TRENDS AND DEVELOPMENTS

Alaska

PINK SALMON CATCH IN SOUTHEASTERN AREA, 1953 SEASON: The 1953-season catch of pink salmon in Southeastern Alaska was 77 percent less fish than in 1951 (the previous pink salmon year); while the catch in Northern British Columbia was down 72 percent from the same period (see table). The decline in the two areas is at about the same ratio, the Service's Branch of Fishery Biology reported recently. Inclusion of the catches for central and southern British Columbia would be misleading, since neither area is adjacent to Alaska, and thus might be expected to have different changes in abundance.

Pink Salmon Catch for Southeastern Alaska and Northern British Columbia

	1953	1951
	No. of Fish	No. of Fish
Southeastern Alaska	5,145,020	22,211,020
Northern British Columbia	1,400,000	4,900,000

The disastrous 1953 pink salmon season in Southeastern Alaska and Northern British Columbia following the successful fresh-water history of the 1951 brood emphasizes the need for some means of predicting marine survival.

PINK SALMON

In only two of the twelve years of records from the Service's Little Port Walter Station were there any significant increases in the number of returning adults. Through use of the number of fry divided by the number of eggs as an index of fresh-water survival, and the number of returning adults divided by the number of fry as a measure of marine survival, the following values were obtained for the two very successful years:

Brood Year	Percentage of Fresh-water Survival	Percentage of Marine Survival
1940/42	6.4	2.7
1947/49	2.0	11.1
12-year average	2.5	2.6

For 1940/42, fresh-water survival was responsible for the success of the year class, while in 1947/49 the marine survival was responsible. At the same time the other survival values were near normal.

In the 1951/53 brood the fresh-water survival value was 9.3 percent--the highest found in 12 years of records. Catastrophic events in the sea allowed a marine survival of only 0.3 percent which wiped out any previous gain and resulted in the very poor catch in the Southeastern Alaska pink salmon fishery during the 1953 season.

California

NEW FISHERIES REGULATIONS: Many changes were made in the California regulations on commercial fisheries in the 1953 session of the State Legislature, reports the October 1953 Outdoor California, a publication issued by that State's Department of Fish and Game.

A number of changes pertaining to use of fish nets included: outlawing use of gill, trammel, and fyke nets in the Sacramento-San Joaquin Delta area; permitting drift and

set gill nets, and drift and set trammel nets in Districts 17, 18, 19, and 20A, and drift trammel nets in District 10.

Other changes prescribed permissible shrimp or prawn nets; set aside coastal waters within three nautical miles of shore as bottomfish nursery grounds; defined legal and illegal trawl nets; and permitted use of beach nets in District 10 providing the meshes are at least $1\frac{1}{2}$ inches in length.

The Legislature set a 2,500-pound yellowtail tuna and 5,000-pound white tuna possession limit, except those taken south of waters off the Mexican border; prohibited sale of all catfish except those imported or artificially reared; and outlawed sale or purchase of surf perch south of Point Arguello. No kelp, rock, sand, or spotted bass, except imported, may be sold or purchased and none of these species may be taken under $10\frac{1}{2}$ inches in length.

Black abalone may be taken for bait in certain sections of District 19. Razor clams may not be taken from Little River Beach in Humboldt County between the mouth of the Mad River and Moonstone Beach; after December 31st (1953) and in succeeding even-numbered calendar years, none may be taken from Little River Beach between the mouth of the Mad River and the mouth of Strawberry Creek; and in each succeeding odd-numbered year thereafter no razor clams may be taken between the mouth of Strawberry Creek and Moonstone Beach.

All natural beds of native oysters on State tidelands and in bays, lagoons, and estuaries together with other State tidelands set aside by the Department of Fish and Game are declared oyster reserves and may not be allotted to persons or companies. Seeds may be removed from them for replanting on permits from the Department providing the person or company agrees to return one-half the amount he removes within a one-year period.

Persons engaged for profit in the capture, transport, or sale of live fresh-water fish for bait need a permit from the Department.

Anchovies may be taken for bait or human consumption in any coastal waters lying south of Pt. Mugu, but fishermen must fish outside the three-mile limit for anchovies for commercial processing.

All charter sportfishing boats of any size whose owners accompany the boat must take out a $3 permit, starting April 1, 1954. Additionally, all vessels operating in public waters in connection with fishing operations for profit must take out a $10 certificate of boat registration starting April 1, 1954. Boats rented without operators, except inboard boats, are excepted.

Under a commercial license, fishermen may take king salmon by hook and line between May 1 and September 30 in Districts 6, 7, 10, 11, 15, 16, 17, and 18; and silver salmon may be taken by hook and line between July 1 and September 30. Legal minimum length for king salmon is 26 inches from snout to tip of tail, that for silver salmon, 22 inches. This section will remain in effect until Oregon and Washington enact laws or regulations prohibiting the taking of silver salmon by commercial trolling prior to July 1 of any year.

Salmon may not be taken commercially at the mouth of Humboldt Bay in those parts of Districts 6 and 7 within three nautical miles north and south of a line due west from the center of the mouth of the bay.

