U. S. DEPARTMENT OF COMMERCE
BUREAU OF FISHERIES

U. S. Bureau of Commercial Fisheries.

REPORT

OF THE

UNITED STATES COMMISSIONER OF FISHERIES

FOR THE FISCAL YEAR 1937

WITH

APPENDIXES

FRANK T. BELL
COMMISSIONER

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Report of the United States Commissioner of Fisheries

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NOTE

The first section of this volume, entitled "Bureau of Fisheries," constitutes what was known in years prior to 1933 as "Report of the Commissioner of Fisheries." Since then, in the interests of economy, it is a reprint from the "Annual Report of the Secretary of Commerce." The pagination, therefore, is the same as that of the Secretary's Report, rather than beginning with page 1.

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BUREAU OF FISHERIES

The calendar year 1936 was one of considerable activity among commercial fishery interests. Available data show increased production of many important varieties of fresh and processed fishery commodities, and as a rule prices for these commodities were maintained during the year or actual increases evidenced. In fact, economic conditions were such that considerable optimism prevailed among members of the industry.

Based on available statistics for 1935, there was a large increase in the catch of fishery products in the United States and Alaska as compared with that of 1933. Statistics of the catch were collected for both 1933 and 1935 in the important New England, Middle Atlantic, Chesapeake, and Pacific sections and in Alaska, and when considering the combined catch of these sections alone, an increase of 45 percent in the volume and 84 percent in the value of the catch is indicated over 1933. Only three sections were surveyed in both 1934 and 1935. These were the Chesapeake, Pacific States, and Alaska. The Pacific States showed increases in both the quantity and value of the catch in the more recent year, while decreases were reflected in the catches of the other two sections.

On the basis of the most recent surveys our fisheries gave employment to about 125,000 fishermen, whose catch amounted to 4,152,349,000 pounds, valued at $80,121,000. The output of canned fishery products in 1935 amounted to 672,756,000 pounds, valued at $74,999,000, representing a decrease of 4 percent in volume and 6 percent in value as compared with 1934; the output of fishery byproducts was valued at $29,520,000, representing an increase of 30 percent; and the production of frozen fishery products, excluding packaged fishery products, amounted to 93,566,000 pounds estimated to be valued at $8,600,000.

The production of fresh and frozen packaged fish and shellfish as based on the most recent surveys amounted to 191,273,000 pounds, valued at $25,379,000; and cured fish 120,516,000 pounds, valued at $15,691,000. It is estimated that about 675,000,000 pounds of fresh fishery products (excluding packaged fish and shellfish) valued at about $53,000,000 were marketed during 1935. Thus the total marketed value of all fishery products to domestic primary handlers in 1935 was about $210,000,000.

Imports of fishery products for consumption during the calendar year 1935 were valued at $36,232,000, which is 18 percent more than in 1934, while exports were valued at $14,374,000, or 4 percent more than in the previous year.

FISHERY ADVISORY COMMITTEE

The Fishery Advisory Committee was consolidated with the Business Advisory Council on January 18, 1937, in keeping with the policy of the Secretary of Commerce of having the various departmental

advisory committees associated with the Business Advisory Council. A number of new members have been appointed; and under a rotational arrangement Gardner Poole was elected chairman of the Committee succeeding E. B. McGovern.

During the year, the committee studied problems of national importance as well as those of local interest to the fishery industry. Among these are: legislation for the protection of game and migratory fish, scientific research, food standards, marketing, and distribution. A program of suggested topics for consideration by regional committees has been drafted for the subjects of reports at later meetings.

SOCKEYE SALMON TREATY

The Sockeye Salmon Fisheries Convention signed at Washington on May 26, 1930, was ratified by the Canadian Parliament in that year and on June 16, 1936, it was ratified with three reservations by the United States Senate. These reservations were accepted by the Canadian Government and ratifications have been exchanged. The treaty provides for the establishment of a commission of six members to be known as the International Pacific Salmon Fisheries Commission whose duty it will be to investigate the natural history of the sockeye salmon runs and to make recommendations to the two Governments as to the best measures for the regulation of the fisheries with a view to conservation and restoration.

The Convention originally provided for certain specific regulations to be prescribed and enforced by the Commission. This power, however, was withheld from the Commission by the reservations of the United States Senate, which provided that the Commission shall have no power to authorize any type of fishing gear in Convention waters which was prohibited by Washington or British Columbia; that no regulations of fishing should be promulgated or enforced until scientific investigations had been conducted for a period of 8 years; and that an advisory committee from each country, representing the various branches of the fishing industry, be established to work with the Commission.

The American members of the International Pacific Salmon Fisheries Commission have not yet been appointed by the President.

CONSTRUCTION ACTIVITIES

During the latter part of 1936 the Bureau began construction of a small byproducts laboratory building located on the grounds of the main laboratory building in Seattle, Wash. This building was completed early in the spring of 1937.

The development and improvement of buildings at fish cultural stations in progress, at the close of the previous fiscal year, were continued in a number of instances. This was almost entirely prosecuted by W. P. A. allotments. Activities at Uvalde, Tex., and Smokemont, N. C., were brought to completion and an enlargement of the San Angelo station was effected. Work continued at various points including the stations at Walhalla, S. C., Rochester, Ind., Natchitoches, La., and Lake Mills, Wis. In the Upper Mississippi Wild Life and Fish Refuge, an extensive acreage of bass ponds is being developed.

The Bureau has also been the beneficiary of C. C. C. labor at a number of stations, including that at Lamar, Pa., and York Pond, N. H.

In the western region, a number of minor improvements have been made at several locations. The construction of hatcheries at Norris Dam, Tenn., and Hoffman, N. C., under the auspices of the Tennessee Valley Authority and the Resettlement Administration, respectively, has been actively prosecuted and the former has been completed. Both of these new establishments are now being operated and maintained by the Bureau as far as fish cultural activities are concerned. At the close of the year, a special appropriation of $60,000 had become available providing for the relocation of the Little White Salmon, Wash., salmon hatching station. This action was necessary because of the fact that the pool created by the Bonneville Dam would flood out part of the existing station and limit fish cultural activities. At the close of the year work had just started on the relocation of this hatchery at a point on the Wind River in the National Forest area.

COOPERATION WITH OTHER FEDERAL AGENCIES

Integration of the work of the various Federal conservation agencies, insofar as the stocking of waters on Federal lands is concerned, has had a practical trial of several years' duration. It is working out very satisfactorily and the provision of fish for the National Forests, National Parks, and other federally controlled areas is on a much more sound and intelligent basis. The United States Forest Service has established several additional rearing ponds and nurseries both for bass and trout and the Bureau has supplied the fish and, where necessary, provided the services of experienced caretakers. The United States Forest Service has constructed a new hatchery and rearing unit in the Pisgah National Forest and this has been taken over for operation by the Bureau. The Bureau is also working in active cooperation with the Tennessee Valley Authority toward the construction by that agency of a new hatchery on the Elk River. It is expected that this hatchery will be operated and maintained by the Bureau on completion as has been done with a smaller unit located at Norris Dam. Effort is being made in cooperation with the Park Service to secure a tract of land suitable for the erection of a new hatchery for supplying Glacier National Park. While these comprise the outstanding instances of coordinated Federal conservation work, there have been numerous contacts with other agencies interested in the maintenance of fish life and in almost all instances practical beneficial results have been forthcoming.

During the past year the technologists of the Division of Fishery Industries engaged in a cooperative study with the Bureau of Chemistry and Soils and the Food and Drug Administration, United States Department of Agriculture, for the development of standards for halibut liver oil essential in the administration of the Federal Food and Drug Act and for other purposes. Some practical studies on the freezing of oysters also were carried on in the Seattle laboratory of the Bureau of Chemistry and Soils. The National Bureau of Standards cooperated with our technological staff in the development of net measuring devices for experimental use in the fisheries of the Great Lakes. In conjunction with the United States Department of Agri-

culture Extension Service, technologists in the Bureau's Washington laboratories gave courses in canning fishery products to State Extension Service workers. Members of the economic and technological staffs of the Division of Fishery Industries worked with the International Fisheries Commission, Seattle, Wash., on various problems of mutual interest. The Bureau of Foreign and Domestic Commerce cooperated in obtaining data on the extension of the cooperative movement among fishermen and information on the grading and standardization of fish in many foreign countries.

COOPERATION WITH STATES AND OTHER AGENCIES

In furtherance of the original plan, the fourth annual meeting of the National Planning Council of Commercial and Game Fish Commissioners was held in Chicago on April 28, 1937, at which Commissioner Frank T. Bell presided.

The council was organized in 1934 to coordinate the fishery conservation work of the State and Federal Governments, to achieve maximum fish protection at minimum cost, to apply efficiency methods in the distribution and planting of fish, and to exchange information of mutual interest and value to fish culturists. Among the chief benefits of this institution has been the elimination of overlapping in fish-distribution activities.

