluated. They are not considered to be barriers but rather traps for keeping down the drill population. The spacing of the tile around beds of oysters will not prevent some drills from passing through, but it will attract many which can be removed and, therefore, save many thousands of bushels of oysters.

"The screwborer was introduced into the British Isles about 50 years ago, when Virginia oysters were shipped to England," the biologist reported. "They have not spread widely from the areas where they were introduced but have increased in number until they have become a dangerous pest, and the British have made great efforts to control them."

These destructive marine snails go by several names in this country. Eastern

shoremen usually call them "screwborers." In some places they are called "screwdrivers" and scientists more often refer to them as "oyster drills." The English, on the other hand, call them "tingles." Their scientific names are *Urosalpinx cinerea* and *Eupleura* *rudata*, two different snails, both of which are destructive of oyster spat and young oysters.

* * * * *

QUALITY OF 1960/61 OYSTER HARVEST GOOD:

According to careful records made at the Virginia Fisheries Laboratory for the past six years, oysters from tidewater Virginia have been fatter during the 1960/61 season than any time since the study began and are probably the best since 1948.



Oysters are a treasure, with or without the pearl. A nutritive treasure, that is.

The Laboratory's mollusc physiology unit began keeping records on the fatness of oysters in 1955. A system has been devised for measuring the plumpness of oysters and comparing the data obtained from year to year, and from one area to another.

The Laboratory's research is designed to determine what factors affect the fatness of oysters. Through carefully controlled experiments, it has been found that oysters will fatten on vitamin-enriched flour and even on pure corn starch which contains no vitamins or minerals. These foods were fed to the experimental oysters at a rate of about one pound for every 45,000 gallons of water.

The biologists are interested in finding out why oysters fattened better than usual in the York and Rappahannock Rivers this year. Answering this question it is necessary to determine what foods oysters eat, whether they require living food, and whether it is possible that they get a great deal of their nourishment from non-living debris on the bottom and in the water. This will necessitate a study of the oyster grounds to find out how they control oyster growth and why they are more productive at one time than another.

Wholesale Prices, March 1961

The March 1961 wholesale price index for edible fishery products (fresh, frozen, and canned) at 131.9 percent of the 1947-49 average dropped slightly from the preceding month (0.8 percent), but was up about 6.9 percent from March 1960. Between mid-February and mid-March this year lower prices for shrimp, oysters, frozen haddock fillets, and frozen dressed salmon more than offset higher prices for fresh drawn haddock, fresh haddock fillets, frozen dressed salmon, fresh round whitefish, and canned Maine sardines. From March a year ago to this March, all the fishery products making up the fishery index were priced higher except for fresh-water fish.

The fresh and frozen drawn, dressed, and whole finfish subgroup index for March this year increased less than one percent from the preceding month. Higher prices for haddock ex-vessel at Boston, frozen dressed Pacific halibut, fresh round whitefish, and fresh yellow pike just about balanced out lower prices for dressed king salmon and drawn whitefish. When compared with March last year, the subgroup index for this March rose 8.6 percent due to higher prices for frozen dressed halibut (up 12.0 percent), fresh drawn haddock (up 4.7 percent), and frozen dressed king salmon (up 12.5 percent). These increases were only partially offset by lower prices for fresh round and drawn whitefish and yellow pike.

From February to March this year, the fresh processed fish and shellfish subgroup index declined 3.2 percent due to a 2.8-percent drop in the fresh shrimp price at New York



Old Fulton Fish Market, New York City (original market).



Remodeled Fulton Fish Market completed in 1939.

Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, March 1961 With Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices ^{1/} (\$)		Indexes (1947-49=100)			
			Mar. 1961	Feb. 1961	Mar. 1961	Feb. 1961	Jan. 1961	Mar. 1960
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					131.9	133.0	130.9	123.4
Fresh & Frozen Fishery Products:					146.8	148.9	146.2	137.6
Drawn, Dressed, or Whole Finfish:					161.3	160.2	162.7	148.5
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.12	.10	122.4	100.5	125.2	116.9
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.33	.32	101.1	99.0	92.8	90.3
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.88	.91	196.6	205.0	202.2	174.7
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.70	.75	173.6	186.0	179.8	195.8
Whitefish, L. Erie pound or gill net, rnd., fresh	New York	lb.	.70	.63	141.6	126.4	126.4	144.7
Yellow pike, L. Michigan & Huron, rnd., fresh .	New York	lb.	.70	.69	164.2	161.8	152.4	181.8
Processed, Fresh (Fish & Shellfish):					150.1	155.1	145.9	142.2
Fillets, haddock, sml., skins on, 20-lb. tins . .	Boston	lb.	.42	.34	141.2	114.0	132.7	117.4
Shrimp, lge. (26-30 count), headless, fresh. . .	New York	lb.	.85	.88	134.3	138.2	118.5	127.2
Oysters, shucked, standards	Norfolk	gal.	7.00	7.50	173.2	185.6	185.6	167.0
Processed, Frozen (Fish & Shellfish):					115.1	117.4	116.0	109.1
Fillets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.39	.39	100.8	102.1	102.1	98.1
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.34	.36	105.2	113.0	109.9	89.5
Ocean perch, skins on, 1-lb. pk.	Boston	lb.	.31	.31	122.8	122.8	118.8	114.8
Shrimp, lge. (26-30 count), 5-lb. pkg.	Chicago	lb.	.70	.70	107.2	108.0	107.2	104.5
Canned Fishery Products:					111.2	110.9	109.9	103.8
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs. . .	Seattle	cs.	28.00	28.00	146.1	146.1	143.5	127.8
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	11.00	11.00	79.3	79.3	79.3	77.9
Sardines, Calif., tom. pack, No. 1 oval (15 oz.), 48 cans/cs.	Los Angeles	cs.	7.75	7.75	91.0	91.0	91.0	93.9
Sardines, Maine, keyless oil, 1/4 drawn (3-3/4 oz.), 100 cans/cs.	New York	cs.	8.75	8.50	93.1	90.5	90.5	93.1

^{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.

City and a 6.4-percent lower price for fresh shucked oysters at Norfolk, Va. These decreases were partially offset by a higher price for fresh small haddock fillets at Boston. In March this year, the subgroup index rose 5.6 percent from the same month of 1960. All the subgroup prices were higher in March this year as compared with March a year ago.

Wholesale prices this March for frozen processed fish and shellfish were off about 2.0 percent from the preceding month. During this period prices dropped for frozen haddock fillets by 6.9 percent, flounder fillets by 1.3 percent, and frozen brown shrimp at Chicago by 0.7 percent. Prices for frozen ocean perch fillets were unchanged from February to March this year. However, the subgroup index rose 5.5 percent from March 1960 to this March because of higher prices for frozen haddock fillets (up 17.5 percent), frozen flounder fillets (up 2.8 percent), and ocean perch fillets (up 7.0 percent). In ad-

dition, frozen shrimp prices at Chicago were up about 2.6 percent.

Wholesale prices for canned fishery products from February to March this year were up slightly (up 0.3 percent), but rose 7.1 percent from last March to this March. The only change in prices for canned fishery products from February to March 1961 was an increase of 25 cents a case for canned Maine sardines. Due to the very short supplies of canned pink salmon and California sardines, primary prices for those products were purely nominal in March this year. From March 1960 to March this year the canned fishery products subgroup index rose 7.1 percent due primarily to a 14.3-percent increase in canned pink salmon prices. During the period canned tuna prices rose slightly and Maine canned sardine prices were unchanged.