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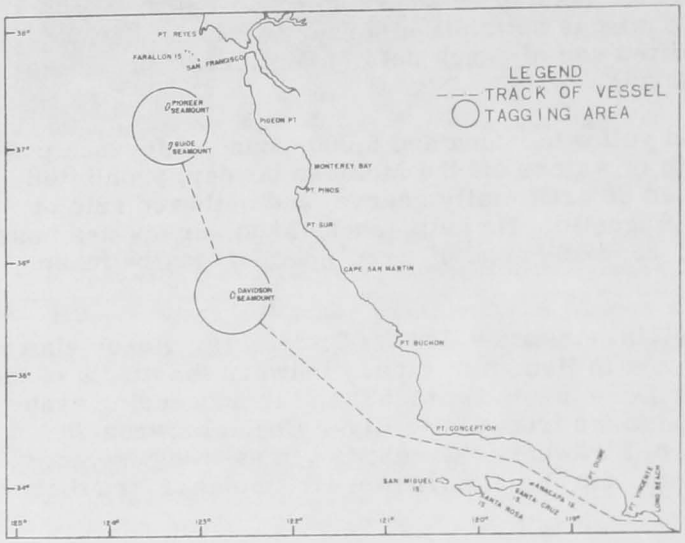
ALBACORE TUNA TAGGING CONTINUED BY "N. B. SCOFIELD" (Cruise 53-S-6): A total of 362 small albacore tuna was tagged off the coast of Central California by the State Department of Fish and Game research vessel N. B. Scofield on an 18-day cruise completed at Los Angeles on October 23, 1953. The objective was to tag the smaller fish near the end of the fishing season, and approximately two-thirds of the tagged fish

were under 700 mm. ($27\frac{1}{2}$ inches) in fork length. This was the time when the fish are more scattered and the fishery had progressed to its more northern limits. Experimental type "F" and "G" tags were used.



ALBACORE TAGGING CRUISE OF THE N. B. SCOFIELD (53-S-6)

The majority of the tagged fish were captured during the early part of the cruise southwest of the Pioneer Seamount. The albacore responded well to live-bait fishing in this area where the water was a deep blue with an average temperature of 60.5° F. Activities were curtailed after $1\frac{1}{2}$ days due to adverse weather. The rest of the fish were tagged farther south in the vicinity of Guide and Davidson Seamounts. In these areas the fish responded poorly to live-bait fishing and, therefore, most of them were taken by trolling in the early morning and late afternoon.

Scale samples were collected from some of the tagged fish before they were released. The scales were taken from an area between the sixth and seventh dorsal finlets and above the lateral line. It is hoped that some of these fish will be returned at a later date so that it can be seen what actually happens to the scales as they grow older.

Examinations of the gonads of the smaller fish indicated that they were in an immature stage of development.

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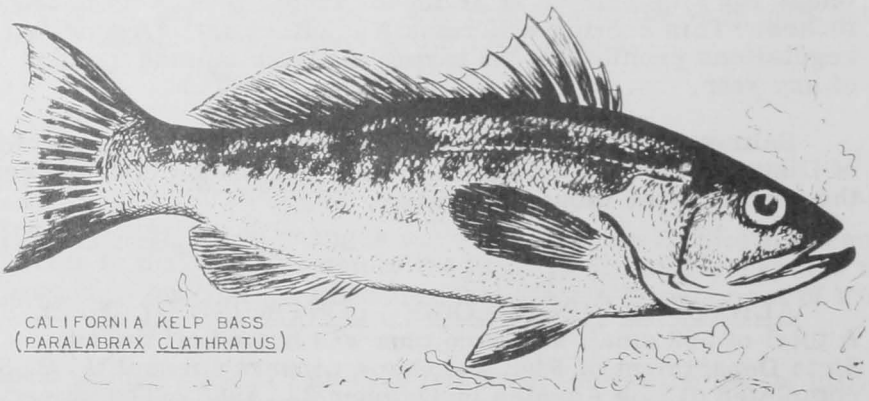
KELP BASS TAGGED BY "N. B. SCOFIELD" (Cruise 53-S-7): A total of 332 kelp bass were tagged and released at Santa Catalina Island off the coast of California by the N. B. Scofield on an 8-day cruise ended November 5, 1953. Large kelp bass were sought in order to obtain growth information, but over half were between 11 and $12\frac{1}{4}$ inches in length; only 14 exceeded $14\frac{1}{2}$ inches in length. Other objectives of the cruise were to: (1) obtain information on the size composition of the bass at selected fishing locations; (2) supplement length-weight data already on hand; (3) obtain spotfin and yellowfin croakers, corbina, and barred perch for tagging, food, and maturity studies; (4) obtain specimens of other fishes for aquaria and taxonomic study.

Fishing was poor at Santa Rosa, Santa Cruz, San Nicolas, and Santa Barbara Islands which were visited in the order named. Specimens of several species of sea perch were taken by beach seining at Santa Rosa Island (Bechers Bay). Bass fishing at San Clemente Island (Mosquito Harbor and White Rock) was very productive, over 300 bass being taken in a day and a half. Two very successful aqua-lung dives were made at Mosquito Harbor. Bass, perch, and blacksmith were very abundant near the vessel and the dives revealed the fish to



CALIFORNIA KELP BASS (PARALABRAX CLATHRATUS)

be from several feet below the surface nearly to the bottom. No kelp bass was present near the diver in the first dive, but some were present in close proximity on the second dive.

Large specimens of bass (over 16 inches) were to be seen, although there were more to be found in the near cover. All sizes of bass, from large to fish probably not over two or three months old were occupying the same relative area. Very small bass could almost be touched with the fingers and seemed to prefer the bottom.

Wire traps and trammel nets were successful in taking several species. Traps were placed in the area where successful hook-and-line fishing occurred. However, despite strategic placing of traps by diving and the use of anchovy bait, only 6 small bass entered. This is the first detailed information obtained on trap efficiency in comparison with live-bait fishing in an area known to be heavily populated with bass.

Light stations produced squid in abundance, and a few species of fish.

Cans--Shipments for Fishery Products, January-September 1953

Total shipments of metal cans for fish and sea food during January-September 1953 amounted to 83,258 short tons of steel (based on the amount of steel consumed in the manufacture of cans). Comparative data for 1952 are not available.

NOTE: STATISTICS COVER ALL COMMERCIAL AND CAPTIVE PLANTS KNOWN TO BE PRODUCING METAL CANS. REPORTED IN BASE BOXES OF STEEL CONSUMED IN THE MANUFACTURE OF CANS, THE DATA FOR FISHERY PRODUCTS ARE CONVERTED TO TONS OF STEEL BY USING THE FACTOR: 23.0 BASE BOXES OF STEEL EQUAL ONE SHORT TON OF STEEL.