A fishery committee was appointed at the annual meeting of the National Association of Marketing Officials, held in October 1936, in Nashville, Tenn. The committee, which consists of prominent marketing officials in important fish-producing States, has been established to study the various aspects of the marketing of fishery products.

In the conduct of its statistical research work, some form of cooperation is given the Bureau in about every State where commercial fishing is prosecuted. This cooperation on statistical work probably has reached its greatest development in the Lake States, the Pacific Coast States, and in Maryland and Virginia.

In its technological work, the Bureau has carried on cooperative investigations with several colleges and universities and other State institutions. In these cooperative projects the scientific staffs and other facilities of these agencies were available to the Bureau's staff. Among the institutions cooperating in these investigations are: State Medical College, Charleston, S. C.; George Washington University, Washington, D. C.; Washington State College, Pullman, Wash.; University of Washington, Seattle, Wash.; University of Maryland, and the Maryland State Agricultural Experiment Station, College Park, Md., Western Maryland College, Westminster, Md., and the Massachusetts State Department of Agriculture, Boston, Mass.

Inasmuch as agreements or informal working arrangements are in effect with most of the States relative to the propagation and distribution of fish, there was but limited extension of cooperative relationships in this field. By agreement with the State of Ohio, fish cultural work at Put in Bay was consolidated with the State utilizing the Bureau's properties by accepting the responsibility for the actual propagation work. In Maine and Massachusetts, the State authorities cooperated in the resumption of lobster propagation at the Bureau's Boothbay Harbor, Maine, and Gloucester, Mass., stations.

The Bureau laid out a program of rearing pond development in the Finger Lakes region and, with local county authorities as sponsors, a W. P. A. project was approved providing for construction of rearing ponds. The Bureau is now supervising this development and will cooperate in its operation on completion. A total of six carloads of fish were assigned to the States of South Dakota and North Dakota for the purpose of stocking new ponds and reservoirs in that area. The respective States defrayed the costs of transportation, and similar assignments on a smaller scale were made to several other States. There has also been an extension of the system of submitting Federal fish applications to State authorities for check and review prior to delivery of the fish.

ALASKA FISHERIES SERVICE

ADMINISTRATION OF FISHERY LAWS AND REGULATIONS

In the control of commercial fishing in Alaska to assure an escapement of brood fish sufficient to maintain an undiminished supply of the fishery resources, the conservation program that had been in effect since 1924 was continued. The Commissioner of Fisheries was in Alaska for a number of weeks for personal observation of both fishery and fur-seal operations.

Revised fishery regulations effective February 8, 1937, contained comparatively few changes from those of 1936, in view of the expectation of generally satisfactory runs upon the basis of known escapements. Some additional restriction was placed on salmon fishing in the Bristol Bay region, particularly in the Nushagak district, and the regulations were relaxed in certain areas, a few closed waters in southeast Alaska being opened to commercial fishing and the limitation on the take of razor clams in the Seward-Katalla region being changed to permit an increased pack.

Fourteen vessels of the Bureau and a number of launches and chartered boats were engaged in the patrol of the fishing grounds in 1936. There were 249 persons identified with fishery protective work, including wardens, stream watchmen, crews of vessels, weir operators, scientific investigators, and special workmen. Airplanes were used to advantage as a supplementary patrol, as well as for transporting officials to isolated districts and in the inspection of certain spawning areas.

Studies of the life history and migration routes of salmon and herring were continued, in connection with which tagging experiments were carried on in southeast Alaska. Eleven weirs for counting the escapement of spawning salmon were operated in typical streams as a means of determining the relation of the catch to the brood stock. The information thus derived from the weir counts and biological investigations is of value in determining adequate conservation measures.

In addition to the regulation of commercial operations to assure the perpetuation of the salmon runs at a high level, the improvement of conditions for natural propagation was given further attention. Through the removal of debris that hinders the passage of salmon upstream, larger spawning areas are made available; the destruction of predatory trout that feed upon salmon eggs and fry

likewise tends to increase the size of the future runs of salmon. The latter work was carried on, particularly in the vicinity of salmon-counting weirs in central Alaska, but the most important program of this kind was, as heretofore, in the Bristol Bay region, where a bounty was paid on predatory trout taken by bona fide residents. Funds for this purpose have been supplied for a number of years by the Territory and by the salmon packers of the district. At its 1937 session the Territorial Legislature appropriated $25,000 to continue the work of clearing salmon streams.

No collection of salmon eggs for artificial propagation was made in 1936, and the hatchery of the Pacific American Fisheries, Inc., at Hugh Smith Lake was abandoned after liberation of the fry hatched from eggs taken in the preceding year.

PRODUCTS OF THE FISHERIES

Although there was some curtailment of fishing operations in the herring and salmon industries by reason of price disagreements between packers and fishermen and in the crab fishery on account of a strike on the Copper River Railroad and the Cordova docks which caused a shortage of cans and other supplies during part of the season, the total amount of fishery products was the largest ever obtained from Alaska waters. This was primarily the result of the heavy runs of salmon in practically all districts. A contributing factor, also, was the unusually large size of pink salmon, especially in the Kodiak and Chignik areas.

Salmon products comprised approximately 81 percent in quantity and 92 percent in value of the total output of the Alaska fisheries in 1936. About 95 percent of the salmon products consisted of canned salmon, the pack amounting to 8,437,603 cases, or 405,004,944 pounds, valued at $44,751,633. Red salmon represented 30 percent and pinks 54 percent of the total pack of canned salmon, as against 16 percent and 63 percent, respectively, in 1935. As compared with the pack of the preceding year, the output of canned salmon in 1936 showed an increase of 64 percent in quantity and 74 percent in value. The number of canneries operated increased from 99 in 1935 to 117 in 1936, owing chiefly to the reopening of certain plants on Bristol Bay that had been closed in the previous year because of the stringent curtailment of fishing in order to rebuild the weak cycle of red salmon in that district.

Products of the herring fishery were somewhat less than in the previous year, although well above the general average. The chief decline was in the Scotch-cured product, owing to the fact that herring suitable for curing were less abundant in all districts except Kodiak Island. Low prices on herring oil and the difficulty of meeting higher prices demanded by the fishermen caused three saltery and reduction plants in southeast Alaska to close for the season. Halibut landings of the Alaska fleet showed a considerable gain over the preceding year and there were increases also in the output of a number of the minor fisheries, although whale, clam, and crab products declined somewhat.

The total output of Alaska fishery products in 1936 was 524,042,000 pounds valued at $50,455,000, as compared with an average of 375,265,211 pounds valued at $32,788,840 for the 5-year period from 1931

to 1935, inclusive. The value of the 1936 catch to the fishermen was approximately $13,891,000, or about $5,188,000 more than in the preceding year. There were 30,383 persons employed in the various branches of the industry, as against 22,620 in 1935.

ALASKA FUR-SEAL SERVICE

GENERAL ACTIVITIES

Sealing operations at the Pribilof Islands resulted in the take of 52,446 fur-seal skins in 1936, or 4,850 less than in the previous year. It was thought that the decline in the number of surplus 3-year-old male seals available on the hauling grounds was owing to unfavorable weather conditions, rather than to an interruption in the normal increase of the various elements of the herd.

The work at the islands was under the direction of a staff of 14 regular employees and a number of special assistants. One hundred and twenty natives of the Pribilofs and approximately 90 natives of the Aleutian Islands participated in sealing activities during the season. Twenty-seven employees of the Fouke Fur Co. were also at the islands to assist with the curing and packing of the skins.

Fur-seal carcasses were utilized at the byproducts plant on St. Paul Island and yielded 25,252 gallons of oil and 276,040 pounds of meal. Except for small amounts retained at the islands for fox feed, the products were shipped to Seattle, where the oil was sold through competitive bidding and the meal was delivered to the Division of Fish Culture for use as fish food at the Bureau's hatcheries throughout the country.

A building to house the new electric-power and cold-storage plant was erected on St. George Island and an addition was made to the garage, and there was considerable extension of improved roads to facilitate the transportation of sealskins from the hauling grounds to the curing stations.

The management of the blue fox herds at the islands continued to be one of the important seasonal activities. During most of the year these animals find an abundant supply of natural food along the beaches, but in the winter they are fed prepared rations and salted seal carcasses. At this time, too, their fur is prime, and they are trapped for their pelts and for marking for the breeding reserve.

Through the courtesy of the Navy Department the annual shipment of supplies was taken from Seattle to the Pribilof Islands on the U. S. S. *Vega* and the season's take of sealskins was brought out on the return trip.