Federal Purchases of Fishery Products

FRESH AND FROZEN FISHERY PRODUCTS PURCHASED BY DEPARTMENT OF THE ARMY, OCTOBER 1953: The Army Quartermaster Corps in October 1953 purchased 2,236,975 pounds (valued at $1,120,493) of fresh and frozen fishery products for

Purchases of Fresh and Frozen Fishery Products by Department of the Army (October and the First 10 Months of 1953 and 1952)

QUANTITY				VALUE			
October		January-October		October		January-October	
1953	1952	1953	1952	1953	1952	1953	1952
Lbs.	Lbs.	Lbs.	Lbs.	$	$	$	$
2,236,975	3,009,618	23,643,186	29,113,339	1,120,493	1,500,691	10,415,224	13,315,720

the military feeding of the U. S. Army, Navy, Marine Corps, and Air Force (see table). This was a decrease of 2.4 percent in quantity, but an increase of 9.3 percent in value as compared with September purchases, and less by 25.7 percent in quantity and 25.3 percent in value than a year ago.

Army Quartermaster Corps purchases of fresh and frozen fish during the first 10 months in 1953 totaled 23,643,186 pounds (valued at $10,415,224), a decrease of 18.8 percent in quantity and 21.8 percent in value as compared with the similar period a year earlier.

The over-all average price paid by the Army Quartermaster Corps was the highest since March 1953, due mainly to seasonal price increases. The average price in October was 50.1 cents per pound, compared with 44.7 cents in September and 49.9 cents in October 1952.

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

Gulf and Caribbean Fisheries Institute

SIXTH ANNUAL SESSION: The Sixth Annual Session of the Gulf and Caribbean Fisheries Institute convened at Miami Beach, Fla., November 16-20, 1953. The meeting was held simultaneously with the International Fishing Vessel Congress of the Food and Agriculture Organization of the United Nations, Shrimp Association of the Americas (Quarterly Meeting), Southeastern Fisheries Association (Quarterly Meeting), and the Atlantic States Marine Fisheries Commission (Southern Section Meeting).

After the opening session, there was a joint session with the International Fishing Vessel Congress, an Industry Session, an Economic Session, a Biological Session, and a Technical Session.

These were the papers presented at the Industry Session:

1. "Handling Shrimp in the Breading Plant," by J. Roy Duggan. Presents a number of rules to be followed in order for a breading plant to produce high quality breaded shrimp.
2. "Handling Shrimp in the Canning Plant," by H. R. Robinson. A step-by-step discussion of the methods and practices employed in shrimp canning.
3. "The Organization of a Quality Control Program in a Fish Plant," by William F. Hampton. Discusses the steps that must be taken in setting up a quality-control program in order to keep a product out front in the race for the consumer's dollar, and also to reduce errors and waste on the production line.
4. "Handling Shrimp Aboard Fishing Vessels and at the Dock," by Pedro Pinson. Describes method of handling shrimp aboard Mexican Pacific coast shrimp trawlers (55-65 feet) operating from Mazatlan, Mexico, from October 1 until early July of the following year. Trips extend 50 to 600 miles from port and last 10 to 12 days. Points out that an experiment will be attempted at Mazatlan in the near future--trained French divers using "Aqua Lungs" will attempt to observe and record photographically the action of the shrimp trawl in catching shrimp.

At the Economic Session these papers were presented:

1. "Financing of Fishing Vessels by Commercial Banks," by Charles T. Taylor. Points out the standards that banks adhere to in making loans. Describes the experience of a number of bankers located in states bordering on the Gulf in making loans to finance the purchase of fishing vessels.
2. "Financing of Vessels in the Gulf States," by Jno. J. Faubion. Indicates that banking in-industry finally is "discovering" the commercial fishing industry to the benefit of all concerned. Urges fishing industry to maintain accurate records of production, earnings, cost of operation, etc.
3. "Financing of Fishing Vessels by Financial Institutions," by R. S. Murphy. Reports on experience in financing income-producing vessels, methods of financing, and financing of the allied equipment in the industry.

These were the papers presented at the Biological Session:

1. "Changing Concepts in Fishery Research in the Great Lakes," by Ralph Hile. Points out that the principal accomplishment of fishery biology in the Great Lakes has been to teach us that for more effective understanding we must focus attention on the ecology of whole populations of fish made up of complexes of species. Of primary consequence are the interactions between species, both commercial and non-commercial, and the manner and extent to which they are affected by changing environment and by fishing activities.
2. "Fifty Years of Fishery Biology in Europe," by Michael Graham. Discusses effect of hydrography on fisheries, rational fishing, study of fluctuations, and studies of plankton. Trends noted are traced by reference to selected discoveries in each field.
3. "Fisheries Dynamics and the Concept of Maximum Equilibrium Catch," by Milner B. Schaefer. Reports on attempts to estimate equilibrium catch and maximum equilibrium catch by combination of estimates of the elemental rates of recruitment, growth, and mortality. Discusses an alternative approach to specify the form of the relationship between population size and natural rate of increase, and to determine the parameters from existing numerical data of the fishery. A method of estimation is outlined, together with the application of the Verhulst-Pearl logistic. Data for the Pacific sardine and halibut fisheries are employed in examples.
4. "Fifty Years of Progress in Solving Fishery Problems," by William C. Herrington. Indicates that there is evidence that the analyti-

cal approach to the study of fish-stock productivity has proven more productive than the synthetic approach. Principal characteristics and some accomplishments of five international fishery conventions are reviewed.

Technical Session papers follow:

1. "Evaluation of Five-Pound Packages of Glazed and Unglazed Shrimp," by Marian Klein, L. E. Simerl, and Ernest Adams. Reports on experiments to determine whether unglazed raw shrimp could be held satisfactorily for long-term storage at 0° F. when protection was provided by a heavy waxed carton with a suitable protective overwrap. Results indicated that unglazed shrimp in packages with an overwrap showed negligible weight loss and were in excellent condition; therefore, the glazing operation is not necessary if the carton has a protective overwrap.
2. "Comparison of Objective Tests for Quality of Fresh and Frozen Gulf Shrimp," by E. A. Fieger and J. J. Friloux. A report on chemical, bacteriological, and organoleptic studies made daily on samples taken from stored fresh headless shrimp, and monthly for 12 months on samples of these same shrimp which had been frozen after 24 hours, 6 days, and 12 days of ice storage. It is postulated that loss of quality during the early period of ice storage is caused mainly by autolysis. With longer storage spoilage occurs mainly through bacterial action. From the results it is evident that changes induced by bacteria or catalyzed by enzymes are proceeding too slowly at 0° F. (-18.8° C.) to be used to measure modification in quality.
3. "Freezing Gulf of Mexico Shrimp at Sea," by John A. Dassow. Points out advantages of brine freezing shrimp aboard the vessel: brine freezers are adaptable to small boats; brine freezing of small units such as shrimp is fast and efficient; brine freezing provides some protection against dehydration. There is no evidence that brine freezing shrimp, then thawing and refreezing produces changes in color, flavor, or texture which do not also occur in air-freezing of shrimp.
4. "Some Physical and Chemical Changes Taking Place in Iced Shrimp," by Charles E. Lane and Edward B. Whittaker. Four hundred shrimp removed at random from a much larger sample stored in Rickey-type crushed ice for periods ranging from one day to 25 days. Reports on analyses of these shrimp for changes in content of moisture, protein, indole, tyrosine, tryptophane, and for gross changes in fluorescence. The most promising approach, from the standpoint of practical utility, appears to be that of the ultra-violet induced fluorescence. Deterioration in quality can generally be detected by this method 24 to 36 hours before it becomes evident to the experienced taste panel. Results and practical implications of the other tests are discussed, along with some of the intrinsic sources of variation in such analyses.
5. "Further Experiments in Holding of Fresh Shrimp in Refrigerated Seawater and Ice," by J. B. Higman, C. P. Idyll, and James Thompson. Discusses refrigerated sea-water experiments and icing experiments in order to determine some method of preventing the formation of "black spot." Aureomycin hydrochloride in concentrations of 5 p.p.m. was found to be effective in elimination of undesirable odors that develop as a result of holding shrimp in sea water in order to curb "black spot" formation. Also, tests have shown that shrimp dipped immediately after heading and a second time 7-8 days later in a $2\frac{1}{2}$-percent concentration of sodium bisulfite developed only traces or small amounts of "black spot" after as much as 17 days.

Gulf Exploratory Fishery Program

LIVE-BAIT TUNA FISHING TESTED IN GULF BY "OREGON" (Cruise 20): Poor results were obtained in live-bait tuna fishing outside the continental shelf of the northeast Gulf of Mexico by the Service's exploratory fishing vessel "Oregon" in the summer and fall of 1953. The cruise commenced in July, but was interrupted on a number of occasions for various reasons and was completed on November 1. Fewer tuna were sighted than during the late summers of 1950, 1951, and 1952, but enough schools were found to allow a good trial of live-bait fishing.

Sufficient quantities of live anchovies for bait were taken at night with a trap lift net near islands off the Louisiana, Mississippi, and Alabama coasts. The behavior of the bait was satisfactory. Losses were 5 percent to 20 percent during the first 24 hours, but after this initial loss the bait appeared to be hardy. A few small blackfin tuna were taken from each of several schools and one series of five small bluefin tuna were taken, but none of the schools could be held at the stern of the vessel long enough for satisfactory catches. The majority of the schools appeared to be made up of tuna of mixed sizes and of more than one species. Occasionally gear was lost to large tuna appearing suddenly among small fish.

Fish Finders Tested: Observations with an electronic fish finder ("Fischlupe") indicated the presence of scattered large fish in midwater outside the continental shelf at depths varying from 40 to 150 fathoms. The indicated distribution was irregular with some apparently rich and some barren areas.

Another experimental and modified electronic fish finder was also used on the Oregon for one week in order to ascertain whether it would be possible to distinguish shrimp from small bottom fish on the instrument. It was possible to predict the volume of trawl catches with reasonable accuracy from indications on the instrument, but indications of shrimp and small bottom fish were not perceptibly different. During most of the time the instrument was in use, the bottom water temperatures in the areas worked were warmer than surface water temperatures and the grooved shrimp were scattered. The instrument did locate concentrations of fish which proved to be mostly spot and croaker, and drags of commercially significant quantities were found in 15 to 20 fathoms south southeast of Cape San Blas, Florida.

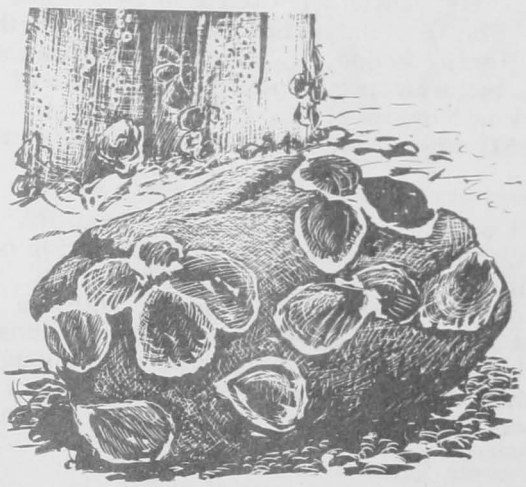
Joint Fisheries Promotion Program Launched by Three Countries

United States, Canadian, and Norwegian fishery interests have launched a joint fisheries promotion program, reports the National Fisheries Institute. The newly-formed N. F. I. Public Relations Committee, composed of members of United States, Canadian, and Norwegian firms, met on December 2 with an advertising agency in New York City. The advertising agency made a presentation of the program which is being executed on fishery products for this newly-formed group.