Delivery of 7,867 fur-seal skins, or 15 percent of the take of such skins at the Pribilof Islands in 1936, was made to an agent of the Canadian Government at Seattle. The Japanese Government, entitled to a like number under the provisions of the fur-seal treaty, continued the practice of sharing in the proceeds of sale, rather than taking actual delivery of the skins. Two hundred and fourteen sealskins taken by the Japanese Government on Robben Island in 1936 were allotted to the United States as its share under the provisions of the treaty and were shipped to the Department's selling agents at St. Louis, Mo., for processing and sale.

SEAL HERD

The computed number of animals in the Pribilof Islands fur-seal herd on August 10, 1936, was 1,689,743, an increase of 138,830, or 8.95 percent over the number for the preceding year.

TAKE OF SEALSKINS

In the calendar year 1936 there were taken on the Pribilof Islands 52,446 fur-seal skins, of which 43,522 were from St. Paul Island and 8,924 from St. George Island. This was a decrease of 4,850 from the total take in 1935.

SALE OF SEALSKINS

Two public auction sales of fur-seal skins taken on the Pribilof Islands were held at St. Louis, Mo., in the fiscal year 1937, and several hundred skins were disposed of at private sales under special authorization of the Secretary of Commerce. In all, 42,793 Pribilof Islands sealskins were sold during the year for a gross sum of $1,274,185.06.

FOXES

The take of foxskins in the 1936–37 season consisted of 97 blue and 9 white skins on St. Paul Island, and 902 blue and 4 white skins on St. George Island, a total of 1,012. One hundred foxes on St. Paul Island and 113 on St. George Island were marked and released for breeding stock.

In the fiscal year 1937 there were sold at public auction 1,019 blue- and 15 white-fox skins that had been taken on the Pribilof Islands in the 1935–36 season. The blue pelts brought $27,502.50, and the white pelts $238, a total of $27,740.50.

FUR-SEAL SKINS TAKEN BY NATIVES

The privilege of taking fur seals at sea is granted to aborigines dwelling along the Pacific coast of North America, under provisions of the fur-seal treaty, although such sealing is restricted to primitive methods. In accordance therewith, Indians of the United States and Canada in 1936 took 1,927 fur-seal skins, which were authenticated by officials of the respective Governments. Of these skins, 11 were taken by Indians of southeast Alaska, 28 by Indians of Washington, and 1,888 by Indians of British Columbia.

FUR-SEAL PATROL

Five cutters and four patrol boats of the United States Coast Guard were detailed to the patrol for the protection of fur seals during their northward migration and while at the Pribilof Islands. Three vessels of the Bureau also participated in this work in 1936, two at Neah Bay and one in southeast Alaska.

PROTECTION OF SEA OTTERS, WALRUSES, AND SEA LIONS

The killing of walruses and sea lions in Alaska is permitted only under limited conditions, and the killing of sea otters is prohibited

at all times. Through the latter prohibition, which has been in effect since 1910, the sea otters have been saved from threatened extinction on the Alaska coast and are slowly becoming reestablished, although it will undoubtedly be many years before the numbers will increase sufficiently to permit an open season for the hunting of these animals. Meantime the protection of the herd from illegal killing requires increased vigilance, and plans are being made to expand the patrol in the Aleutian Islands region.

PROPAGATION AND DISTRIBUTION OF FOOD AND GAME FISHES

The yield of fish and eggs derived from the Federal hatcheries showed a slight recession in comparison with that of last year. The 1937 output comprised 7,919,100,000, in comparison with 8,120,000,000 recorded for the previous year. The 1937 output, however, surpasses all previous years with the exception of 1936. There was a noticeable recession in the number of larger fish produced. Fish listed as fingerlings to adults in size totaled 136,000,000, in comparison with the 157,000,000 of the previous year. An analysis of the production of individual species reveals that there was a drop in the output of Pacific salmon with the exception of the chum salmon and the steelhead. The only species of game trout produced in greater numbers was the brook trout. There was a material increase in the production of black bass, this being confined to the largemouth variety. Special attention was given to extending the propagation of shad with a consequent increase in the number distributed. A more satisfactory season was experienced with the commercial whitefish of the Great Lakes. In the marine-fish cultural work, much of which is confined to the fertilization and planting of eggs of commercial species, an increased number of haddock and pollock eggs and fry was handled by the Division's hatchery forces. The artificial propagation of lobsters was also resumed in the New England States with a hatch of 8¼ million fry. Much of the Bureau's fish cultural work is affected by weather conditions, and the fluctuations in the output of the different species are to be expected from year to year. It should be pointed out that the production of larger size game fish for distribution requires tremendous quantities of fish food, and steadily increasing costs for this item are partly responsible for inability to release all of the game fish as a "finished product" of large size.

PROPAGATION OF COMMERCIAL SPECIES

Marine species, Atlantic coast.—Largely because of low unit cost of production and the fact that the salvaging of eggs from the commercial fishing boats represents a byproduct recovery, greater attention has been given to the propagation of strictly marine species. The cod, haddock, pollock, and flounders handled at the New England hatcheries frequent inshore waters and are the basis of a more or less local fishery. Consequently, it is felt that the distribution of approximately 6½ billion of the eggs and fry of these species from the Boothbay Harbor, Maine, and Gloucester and Woods Hole, Mass., stations has real economic significance, although it makes no direct contribution to the great offshore fisheries. Recent developments in the artificial feeding of lobster fry have warranted a resumption of the

propagation of this shellfish, and such work was undertaken in Maine and Massachusetts in cooperation with the State authorities.

Pacific salmon.—Extremely satisfactory results were achieved in the salmon cultural work on the Columbia River. Less favorable conditions elsewhere on the Pacific coast resulted in a reduction in the output of the chinook salmon and the sockeye salmon, the most important species handled. Over 32,000,000 fingerlings of the two species were reared to larger size before release. Salmon cultural operations on the Columbia River will be greatly modified by the program of dam construction now approaching completion in that basin. The needs have been foreseen, and ample provision is being made to modify and enlarge operations so as to meet the new development.

Anadromous species, Atlantic coast.—Intense interest on the part of State authorities on the eastern seaboard in the perpetuation of the shad runs prompted more intensive effort to increase the hatchery output of this species. This was reflected in an augmented distribution of fry of 18½ million in comparison with the 12 million of the previous year. Less attention was given to the hatching of yellow perch, and in the case of Atlantic salmon the work was virtually discontinued. This was due to inability to secure any eggs from the Dominion of Canada on an exchange basis as had been the case previously.

Commercial species, interior waters.—There was a material increase in the production of whitefish fry, a total of 88,000,000 being derived principally from operations at the Cape Vincent, N. Y., station and at the Put in Bay, Ohio, establishment. The latter hatchery has been taken over by the State of Ohio, which agency has assumed responsibility for the actual fish cultural work. The Bureau, however, has assigned certain personnel to supervise and assist in the activities. The Duluth, Minn., station obtained limited quantities of lake trout and whitefish eggs. As usual, the center of pike perch propagation, conducted in the spring months, was the Put in Bay station, the output being approximately one-half the production of the previous year. A considerable number of carp fry were produced for replanting in the commercial fishing areas of the Mississippi River.

Game species.—The production and distribution of species which constitute the most prized trophies of the angler were closely comparable to the record of the previous year. Brook trout were distributed in larger numbers, and a production of 8,000,000 large and smallmouth bass constitutes a new record for these species. Over 5,300,000 of these were good-size fingerlings. While the percentage of fingerlings and larger fish was below that of the previous year, the records only cover the size of the fish as they left the Bureau's hatcheries. Millions of them were transferred to rearing pools and were subsequently released when they approached legal size. It is regretted that there are still several sections, including the far southwest and central and southern Florida, which are not accessible from any of the existing Federal hatcheries. Only by the construction of new hatcheries in the areas to be served can this condition be overcome.

RESCUE OPERATIONS

In spite of the fact that the salvage work was somewhat restricted by the development of the 9-foot channel in the Upper Mississippi River, the number of fish rescued in that area was slightly above last year's figures; 50,500,000 were salvaged from the overflowed sloughs, of which over 50,000,000 were returned directly to the main river channels. The provision of artificial cultural ponds in the areas adjacent to the pools created by the new dams is an expedient of proved success. An excellent hatch of bass and other species has been achieved in the ponds already constructed, and at the close of the fiscal year some 400,000 bass fry were being stocked in the storage reservoirs. In the future, the removal of fish by means of rescue operations will be discontinued, and the current supply of game fish in the Mississippi River will be augmented by the output of these large ponds.

FISHERY INDUSTRIES

ECONOMIC AND MARKETING INVESTIGATIONS

Fishery trade in San Francisco Bay area.—A survey made during the year showed that the annual per-capita consumption of fish and shellfish in the San Francisco Bay area is about 25 pounds, or nearly twice that of the entire United States. About 90 percent of the fish handled in the area originates along the California coast. The survey provided much useful data concerning supply, marketing channels, nature of market, and trade practices and problems.

Marketing shad on the Atlantic coast.—In addition to large and consistent decreases in the total supplies of shad on the Atlantic coast, there has been an apparent decline in the popularity of this species. As a result of a study of the markets for shad, it was found that decreased sales for shad have occurred in retail stores rather than through public eating houses. In order to stimulate demand the publication resulting from the survey recommends, among other things, that boned shad as well as half shad or other smaller portions be featured in the various sales channels.

Frozen fish.—Owing to the mild winter of 1936-37, fishing operations were conducted almost continuously throughout the winter. This condition, coupled with retarded sales due to floods in the Middle West, resulted in unusually large holdings of fish in cold storage, which had a depressing effect on markets for fish in general. Consequently, appropriate legislation was introduced in Congress and enacted into law to authorize the Federal Surplus Commodities Corporation to purchase surplus fish up to $1,000,000 in value. This program had a stimulating effect in permitting fishing to be resumed on a more normal basis and in creating a demand for fish in areas where this surplus fish was distributed.

Retail sale of fishery products.—A study was made during the year to determine the order of importance of the 6 species of fish or shellfish leading in retail sales of about 60 cities of this country. While the study was designed primarily to develop basic information on which to investigate the feasibility of inaugurating a service for the collection of retail prices of these commodities, it was most interesting in showing the geographical variation in preferences for the several

species. Usually the most important of the six species predominating in the retail sales of cities close to important producing waters are the species taken in abundance in these waters; but in cities located farther inland the number of sources of these commodities increases. However, such species as haddock, halibut, salmon, shrimp, and oysters appeared among the six species leading in retail sales in many inland cities as well as in those close to their natural habitats.

North Pacific halibut fishery.—A study was undertaken during the year of the marketing of halibut. While the annual limit of halibut taken from the North Pacific during the past few years has been set by the International Fisheries Commission of the United States and Canada at around 46,000,000 pounds, it is anticipated that as the reserve brood stock is replenished, a higher limit of the annual take may be set. If this is done the current marketing problems may be augmented by new ones. Consequently the survey is undertaking a broad field of inquiry, to include distribution, competition, vessel operation, transportation, warehousing, merchandising practices, consumer attitude, and a chronology of the fishery from its inception in the North Pacific.

Cooperative marketing.—In connection with the administration of Public No. 464, authorizing associations of producers of aquatic products, studies have been made pertaining to fishery cooperatives and the financing of fishermen. Also, information has been supplied to interested parties as to the organization and operation of fishery cooperatives. There are more than 100 associations of various types, 54 of which are classed as either commercial or semicommercial. The associations engaged in selling fish and buying supplies for their members had a volume of business in 1935 of more than 9 million dollars and had investments in association property in excess of $5,200,000. The 54 associations had members and crews exceeding 12,500 fishermen. These members had investments in boats and vessels of over $20,700,000. Investment in fishing gear for these members amounted to more than $3,600,000 in 1935, not considering replacement which ranges from 30 percent to 300 percent annually. The studies revealed that the conduct of fishing enterprises generally is without an adequate financial foundation. Independent fishermen for the most part rely upon buyers, dealers, and others in the trade for financing fishing operations. Fishery cooperatives generally have inadequate equipment and facilities and are in need of more appropriate financing.

STATISTICAL INVESTIGATIONS

FISHERIES OF THE UNITED STATES, CALENDAR YEAR 1935

New England States.—During 1935 the commercial fisheries of Maine, New Hampshire, Massachusetts, Rhode Island, and Connecticut employed 18,449 fishermen. Their catch amounted to 655,430,000 pounds, valued at $17,894,000—an increase of 31 percent in volume and 33 percent in value as compared with 1933. Landings of fish by American fishing vessels at Boston and Gloucester, Mass., and Portland, Maine, amounted to 373,118,000 pounds, as landed, valued at $9,005,000—an increase of 24 percent in volume, and 14 percent in value as compared with 1934.

Middle Atlantic States.—The commercial fisheries of New York, New Jersey, Pennsylvania, and Delaware in 1935 gave employment to 9,620 fishermen. Their catch amounted to 279,438,000 pounds, valued at $6,416,000—an increase of 65 percent in volume and 38 percent in value as compared with 1933. Landings of fish at New York City during 1935 amounted to 39,615,000 pounds. The shad fishery of the Hudson River was conducted by 498 fishermen, who caught 847,000 pounds of shad, valued at $71,000. The value of the shad increased 96 percent as compared with 1934.

Chesapeake Bay States.—In 1935 the commercial fisheries of Maryland and Virginia employed 19,116 fishermen. Their catch amounted to 265,827,000 pounds, valued at $5,525,000—a decrease of 8 percent in volume and 7 percent in value as compared with the previous year. The shad and alewife fisheries of the Potomac River were prosecuted by 650 fishermen, who caught 631,000 pounds of shad, valued at $56,000, and 4,457,000 pounds of alewives, valued at $27,000.

South Atlantic and Gulf States.—No survey was made of the fisheries of this area for the year 1935.

Pacific Coast States.—The commercial fisheries of Washington, Oregon, and California in 1935 employed 20,583 fishermen. Their catch amounted to 1,676,236,000 pounds, valued at $23,089,000—an increase of 8 percent in volume and 16 percent in value as compared with 1934. The total catch of halibut by United States and Canadian vessels amounted to 45,772,000 pounds, valued at $3,252,000—a decrease of 1 percent in volume, but an increase of 10 percent in value as compared with the preceding year.

Lake States.—No survey was made of the Lake fisheries (Lakes Ontario, Erie, Huron, Michigan, and Superior, and Namakan and Rainy Lakes, and Lake of the Woods), for 1935.

Mississippi River and tributaries.—No complete survey of the commercial fisheries of the Mississippi River and tributaries was made for 1935. The catch of Lakes Pepin and Keokuk and the Mississippi River between these two Lakes in 1935 amounted to 6,695,000 pounds, valued at $282,000—an increase of 19 percent in volume and 36 percent in value, as compared with the yield of the same waters in 1934.

MANUFACTURED PRODUCTS OF THE UNITED STATES AND ALASKA, CALENDAR YEAR 1935

Fresh and frozen packaged fishery products.—Based on the most recent available data, the domestic production of fresh and frozen packaged fishery products amounted to 191,273,000 pounds, valued at $25,379,000. Important commodities in this group were fresh-shucked oysters, 7,338,000 gallons, valued at $9,391,000; packaged haddock, 46,488,000 pounds, valued at $4,427,000; and fresh-cooked crab meat, 6,370,000 pounds, valued at $2,195,000.

Frozen products.—The production of frozen fishery products in 1935 amounted to 149,643,000 pounds, estimated to be valued at $15,000,000. The volume of the production was 12 percent greater than in 1934. The most important products frozen were groundfish, salmon, whiting, halibut, and mackerel.

Cured products.—Based on the most recent data available, the production of cured fishery products amounted to 120,516,000 pounds,

valued at $15,691,000. Important products in this group were smoked salmon, 8,822,000 pounds, valued at $2,674,000; mild-cured salmon, 10,571,000 pounds, valued at $2,148,000; and boneless cod, 8,678,000 pounds, valued at $1,535,000.

Canned fishery products.—Canned fishery products produced in 1935 amounted to 672,756,000 pounds, valued at $74,999,000—a decrease of 4 percent in volume and 6 percent in value as compared with 1934. Canned salmon alone amounted to 289,339,000 pounds, valued at $32,475,000. Other important canned products were tuna and tuna-like fishes, sardines, mackerel, shrimp, clam products, and oysters.

Byproducts.—During 1935 the value of the production of fishery byproducts amounted to $29,520,000—an increase of 30 percent as compared with the preceding year. Important products in this group were marine-animal oils and meals, and aquatic-shell products.

TECHNOLOGICAL INVESTIGATIONS

Preservation of fishery products for food.—During 1936, major projects in this field covered a continuation of the development of electrometric tests for the freshness of fish, studies of rancidity in fish, variation in the fat content of halibut, identification of canned salmon, development of methods for canning various fishery products, and studies of the low temperature preservation of Pacific oysters. The problem of preventing or retarding the development of rancidity of the oil or fat in fish has always been a serious one and one which is very difficult of practical solution. However, during the past year, the Bureau's technologists continued a study of the possible application of various harmless antioxidants for preventing or retarding this rancidity and among those antioxidants or inhibitors of oxidation tested were the cereal flours, such as oats, rice, etc. Studies of the chemical and physical characteristics of various salmon oils prepared from cannery trimmings indicate that the variation in the characteristics of these oils may provide a method for checking the identity of the species of salmon after it is canned. Experiments in the development of methods for canning various fishery products, both in the home and for application on a commercial scale, have aroused considerable interest. In fact, in some instances, widespread use is being made of methods already published by the Bureau.