The launching of this promotion program is a result of the decision of the National Fisheries Institute's Board of Directors made at their last annual convention in Washington, D. C., to invite firms from Canada, Iceland, and Norway to join the Institute in its fisheries promotion program.

Maryland

CHESAPEAKE OYSTER INVESTIGATIONS: Oyster shell bag exposures were discontinued for the 1953 season by the State of Maryland's Cheaspeake Biological Laboratory, except at local stations where observations on year-round fouling of shells are being made, reports a recent release from the Maryland Department of Research and Education. Recovery of some of the last test shells exposed has been irregular and those at a number of stations were unrecovered. Setting ended in September 1953 at most locations. Two spat found on 20 shell faces from Cinder Hill exposed during the period October 11-27 were the last observed set of the season.



OYSTER SPAT (MAGNIFIED MANY TIMES) ON SMALL PEBBLE.

The primary purpose of test-shell exposure is to determine the time and relative intensity of oyster setting at a given location. The time and degree of fouling of shell surfaces by other organisms also can be observed. The relationship between the number of spat attaching to clean test shells and the amount of commercial set on old cultch or on commercial shell plantings is highly variable and appears to be largely dependent upon the extent of fouling of the commercial cultch or shell. Fouling on test shells exposed for only a one-week period seldom is sufficient to affect the number of

spat attaching during the exposure period. With weekly changes of test shells during a very intensive set, the total number of spat for the season (obtained by adding together the sets for each week) could be so great that a single batch of shells exposed during the whole season would not have enough surface to receive all of the spat. Hence it usually happens that the count of spat on commercial shells is a smaller fraction of the number found on test shells when sets are heavy than when sets are light.

During 1953 the set of oysters on test shells as well as on natural cultch was considerably lower than is usually found. Many complex and interacting factors are believed to affect the successful spawning and setting of oysters. Present knowledge of these is quite incomplete and no explanation of the season's below-normal set can be made. The amount of set in Maryland has varied widely from year to year in the past and may be expected to continue to do so in the future. Certain of the data obtained from test shells and from other longer period exposure of experimental shells, however, are useful in indicating how the greatest advantage can be taken of the sets which do occur.

The greatest initial set on commercially-planted shell can be had by timing the planting so that clean shell surfaces are presented during the period of maximum setting intensity. Practical considerations usually make it difficult, if not impossible, to attain this ideal. No method for accurately predicting the exact time of maximum set in Maryland areas has yet been worked out. Records of setting on test shells in a given area over a period of years, however, makes it possible to determine the normal time when peak setting can be expected, and the degree of variation which may occur from this normal. The time of setting may vary from place to place and may be of brief or long duration with single or multiple peaks. Counts of spat were made on 40 shell faces (inner surface only) exposed at two locations in each of the areas shown. Areas of shells were measured and a figure calculated to represent the number of spat which attached per day to a single uniform shell face of 50 square centimeters or about the area of a typical four-inch oyster shell.

It has been observed that a definite succession of attachment of fouling organisms occurs at certain seasons and that the presence of one type of fouling may affect the kind and rate of attachment of other fouling organisms. Barnacles have a heavy wave of setting in late spring and another during the fall and early winter under most Maryland conditions. Barnacles are further known to interfere seriously with oyster setting when alive and present in quantity. It also has been observed that barnacles set in much greater numbers on newly planted shell than on shell which has been overboard long enough to acquire a coating of organic film (distoms, algae, bacteria, etc.). Since the heavy barnacle set usually occurs about two months before the peak of oyster setting, delay of shell planting until after the barnacle set should result in better sets of oysters than if the shells were planted in early May.

The huge quantities of shells planted annually by the State presents a formidable problem in physical handling alone. Effective use of equipment and manpower from the standpoint of economy can be had by planting over as long a period as possible. Inability to store shells economically in certain areas also may require their planting as they accumulate if they are to be used at all for cultch. Similar problems are faced in lesser degree by private planters. Obviously under present conditions it is not possible to make all shell plantings during June or early July. If planting is done during other months, then it is desirable to know what loss of shell efficiency as cultch may occur and whether or not such loss among early spring planted shell might not be offset to some extent by the lesser quantity of barnacles they would pick up in May.

In order to gather information on comparative efficiency of shells planted in different months of the year, the Chesapeake Biological Laboratory made plantings on numbered shallow trays placed overboard at two locations in the St. Marys River and one in Holland Straits. Such plantings were made from October 1952 to June 1953. These trays were taken up in November 1953 and spat counts were made. Since 1953 proved to be a poor setting year the counts are not considered as representative as would be true in normal years. Also the barnacle set was heavy at only one of the locations so that interference by this organism was not as great as usually occurs. The results

have proved interesting even though they must be considered preliminary in nature and not necessarily typical of what may occur in other years or in other locations. Since counts are rather irregular, the general trend can best be shown by averaging together the trays at all three locations. It should be pointed out that the upturn in spat count on June shells was due mostly to the results at the one station where barnacle setting during May had been highest. Similar experiments in past years for the late spring months only also have shown a decreased efficiency of May planted shells and a marked upturn in counts on those planted in late June.

The above information was abstracted from Oyster Bulletin No. 10. Copies of the bulletin are available from the Chesapeake Biological Laboratory, Department of Research and Education, State of Maryland, Solomons Island, Maryland.

North Carolina's New Shellfish Regulation

A regulation, apparently to aid the enforcement of a tax on certain shellfish, was published as a legal notice in North Carolina recently, reports the Service's Fishery Marketing Specialist in that State. The new law, scheduled to go into effect on January 1, 1954, states:

> "Regulations No. 5--(173) Section IX: It shall be unlawful for any person or persons, firm or corporation to ship or offer to ship oysters, clams, shrimp, escallops or crabs without a bill of consignment and tax receipts from the shipper written or stamped in ink or indelible pencil, showing the date of shipment, quantity of each product shipped, and to whom consigned. It shall be unlawful for any express company, railroad company, or any other common carrier to accept for shipment, or to transport on the public highways any shrimp, escallops, clams, oysters or crabs without the bill of consignment and tax receipts from the shipper showing the tax has been paid."