Bacteriological studies.—The Bureau's bacteriological studies have been closely correlated with other investigations of the technological staff, as many of these problems require a knowledge of the action of bacteria. These bacteriological investigations have included examinations of the experimental packs of canned fishery products to determine which processes produce sterility; bacterial counts on samples used in experiments on freezing oysters; studies of the role of bacteria in the different types of decomposition or spoilage described in preceding paragraphs, with special reference to the studies on mackerel; determinations of the effectiveness of formaldehyde and other chemical preservatives in preventing or retarding the development of bacterial spoilage in fishery byproducts; and other miscellaneous bacterial control problems.

Pharmacological studies.—The pharmacology of fishery products is a comparatively new investigational field, and interest in it has been greatly stimulated by discussions in scientific journals and in the press

concerning the role or effect of mineral constituents as they naturally occur in fishery products, as compared with these same minerals in inorganic form, on metabolism in both human and animal nutrition. Such studies on arsenic and copper, which included tests not only on experimental animals, such as albino rats, but also included clinical tests with humans, have been published by the Bureau. These tests showed that arsenic, which occurs in shrimp in a stable, undissociated, organic state, is readily soluble in water and is rapidly eliminated by the kidneys.

Preservation of fishery byproducts.—In this field the Bureau's technologists studied the utilization of salmon cannery waste, the extraction of oil from halibut livers and fish livers of similar type, methods for preventing or retarding the development of rancidity in fish and fish-liver oils, the place of oily fish meals in animal feeding, studies of methods for determining the fat content of fish meal, and the development of methods for the chemical preservation of fish waste. Developments in the preservation of fishery byproducts have yielded results of great economic value both to the fishery industries and to the agricultural industries, as fish oils and fish meals, kelp meal, oyster and clam shell products, etc., are becoming of increasing economic value to the farmer in providing to him for the livestock ration feed concentrates of unexcelled nutritive properties.

Nutritive value of aquatic products.—This is also a most important phase of technological investigations, since the ultimate nutritional value of finished aquatic products, ready for consumption, is the only true yardstick for evaluating improvements and advancements in the utilization of fishery products and byproducts for human and animal nutrition. Among the major projects in nutrition occupying the technological staff during the past year were studies of the vitamin potency of fish-liver oils, the further development of menhaden fish oil for poultry feeding, studies of the vitamin content of fresh fish flesh, the value of menhaden fish meal as an ingredient of the dairy ration, summary or compilation of literature on the nutritive value of shellfish, studies of the chemical composition and nutritive value of fish proteins, and of mineral constituents in fishery products and byproducts.

Fish cookery.—In the fish-cookery laboratory there have been continued the development and testing of recipes for the preparation of various fishery products. During most of 1936, however, the Bureau's fish cookery expert carried on educational work and practical demonstrations in the preparation and cooking of fish and shellfish at schools, women's clubs, and various other gatherings. As a result of this work considerable interest has been stimulated among the public in fish cookery and in the food value of fishery products.

BIOLOGICAL FISHERY INVESTIGATIONS

The program of biological investigations pursued by the Bureau of Fisheries during the fiscal year 1937 followed three major lines of endeavor: (1) population studies of commercial and game fishes to measure the effect of fisheries of known intensities, to determine the effectiveness of various conservation measures, and to devise methods of managing or controlling the fisheries so as to maintain a self-sustaining level of population abundance; (2) management of in-

terior waters for the purpose of developing scientifically sound methods of hatchery procedure, of formulating stocking policies compatible with the productive capacities of the waters stocked, and of improving environmental conditions in streams by investigating methods of eliminating pollution hazards; and (3) development of more effective methods of shellfish culture through control of natural enemies and improvement of the market quality of oysters.

INVESTIGATIONS OF COMMERCIAL FISHES

North and Middle Atlantic fishery investigations.—With the continued rise in fish prices and the increasing activity in the fishing business, New England fishery landings were the largest in their recent history. It should nevertheless be noted that the yield of several staple species, such as mackerel, haddock, and cod, declined. The larger total production was the result of increases in the landings of rosefish (a species hitherto little exploited) from 17 million to 66.6 million pounds for the calendar year 1936, and in vessel-caught whiting from less than 2 million to nearly 18 million pounds.

Observations on the condition of the haddock fishery have been continued to the full extent that limitations of personnel and equipment permit. A continued improvement from the low level of 1930–31 was noted in the fishery on Georges Bank, which remains, however, far below the 1925–29 level. On the Nova Scotian banks the average productivity was less than during the preceding year, owing to the scarcity of haddock spawned since 1929. As a result of the long-period program of study inaugurated in 1930 it has been learned that the haddock populations on the New England and Nova Scotian banks are subject to wide fluctuations in abundance not only from year to year but to an even greater extent over periods of years. The direct cause of such fluctuations is the varying survival of the young. The combination of an intensive fishery and a succession of poor spawning years may reduce the population to disastrously low levels, as happened between 1927 and 1931. It is further evident that the haddock populations of the various Nova Scotian banks differ markedly from each other and from that of Georges in their variations in abundance; each therefore requiring individual observation if effective measures for the management of the fishery are to be prescribed. Direct observations over widely scattered areas of the fishing grounds to assess the abundance and distribution of young haddock below commercial size are highly desirable, but are not practicable with present facilities. Up to the present time the fluctuations and trends in the haddock fishery have been considered mainly in qualitative terms.

As a result of findings and recommendations of the Bureau, the majority of the New England operators of large and medium otter trawlers voted to begin the use of larger meshed otter trawls early in 1937 and to continue such use for a trial period of 6 months. Such savings gear is considered the most effective and practical measure to decrease the destruction and capture of undersize haddock.

Continuation during the year of research on the natural history and fluctuations in abundance of mackerel provided more definite information on the seasonal movements of these fish; the location of important spawning grounds; the rate of growth during larval, juvenile, and adult existence; fluctuations in survival rate of the young;

and the attendant effects on the commercial stock available to the fishery. Information has also been obtained on the migratory, spawning, feeding, and schooling habits of the mackerel, and progress has been made toward discovering the relationship between the northern and southern subdivisions of the stock which have been found to have an important bearing on availability to the fishermen.

During the 1936 season the abundance of mackerel remained at a fairly high level, although the total catch, 40,173,400 pounds, represented a decrease of 24 percent as compared with the previous year. During the first half of the 1937 season the decline has been even more marked, and appears to be too severe to be ascribed to variations in year-class survival. Without hydrographic work from a research vessel, however, the abundance of yearling mackerel, often a determining factor in the success or failure of a fishing season, must remain an element of uncertainty in the predictions made each year by the Bureau.

Because of the migratory habits of the shore fishes of the Middle Atlantic region, the division of jurisdiction among many States, and the interstate traffic in the products of the fishery, the problems of this area are far beyond the scope of the conservation organizations of the several States. In recognition of this fact, leaders of the fishing industry and of angler organizations have united during the year in urging that the Bureau of Fisheries undertake scientific and economic studies necessary for formulation of a conservation policy to arrest the evident depletion of several important species.

From data collected between 1927 and 1935, a comprehensive study of the problems of squeteague or weakfish conservation has been completed. Observations have been continued on the new and important winter trawl fishery off the Virginia Capes. During the 1937 season, an observer spent considerable time at sea aboard fishing boats collecting detailed information on fishing activities and composition of catch as to kind, quantity, and sizes of fish; and gathering data on various types of trawls with particular attention to the need for and practicability of modifications in size of mesh to insure release of undersized and unsalable fishes, especially scoup and sea bass.

In response to general complaint of depletion of the winter flounder, the Bureau is beginning investigations of the life history and conservation needs of this species. During the spring of 1937, a tagging experiment was undertaken to obtain information on the seasonal migrations of flounders and to gain some measure of the intensity of the fishery.

Shrimp investigations on the South Atlantic and Gulf coasts.—Total catch statistics collected for the important shrimp fishery of the South Atlantic and Gulf coasts reveal the fact that the yield is not increasing in proportion to the increase in fishing effort. This fact, considered in relation to the scarcity of spring shrimp that has prevailed during the past three seasons, indicates a heavy drain on the fishery.

The tagging program, designed to secure data on migrations, growth rate, and fishing intensity, has been continued on both the South Atlantic and Gulf coasts. Returns from tagging, together with length-frequency data that have been collected, indicate that on the South Atlantic coast the shrimp move from the area of southern South Carolina, Georgia, and northern Florida to the central Florida

coast in winter, some traveling upward of 300 miles; while on the Gulf coast the winter movement is offshore, with a probable return to shallow water in the spring. Growth studies of the shrimp have been continued, and data have been collected for a report on the shrimp and shrimp fisheries of Texas.

During the year extensive collections of eggs and larvae of important commercial species have been studied, and a manuscript is being prepared which will set forth the characters by which these immature forms may be identified. The *Pelican*, a 73-foot Diesel ship, was transferred during the year to the shrimp investigation and will be used next season in offshore work. Aided by the life history studies now completed, it will be possible to determine the distribution of larvae and young and possibly to discover basic causes for the fluctuations in abundance that disturb the fishery. With the *Pelican*, an attempt will also be made to discover whether the larger shrimp congregate in deep offshore waters after they leave the shallower areas in the fall and winter. If they are found to do so, an important new fishery may be opened up.

Pacific coast and Alaska fishery investigations.—Investigations on the Pacific coast and in Alaska are concerned mainly with the maintenance and rehabilitation of the salmon and herring fisheries of Alaska and the salmon fisheries of Puget Sound and the Columbia River. All of the major investigations in progress during the fiscal year 1936 were continued in 1937.

In the Columbia River area the collection and analysis of catch records has been continued to determine the condition and trend of the commercial fishery, to demonstrate the extent of depletion of the supply if it prevails, and to establish a basis for proper regulation of the fishery. Excellent progress has been made on the stream-survey program, out of which is emerging a clear picture of the extent of available spawning areas, the location of barriers which may be removed or modified to permit the passage of fish, and the number of unscreened irrigation outlets that menace downstream migrants. A manuscript tracing the history and development of the fisheries of the Columbia and the parallel development of other natural resources which directly or indirectly influence the fisheries has been prepared for publication. Studies of the migrations and the size and seasonal occurrence of the runs of salmon have been aided by tagging experiments performed during the year and by counts of migrating salmon passing through the three fish ladders at the Rock Island Dam and through weirs in the Okanogan and Wenatchee Rivers.

In Puget Sound special attention has been given to determining the causes and extent of the decline in abundance of the sockeye salmon. These statistical and biological studies provide essential data for the scientific management of this seriously depleted fishery. The coho salmon of Puget Sound has been the object of special studies on rebuilding depleted populations through artificial propagation and transplanting of fingerlings. Marking experiments have been undertaken to determine the success of liberating hatchery-produced fingerlings of different sizes and of transplanting fish to "foreign" stream systems.

In Alaska the long-term studies of the red salmon runs of the Karluk River have been continued. One of the more important findings of the year was the accumulation of evidence indicating a positive correlation

between the growth of seaward migrants during their stay in Karluk Lake and the returns from the escapements. Such a correlation, if established beyond question, will throw light on observed fluctuations in abundance and will prove useful in predicting the relative size of the runs to be expected in any season. Chemical analyses of lake and stream waters to determine factors influencing the growth and survival of fingerlings have been continued. Returns from marking experiments of previous years were consistently large, indicating that Karluk fingerlings, most of which migrate seaward during the spring of their third or fourth year, have a higher survival value in the sea than those which migrate at an earlier age.

Similar studies are being made of pink salmon, the most valuable species in southeastern Alaska. Studies of the migratory routes of pink salmon in Clarence Strait may be expected to aid the fishery in the establishment of boundaries for future protective measures to allow adequate escapement. Cooperative work with the National Canners Association of Seattle on the physical and chemical changes that take place within pink salmon during their period of spawning migration was continued. The native and exotic distribution of the Pacific salmons has been investigated during the past year and a report has been prepared for publication.

The collection of statistics of the Alaska salmon fisheries was continued. These data provide a permanent source of information of the daily catch records of the various forms of gear from each of the geographical divisions of the Territory, and are indispensable to the important regulation of the fishery.

The investigation of Alaska herring, which has been prosecuted since 1925, has established the fact that these fish are not a homogeneous population, but are composed of separate races, each of which inhabits a restricted area. During the past year the tagging program has been extended to include areas for which data had not previously been available, and has demonstrated that certain races support the fisheries of two separate areas during different parts of the season, and are therefore especially susceptible to overfishing. Studies have also been carried on to evaluate the effect of dominant "year classes" in producing the fluctuations in abundance which have been observed to occur.

Great Lakes fisheries investigations.—The program of investigations on the Great Lakes has continued during the fiscal year 1937 to emphasize the practical phases of scientific research, that is, the conservation of the fisheries. This has been made an urgent necessity by the fact that the more important species, such as the whitefish, yellow perch, and the several species of chubs are definitely on their way to commercial extinction, a fate that has already overtaken the Lake Erie cisco. Although no field work was conducted during the fiscal year 1937, the staff made excellent progress in the compilation of data collected during earlier investigations. Active cooperation with the fishery authorities of the various States fronting on the Great Lakes included the furnishing of a large amount of data to be used as a basis for uniform fisheries legislation. The detailed analysis of commercial fishery statistics of the Great Lakes waters under the jurisdiction of the State of Michigan was continued. One of the important findings resulting from the application of statistical methods was the demonstration that fluctuations in the abundance and production of yellow

pike perch in Saginaw Bay over the period 1929–35 showed no correlation with the plantings of fry in earlier years. Methods for the simplification of statistical procedure have been evolved. Racial and life history studies of several important commercial species were continued during the year.

POLLUTION INVESTIGATIONS

Investigations concerning the toxicity of industrial effluents on aquatic life have been continued in 22 States, so that to date some 60 major groups of effluents representing over 200 kinds of industrial wastes have been studied, assayed, and the biological effects of their components standardized. For many of these substances detoxifying procedures have been devised and tested. From these data on effluents and soil constituents the manuscript for the second part of the series of pollution studies, "Trade wastes, chemical effluents, and natural pollutants," has been prepared for publication. Part I of this series of studies, "Detection and measurement of stream pollution," was published during the year.

One of the striking findings in the investigations of natural pollutants has been the demonstration of the high toxicity of minute quantities of selenium to fish. This work is particularly significant in view of recent surveys which show this element to be a widespread menace in several Western States. Besides selenium, several other substances that occur in small quantities in some natural waters and soils, as boron, fluorin, titanium, and others, have been found to present previously unrecognized hazards to fish and other aquatic life.

The investigations on fish physiology as related to water conditions have been greatly extended during the past year with the perfection of new apparatus for studying fish respiration, heart action, and internal metabolic activities.

At Fort Worth, Tex., the long-time experiments on mussels in confined areas have been continued with satisfactory returns. These tests have confirmed the previous findings that the river mucket is the most promising species studied thus far for commercial propagation, and have given additional information on the survival of fresh water mussels under adverse conditions.

AQUICULTURAL INVESTIGATIONS

Trout investigations during the year consisted of field studies in streams of the George Washington National Forest and in various other waters; and of hatchery investigations at Leetown, W. Va., and Pittsford, Vt. The use of "test waters" in Vermont to obtain much-needed information on the productive capacity of streams under intensive fishing and the best methods of maintaining maximum production was increased to the full extent allowed under the State law, a maximum of four test waters. Arrangements were completed with the United States Forest Service for the operation of four experimental streams in the White Mountain National Forest for the purpose of obtaining information on the relative value of different sizes for stocking, and for the utilization of the streams

of the Pisgah Division of the Pisgah National Forest, N. C., as an experimental project to demonstrate the value of scientific stream management in improving angling conditions.

Laboratory studies on trout culture included: (1) Feeding experiments at the Leetown hatchery to determine efficiency of certain low-cost diets; (2) breeding experiments at the Pittsford hatchery in which it appears that a strain of trout more resistant to disease is being developed; and (3) experiments to determine the cause of the heavy losses of brook trout eggs suffered at the Leetown hatchery.

The California trout investigations have proceded along two major lines of effort: Experiments at the Hot Creek Station to develop a superior brood stock, and coastal stream studies of the steelhead trout. Detailed plans have been drawn up for the development of a major stream and lake management project on the Convict Creek drainage in eastern California. Investigations dealing with the life histories and migrations of the steelhead and salmon of the coastal streams have been continued in the Klamath River and in Scott and Wadell Creeks.

Investigations in pond culture for bass and other warm-water fishes were conducted at Marion, Ala., during the year. The results confirmed those of previous years, showing that production of food organisms is greater in ponds containing vegetation than in those without an appreciable growth of higher plants. Comparative studies of the suitability of two streams, one in West Virginia and the other in Virginia, for the production of bass, showed marked differences in the rate of growth of both bass and forage fish.

Facilities for the study of fish diseases were markedly improved during the year by space provided in the new hatchery at Quilcene, Wash., where various methods for the prevention and cure of diseases will be tried under experimentally controlled conditions. As in previous years, epidemics reported from hatcheries were investigated and hatcherymen were advised on disease problems. The disease service has proved very popular and a large number of specimens submitted by various State and Bureau hatcheries and by private individuals were examined at both the Washington, D. C., and Seattle laboratories.

SHELLFISH INVESTIGATIONS

Shellfish investigations during the fiscal year 1937 comprised studies of the metabolism and fattening of the oyster; determination of the factors involved in sex changes in oysters and clams; investigations in the biology and control of various natural enemies of the oyster; and observations on the effect of pulp mill pollution on shellfish.