Pacific Oceanic Fishery Investigations

YELLOWFIN TUNA ABUNDANCE OFF CHRISTMAS ISLAND INVESTIGATED BY "JOHN R. MANNING" (Cruise 17): A 23-day cruise to the equatorial tuna grounds was completed on November 8 by the Pacific Oceanic Fishery Investigations' research vessel John R. Manning. At the same time the vessel successfully established a temporary scientific field station at Christmas Island about 1,000 miles south of Hawaii. Experimental long-line fishing to test the abundance of yellowfin tuna in the immediate vicinity of that atoll was carried out by the vessel.

The tuna catch was good during the 6 days of experimental fishing around the island; about 6 tons of yellowfin tuna were caught and landed at Honolulu. Six stations were fished in the Christmas Island area; three as close inshore as practicable and three stations 30 miles offshore. The average yield of tunas for all stations was 8.2 per hundred hooks for the 6-hook baskets (0.52 per basket), and 4.9 per hundred hooks for the 11-hook baskets (0.57 per basket). The station 30 miles to the west (leeward) of Christmas Island produced the best catch; here the rate was 12.5 per hundred hooks for the 6-hook baskets and 6.8 per hundred hooks for the 11-hook baskets. The poorest station was the inshore station to the east (windward) of Christmas Island where the catch was 5.6 per hundred hooks for the 6-hook gear and 2.4 per hundred hooks for the 11-hook gear.

These yellowfin tuna were frozen and shipped to a United States west coast cannery for processing as a sample of central Pacific tuna. The outcome of this canning experiment is expected to influence the development of plans for mainland tuna boats to begin commercial fishing in the rich equatorial tuna grounds pioneered by POFI research vessels.

A shore party of two fishery scientists and two Hawaiian fishermen was put ashore for a 2-months' detail. During this period the party will install meteorological instruments loaned by the U. S. Weather Bureau and will train local cooperators to record observations of rainfall, humidity, barometric pressure, and wind velocity and direction. The field party will also prospect sites for the installation of daily recording thermometers to make a continuous record of sea-water temperatures on several sides of the island. It is hoped that the data from these instruments, together with the weather records, will make it possible to understand the seasonal and cyclical changes in the ocean currents that ultimately affect the abundance of tuna in the equatorial fishing grounds. Christmas Island, one of the largest atolls in the Pacific, is only 2 degrees north of the equator and is ideally situated as a base for such a study, as it lies in the center of the rich new tuna grounds found by the Service's research vessels.

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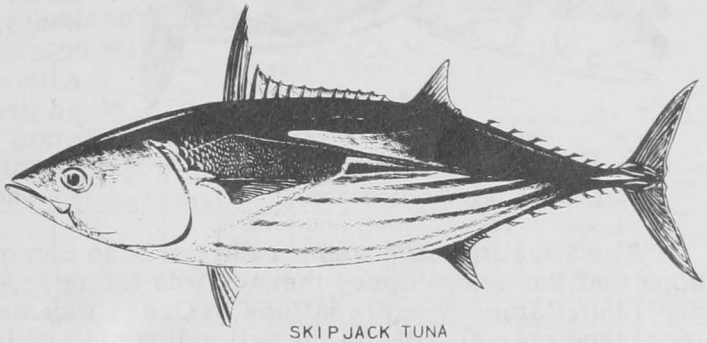
SKIPJACK TUNA FOUND ABUNDANT IN HAWAIIAN WATERS BY "HUGH M. SMITH:" Good concentrations of skipjack tuna were discovered in Hawaiian waters by the Service's research vessel Hugh M. Smith on a 2-weeks' tuna-scouting cruise completed at Pearl Harbor on October 27.

In 13 days of searching in two areas--one extending 300 miles south and 250 miles west of Oahu and the other reaching 250 miles northeast of the island--30 schools of shipjack (aku) were seen. The best concentrations of fish were found about 110 miles south of Oahu and in the vicinity of a large eddy about 80 miles west of the island of Hawaii. This eddy had been revealed by earlier investigations of the vessel to be a more or less permanent feature of the pattern of ocean currents around the Hawaiian Islands. It was considered likely to offer good fishing, as such eddies often bring about a concentration of the small fish and animals upon which the tuna feed. Skipjack were also abundant in the same vicinity at the time of the Hugh M. Smith's September cruise. On this latest cruise, schools were found as far as 300 miles to the south and west of Oahu, but they were less numerous than in September, and while scouting north and east of Oahu in four days of scouting only two schools were seen.



SKIPJACK TUNA

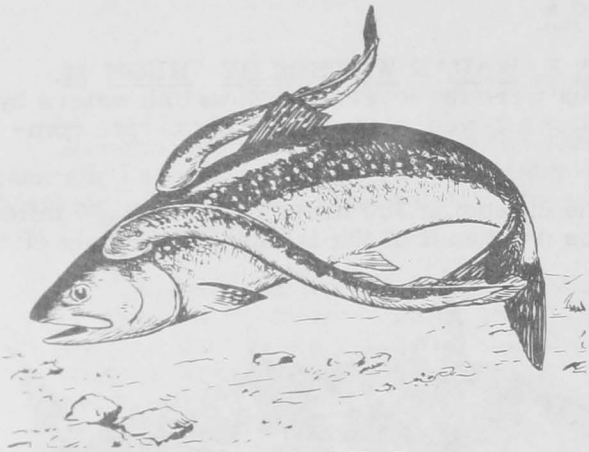
The skipjack (aku) is by far the most important species in the Hawaiian Islands' fisheries and is the only one that supports a canning industry. The local skipjack research program of the U. S. Fish and Wildlife Service, in cooperation with the Territorial Division of Fish and Game, has as its aim the discovery of concentrations of this tuna species which will permit the fishery to expand beyond its present narrow geographical and seasonal limitations. The operating range of the Honolulu-based skipjack sampan fleet does not extend as far from land as the area where the Hugh M. Smith found fish most abundant.