The production of oysters of high nutritive value is at present the principal problem of oyster culture in the Northern States. Good oysters are characterized by the storage of a large amount of glycogen in their tissues and by the presence of lesser quantities of metals important in human nutrition, especially iron and copper. Observations on the seasonal fluctuations in the chemical composition of oysters kept under known natural conditions have now been completed and form an important contribution to studies upon

which oyster growers may eventually be able to produce a standard product of known chemical composition. Experimental methods for increasing the iron content of the northern oyster have been tested. As a practical aid to oyster growers of Long Island Sound, where the amount of set to be expected in any given year is very uncertain, studies of spawning and setting have been undertaken and will make possible the prediction of the date and intensity of setting.

Studies of the biology of the starfish have demonstrated that the distribution of this oyster pest is correlated with the presence of food; that the migrations of starfish are restricted, probably not exceeding a mile; that there is no seasonal migration; and that certain areas of the western part of Long Island Sound and of the Connecticut shore serve as dispersal centers from which spawn may be carried considerable distances to infest new grounds. Investigation of the damage done by oyster drills was continued on the Eastern Shore region of Virginia, and a manuscript on the life history and methods of control of the oyster drill was prepared for publication. Details of the life history of a sporozoan parasite of the oyster were demonstrated at Beaufort, and experiments on the control of the conch or borer were continued in Florida.

The investigation of the effects of pulp mill pollution in the York River consisted of extensive surveys of hydrographic conditions in the York and Piankatank Rivers; studies of the effects of transplanting oysters from the upper York, where shellfish are of markedly poor quality, to areas not affected by pulp mill pollution; laboratory analyses of oyster meats; and studies of the effect of the pulp mill pollutant on diatoms, which constitute oyster food, and on the physiological processes of the oyster. Evidence is accumulating to show that the pollutant interferes with normal respiratory and feeding activities. When transplanted to more favorable environments, oysters from the upper York show increased growth, fattening, and improvement in the condition of the shells.

During the year the following special investigations were carried out: A program for experimental and field studies of the effect of dredging operations on oysters, prepared for the War Department; an investigation of the destruction of shellfish on the Eastern Shore of Virginia by a September hurricane; a survey of oyster bottoms in Mobile Bay to assist State authorities in rehabilitating depleted beds; a survey of oyster-producing areas in Florida to determine where extension of natural bottom could be accomplished by planting and culture; and an investigation of the unusual abundance of starfish in Chesapeake Bay during the spring of 1937.

LAW ENFORCEMENT DIVISION

This Division has charge of the enforcement of the law regulating the interstate transportation of black bass and administers that part of The Whaling Treaty Act of May 1, 1936, charged to the Department, which includes the issuance of licenses to shore whaling stations, floating reduction ships, and catcher boats. The Division also conducts an anglers' section, where information pertaining to angling is compiled and made available to the public.

The Federal black bass law was administered, as in previous years, by 2 regular field employees, 2 temporary assistants, and 1 permanent employee in the Washington office, assisted by 125 deputy black

bass law inspectors who are regularly employed State officials serving the Federal Government without pay under the direction of the Chief of the Division.

Over 100 investigations were made of reports of violations. No cases were reported for prosecution in Federal court, as this drastic procedure was not found necessary to obtain compliance with the law. Two seizures were made, and a number of cases were successfully prosecuted in State courts.

Progress was made in obtaining improvements in State black bass laws, the most important of which was the adoption of a closed season in Florida. Considerable work was done in Tennessee, South Carolina, Maryland, and Kentucky in connection with giving black bass better legal protection. Daily and size limits were improved in many States, and 3 States adopted resident anglers' licenses for the first time. Three States adopted part-time nonresident anglers' licenses. Over 40 State legislatures were in session, and more changes than usual were made in the sport fishing laws, both by statute and regulation, than in any previous year. Five States made very definite changes in their regulatory bodies administering fish and game work.

A Fishery Circular containing the text of the black bass law and a synopsis of the laws of the United States and Canada was revised and published. Also several of the series of leaflets on various angling subjects were revised and issued. Articles, press releases, and radio talks were prepared; fish codes corrected for national magazines; addresses were prepared and delivered to various fish and game organizations on black bass protection.

The Division has prepared under the terms of the act of Congress for the protection of whales a total of 36 licenses: 3 of these were for floating factory ships, 2 for shore stations, 1 for a combination observation and killer boat, and the others for catcher boats operated by ships or shore stations. The total revenue received from the issuance of these licenses was $10,250, which was turned into the United States Treasury. The Division has cooperated with officials of the Treasury Department, State Department, and others in administering The Whaling Treaty Act.

The act of Congress providing for the issuance of permits to take certain small fish for bait in the District of Columbia is also administered in the Division, and over 30 permits were issued during the year.

AQUARIUM

The aquarium, located in the Department building, has maintained its status as a focal point of interest to visitors, school classes, and students of biology. However, increasing chlorination of the city water supply which feeds the aquarium is presenting a serious problem in the maintenance of the specimens. In order to assure a continuation of the displays, particularly of young fish and a model hatching apparatus, it will be necessary to provide suitable equipment for dechlorinating the water.

VESSELS

Fifteen vessels of the Alaska service cruised approximately 127,000 nautical miles in the fiscal year 1937 as compared with 120,000 miles in the previous year. The *Penguin* covered approximately 28,000 miles,

the *Crane* 17,000 miles, the *Brant* 15,000 miles, and the *Teal* and *Eider* each about 11,000 miles.

The *Penguin* served as tender for the Pribilof Islands and made five round-trip voyages between there and Seattle, carrying personnel and emergency supplies. Interisland service also was performed, and native workmen from the Alaska Peninsula and Aleutian Islands were transported to the Pribilofs to assist with the season's sealing activities.

The *Auklet*, *Kittiwake*, *Merganser*, *Murre*, and *Widgeon* were engaged in the fishery-protective work in southeast Alaska during the 1936 season. The *Blue Wing* was in the Kodiak area until June, when it was transferred to Prince William Sound. The *Eider*, after assisting with the Works Progress Administration project of stream improvement in southeast Alaska in the early spring, transported crews and supplies from Seattle to the Alaska Peninsula and intermediate points, and then was on patrol duty in the Kodiak area from May 30 until the latter part of September.

The *Crane* and *Red Wing* patrolled the Alaska Peninsula area, the *Ibis* was at Chignik, and the *Coot* was on the Yukon River. The *Scoter* engaged in the Bristol Bay patrol during the fishing season, and in August it assisted with the stream survey in the Alaska Peninsula region. The *Teal* was on Cook Inlet from May 26 until the early part of September, after which it participated in the patrol and stream inspection in southeast Alaska. The *Brant* was again used primarily for general supervisory work, chiefly in southeast Alaska, although one trip was made to the westward as far as Bristol Bay.

In the spring of 1937 the *Teal* was used in herring tagging in southeast Alaska, and the *Scoter* was assigned to seal patrol duty in the vicinity of Neah Bay, Wash. From about the middle of November 1936, to February 4, 1937, the *Crane* was detailed to the service of the Post Office Department for the purpose of transporting mail between Seattle and Juneau during the maritime strike on the Pacific coast. Expenses in connection with this service were paid by that Department.

The *Pelican* was reconditioned for use in the shrimp investigations in the South Atlantic and Gulf area.

APPROPRIATIONS

Appropriations for the Bureau for the fiscal year aggregated $1,565,920 as follows:

Salaries, Commissioner's office	$156,420
Propagation of food fishes	667,000
Maintenance of vessels	160,000
Inquiry respecting food fishes	172,000
Fishery industries	62,000
Protecting seal and salmon fisheries of Alaska	278,000
Upper Mississippi Wild Life and Fish Refuge	18,000
Enforcement of black-bass law	15,000
Fisheries Cooperative Marketing Act	12,500
Shellfisheries investigation	25,000
Total	1,565,920

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U. S. DEPARTMENT OF COMMERCE
DANIEL C. ROPER, Secretary
BUREAU OF FISHERIES
FRANK T. BELL, Commissioner

Administrative Report No. 27

FISHERY INDUSTRIES OF THE UNITED STATES

1936

By R. H. FIEDLER

APPENDIX I TO REPORT OF COMMISSIONER OF FISHERIES
FOR THE FISCAL YEAR 1937

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ADMINISTRATIVE REPORT SERIES

Since the beginning of the Administrative Report Series, considerable confusion has arisen concerning the system of numbering the separates composing it. Inasmuch as the Reports of the Divisions vary in order from year to year, many have found their designations as "Appendix No. I, II, III, or IV" very confusing. To relieve this, it has been decided to number them as "Administrative Report No. —." Inasmuch as 20 separates had already been printed in this series before starting the numbers, it was deemed advisable to begin the numbering with Administrative Report No. 21. Of course, numbers cannot be printed on those already off the press, but for the information of those who wish to know what the first 20 were, they are numbered for filing purposes as follows:

No. 1. Report, Commissioner of Fisheries, 1931.
No. 2. Alaska Fishery and Fur-Seal Industries, 1930.
No. 3. Fishery Industries of the United States, 1930.
No. 4. Progress in Biological Inquiries, 1930.
No. 5. Propagation and Distribution of Food Fishes, 1931.
No. 6. Report, Commissioner of Fisheries, 1932.
No. 7. Alaska Fishery and Fur-Seal Industries, 1931.
No. 8. Fishery Industries of the United States, 1931.
No. 9. Progress in Biological Inquiries, 1931.
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No. 11. Alaska Fishery and Fur-Seal Industries, 1932.
No. 12. Progress in Biological Inquiries, 1932.
No. 13. Fishery Industries of the United States, 1932.
No. 14. Propagation and Distribution of Food Fishes, 1933.
No. 15. Fishery Industries of the United States, 1933.
No. 16. Alaska Fishery and Fur-Seal Industries, 1933.
No. 17. Progress in Biological Inquiries, 1933.
No. 18. Propagation and Distribution of Food Fishes, 1934.
No. 19. Alaska Fishery and Fur-Seal Industries, 1934.
No. 20. Fishery Industries of the United States, 1934.