During this cruise, experiments with possible substitutes for scarce live-bait were continued in cooperation with the University of Hawaii. The search for a bait substitute for the skipjack fishery has led to the use of chemical attractants in combination with articles which might prove attractive in appearance to the aku. As yet no good substitute has been found to take the place of the nehu, the main bait fish used around the Hawaiian Islands.

Sea Lamprey Invade Green Bay in Lake Michigan

Sea lamprey in such vast numbers that the water literally teemed with them invaded Green Bay in Lake Michigan early in the fall of 1953, bringing fishing operations practically to a standstill, reports the Service's Branch of Fishery Biology. All important commercial species were attacked, and so great was the destruction that dead and dying fish littered the surface of the water. Fishermen of northern Green Bay had removed most of their gear from the water by the end of September because they were discouraged by dwindling catches, the presence of large numbers of lamprey in their nets, and the necessity of discarding a high percentage of mutilated fish in their catches.

Both trap netters and gill netters suffered. Trap-net fishermen reported as high as 60 to 70 percent of their catch scarred and many fish dead when the nets were lifted. Gill netters fared even worse. One of the last fishermen to remove his large-mesh gill nets from Big Bay de Noc took between 4,000 and 5,000 pounds of dead fish from each of two gangs.



SEA LAMPREY FEEDING ON A TROUT.

Fishermen captured large numbers of sea lamprey in addition to those taken in their nets. Some removed daily as many as 20 that had attached themselves to their boats. Others added to their take of hitchhiking parasites by towing a white box astern. Although the fishermen are to be commended greatly for their efforts in destroying as many sea lamprey as possible, there is small chance that they made any important inroads on such a tremendous population.

The 1953 invasion was a rude shock to commercial operators who had begun to hope that the sea lamprey menace was fading. After considerable destruction in 1949 and 1950, lamprey depredations in Green Bay were relatively limited in 1951/52 and increased only slightly in the fall and winter of 1952/53. This past fall's experience proves that the respite was only temporary and that the threat to fish stocks is greater than ever.

The movement of sea lamprey into shallower water in the fall is normal behavior for that predator, according to the Service's fishery research biologist who visited the Green Bay region September 14 to 18 to study the situation. "According to our best knowledge of the lamprey's life history," he explained, "the newly transformed parasitic-phase sea lamprey go at once to deep water when they leave the streams in late fall or early spring to take up their lake existence. They remain at the greater depths during the summer but move shoreward as fall approaches.

"During their stay in deep water the sea lamprey formerly attacked chubs, lake trout, and burbot. With the last two species practically extinct in Lake Michigan, the chubs doubtless are bearing the brunt of the lamprey's summer feeding. The fact that the larger chubs are of more suitable size as prey for the lamprey may be a factor in the increasing dominance of small fish in the chub-net catches.

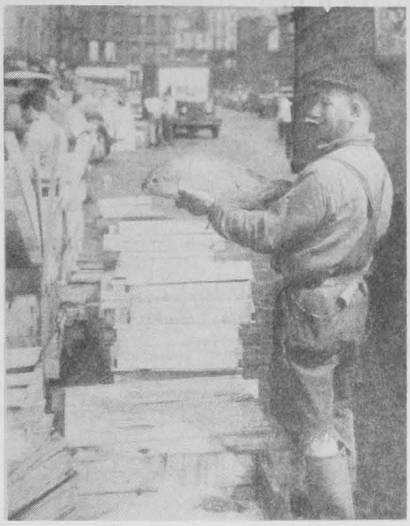
"It is after the onshore movement of lampreys toward shallow water," the biologist continued, "that such species as whitefish, lake herring, walleyes, suckers, and perch suffer greatest damage. Lamprey attacks are especially harmful at this season because of the relatively large size of the parasite. Feeding can be expected to continue actively during the fall, but to decrease gradually during the winter, and come completely to an end some time before the lamprey enter the streams to spawn in the spring.

"The million-dollar question for the fishing industry of Green Bay," he concluded, "is whether enough fish have survived this fall's destruction to support future fishing operations at a good level of production. Time alone can give the answer."

Wholesale Prices, November 1953

In spite of lighter landings, a considerable drop in demand caused wholesale prices for edible fishery products to drop from October to November. However, prices in November 1953 were higher than for the same month in 1952. The over-all edible fish and shellfish (fresh, frozen, and canned) wholesale index for November 1953 was 106.1 percent of the 1947-49 average (see table)--lower than October by 4.7 percent, but 6.7 percent higher than a year earlier.

The largest decline was in the drawn, dressed, or whole finfish subgroup--November 1953 prices were 13.3 percent under the previous month and 18.6 percent below November 1952. Catches were generally light and the demand light. Prices of all items in this subgroup were lower than in October, except lake trout prices at Chicago which remained unchanged. Large drawn offshore haddock prices at Boston in November dropped 22.0 percent below October and were 28.6 percent less than a year ago. West Coast salmon and halibut at New York City both sold below October prices. But salmon prices were higher than a year ago, while halibut prices were 33.0 percent lower.



NEW YORK'S PECK SLIP, THE WHOLESALE FRESH-WATER FISH MARKET.

Table 1 - Wholesale Average Prices and Revised Indexes for Edible Fish and Shellfish, November 1953 and Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices 1/ ($)		Indexes (1947-49 = 100)			
			Nov. 1953	Oct. 1953	Nov. 1953	Oct. 1953	Sept. 1953	Nov. 1952
ALL FISH AND SHELLFISH (Fresh, Frozen, and Canned)					106.1	111.3	104.9	113.2
Fresh and Frozen Fishery Products:					114.0	122.7	112.3	125.8
Drawn, Dressed, or Whole Finfish:					112.8	130.1	113.0	138.6
Haddock, large, offshore, drawn, fresh	Boston	lb.	.12	.16	126.4	162.0	114.9	177.0
Halibut, Western, 20/80 lbs., dressed, fresh or frozen	N.Y.C.	"	.30	.30	91.8	93.9	92.3	137.0
Salmon, king, lge. & med., dressed, fresh or frozen	"	"	.52	.55	115.7	123.9	114.2	109.7
Whitefish, mostly Lake Superior, drawn (dressed), fresh	Chicago	"	.35	.49	85.5	121.5	154.9	109.1
Whitefish, mostly Lake Erie pound or gill net, round, fresh	N.Y.C.	"	.50	.52	101.1	104.1	148.6	94.0
Lake trout, domestic, mostly No. 1, drawn (dressed), fresh	Chicago	"	.53	.53	107.6	107.6	97.3	120.9
Yellow pike, mostly Michigan (Lakes Michigan & Huron), round, fresh	N.Y.C.	"	.44	.45	102.0	105.5	140.7	96.1
Processed, Fresh (Fish and Shellfish):					119.3	118.5	116.2	113.8
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.38	.38	129.3	129.3	112.3	129.3
Shrimp, lge. (26-30 count), headless, fresh or frozen	N.Y.C.	"	.68	.67	107.9	106.4	105.4	96.4
Oysters, shucked, standards	Norfolk area	gal.	5.25	5.25	129.9	129.9	129.9	129.9
Processed, Frozen (Fish and Shellfish):					107.0	103.4	101.4	102.8
Fillets: Flounder (yellowtail), skinless, 10-lb. pkg.	Boston	lb.	.31	.31	108.7	108.7	108.7	119.2
Haddock, sml., skins on, 10-lb. cello-pack	"	"	.27	.27	100.4	98.6	93.0	93.9
Ocean perch, skins on, 10-lb. cello-pack	Gloucester	"	.22	.22	105.9	105.9	104.7	114.4
Shrimp, lge. (26-30 count), 5-lb. pkg.	Chicago	"	.71	.66	109.9	102.2	101.1	94.9
Canned Fishery Products:					94.5	94.5	94.0	94.7
Salmon, pink, No. 1 tall (16 oz.), 48 cans per case	Seattle	case	17.70	17.70	93.9	93.9	93.9	99.1
Tuna, light meat, solid pack, No. ½ tuna (7 oz.), 48 cans per case	Los Angeles	"	15.30	15.30	95.5	95.5	95.5	90.5
Sardines (pilchards), Calif., tomato pack, No. 1 oval (15 oz.), 48 cans per case	"	"	9.25	9.25	108.0	108.0	108.0	109.4
Sardines, Maine, keyless oil, No. ¼ drawn (3¼ oz.), 100 cans per case	N.Y.C.	"	8.20	8.20	87.3	87.3	81.9	76.6

1/ REPRESENT AVERAGE PRICES FOR ONE DAY (MONDAY OR TUESDAY) DURING THE WEEK IN WHICH THE 15TH OF THE MONTH OCCURS.

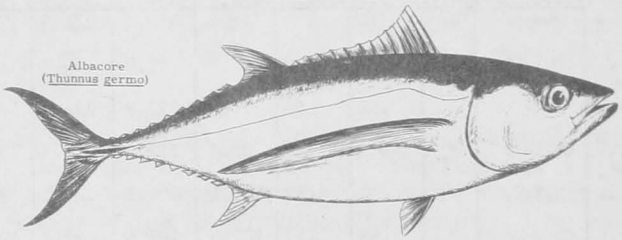
Prices of large shrimp at New York City in November increased 1.4 percent as compared with the previous month and was the only item in the fresh processed subgroup to register a change. Shrimp supplies were good and the demand was very good. Haddock fillets and shucked oysters were priced the same as in October. The same situation prevailed when comparisons are made with November 1952 prices--shrimp was up 11.9 percent and haddock fillets and oysters were priced the same.

The November frozen processed fish and shellfish index was up 3.5 percent as compared to October, due to higher shrimp and haddock fillet prices. Flounder fillet and ocean perch fillet prices remained the same as the previous month. Compared with a year ago, haddock fillets and shrimp were priced higher while flounder fillets and ocean perch fillets were priced lower.

There were no changes in the prices of the canned fishery product items from October to November. However, there were some changes from a year earlier, with Maine sardines 14.0 percent higher and canned tuna up 5.5 percent; pink salmon and California sardines were down slightly when compared with November 1952.

CALIFORNIA-TAGGED ALBACORE RECOVERED OFF JAPAN

The first authentic record of transpacific migration by an albacore (Thunnus germo) was obtained by the California Department of Fish and Game in July 1953 through the return of a tag from Japan. Japanese fishermen aboard the vessel Chesho Maru No. 5 of Mie Prefecture noticed the fish when it was caught on hook and line 550 miles south of Tokyo (latitude 31°30' N., longitude 149°40' E.) on June 23, 1953. The fish was one of 215 albacore tagged by the Department of Fish and Game during August 1952.



The fish was tagged on August 4, 1952, 18 miles south of Los Angeles, California (latitude 32°25' N., longitude 118°15' W.). It had moved 4,900 miles west and had been out 324 days since the time of tagging. A type "F" tag of blue vinylite tubing secured with nylon line had been used. The fish was 76 cm. (30 inches) long when tagged. No valid information as to size or general condition was obtained at the time of recapture.

There were two earlier recoveries from the same group of tagged albacore, both off Morro Bay, California. Both of these fish had traveled about 200 miles northwest from the same point of release as the individual recaptured off Japan and had been out 30 and 43 days, respectively.

--California Fish and Game, October 1953