Note that the last Commissioner's Report was for 1932. Since then its place has been taken by a reprint from the Report of the Secretary of Commerce under the title "Bureau of Fisheries." Inasmuch as it is no longer a Bureau publication, it is not numbered; but it will be supplied, if available, to any who request the Report of the Commissioner for any year since 1932.

FISHERY INDUSTRIES OF THE UNITED STATES, 1936 [1]

By R. H. FIEDLER, *Chief, Division of Fishery Industries*

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[1] Administrative Report No. 27, Appendix 1 to the Report of the U. S. Commissioner of Fisheries, 1937. Approved for publication, June 21, 1937.

FOREWORD

This report constitutes a summary of the activities of the Division of Fishery Industries as well as an annual review of fishery statistics. As its name indicates, this Division of the Bureau is concerned with the activities and welfare of the commercial fishery and fishery industries, the trade in fishery products, and the fish canning and preserving industries. Its functions include the collection and publication of fishery statistics, the conducting of market surveys, the prosecution of research designed to solve the technical problems of the industry, and the dissemination of authoritative and practical information to the fishery industries and the public. Results of technological investigations and marketing studies are published in separate documents as each project is completed. The information obtained from statistical surveys is published in part 2 of this report, which includes all the detailed statistical information that has become available since the issuance of the previous report,[2] together with such summarized statements and interpretations of the statistics as are deemed significant and useful. In the preparation of this report, members of the Division's staff have taken part and their assistance is appreciatively acknowledged.

Part I. OPERATIONS OF THE DIVISION

COOPERATION WITH OTHER FEDERAL AGENCIES

As in 1935, various members of the Division's technological, economic, and statistical staff assisted other Federal agencies where the work and studies of such agencies required information or advice concerning the fishery industries.

During the past year, our technologists engaged in a cooperative investigation with the Bureau of Chemistry and Soils and the Food and Drug Administration of the United States Department of Agriculture for the development of standards for halibut-liver oil essential in the administration of the Federal Food and Drug Act and for other purposes. This cooperative project will be described in detail elsewhere in this report. In addition, various members of our technological staff, both in our Washington, D. C., laboratories and in our field laboratories, cooperated with the scientists of other Federal Government organizations wherever helpful information of mutual interest could be exchanged and whenever cooperative assistance could be extended.

For a few months in the summer of 1936, Dr. Francis P. Griffiths, of our technological staff, conducted some practical studies in the freezing of oysters in the Seattle laboratory of the Bureau of Chemistry and Soils, United States Department of Agriculture.

The National Bureau of Standards also cooperated with our technological staff in the development of net measuring devices for experimental use in the Great Lakes' fisheries.

Our technologists, in the Bureau's Washington laboratories, gave courses in canning fishery products to State Extension Service workers at the request of the State Extension Service, of the United States Department of Agriculture.

Cooperation was had with the Bureau of Foreign and Domestic Commerce in obtaining data on the extent of the cooperative move-

[2] Fishery Industries of the United States, 1935, by R. H. Fiedler: Appendix II to the Report of the U. S. Commissioner of Fisheries for 1936, pp. 73-348.

ment among fishermen, as well as information on the grading and standardization of fish in many foreign countries.

In the conduct of several phases of economic and technological work the Division had the cooperation of the International Fisheries Commission at Seattle, Wash. This included a study of the variation of the fat content of halibut made by technologists of the Division at the request of the Commission and cooperation of the Commission in the collection of economic and statistical data on the North Pacific halibut fishery.

The Bureau also has cooperated with various Federal agencies in obtaining statistical data on our fisheries. The Bureau had the cooperation of the Bureau of Agricultural Economics, Department of Agriculture, in the collection of statistics on the volume of cold-storage holdings of fish, and of the health authorities in Washington, D. C., in obtaining the volume of fish handled at the Municipal Fish Wharf and Market in this city. In another instance the Bureau obtained figures on the volume of the quarterly production and holdings of fish oils for the Bureau of the Census.

COOPERATION WITH STATE AGENCIES

The Bureau of Fisheries long ago began establishing cooperative relations with the States in fields of mutual interest and endeavor and, in succeeding years, has constantly encouraged, fostered, and expanded this cooperative plan of work. By working closely, whenever possible, with the members of the scientific staffs of various State laboratories and institutions, we have been able to increase the productivity of our relatively small technological staff and have been able to carry out cooperative investigations at considerably less cost. During 1936, the following cooperative investigations were conducted in the State institutions listed:

A member of our technological staff was stationed in the laboratories of the State Medical College, Charleston, S. C., until September 1936, where members of the staff of the State Medical College gave valuable cooperation in chemical, biochemical, and pharmacological studies of the mineral content of fishery products. Dr. Roe E. Remington and Dr. Kenneth M. Lynch participated in these investigations.

At George Washington University, Washington, D. C., Dr. Leland W. Parr, associate professor of bacteriology in the school of medicine, assisted in the supervision of one of our cooperative investigations on the development of disinfectants for sponges.

At Washington State College, Pullman, Wash., our Seattle technological laboratory staff cooperated with Dr. J. S. Carver in carrying on tests with poultry in the feeding of salmon oils and meals.

Dr. Earl Norris, Department of Biochemistry, University of Washington, Seattle, Wash., cooperated with members of our Seattle technological staff in various fishery products investigations. The University of Washington also placed space at the disposal of members of our Seattle technological laboratory for the conduct of certain by-products investigations, until the Bureau could erect a suitable building for this purpose, which is now under construction.

The University of Maryland and the Maryland State Agricultural Experiment Station, College Park, Md., have rendered excellent cooperative services to our technological staff. Free space for the Bureau's laboratories in two of its buildings (discussed elsewhere in this report)

has been provided by the University of Maryland, and both the University and the Maryland State Agricultural Experiment Station are conducting in their various laboratories and departments of animal husbandry cooperative studies of the feeding value of fishery by-products. The members of the staffs of these two institutions engaged in these cooperative investigations are Dr. L. B. Broughton, Dr. W. C. Supplee, L. E. Bopst, and M. H. Berry.

Prof. Samuel B. Schofield, head of the chemistry department, Western Maryland College, Westminster, Md., conducted and assisted in the supervision of a cooperative study of the chemistry of fish protein in the college laboratories with the aid of student assistants.

There was continued in Massachusetts, during the past year, by our fish cookery and home economics worker in cooperation with the Massachusetts State Department of Agriculture, a project covering lectures and practical demonstrations in fish cookery at various schools, women's clubs, and other gatherings. This educational program was conducted by Miss Agnes I. Webster of our staff and R. H. Sullivan, of the State Department of Conservation.

These cooperative investigations in the above mentioned State universities and institutions are described in greater detail elsewhere in this report.

In the conduct of its statistical research work, the Bureau also obtains unusual cooperation from various States. The surveys of the fisheries in the various States bordering on the Great Lakes, in the Pacific Coast States, and in Maryland and Virginia, have been greatly facilitated by special cooperation obtained from the State fishery agencies in these States. With this aid, it is now only necessary for the Bureau to conduct partial surveys in these States to supplement the data available from the fishery agencies.

In addition, in nearly every other State where commercial fishing is prosecuted, some type of cooperation on its statistical work is rendered the Bureau by the State fishery or other agencies. This makes it possible for the Bureau to make statistical surveys of a greater portion of our fishery industries than otherwise would be possible.

EXHIBITS AT EXPOSITIONS

During 1936 the Division, under the direction of the writer, supervised the construction and maintenance of the Bureau's exhibits at the Texas Centennial Central Exposition at Dallas, Tex., and the Great Lakes Exposition at Cleveland, Ohio, and the maintenance and dismantling of the exhibit at the California Pacific International Exposition at San Diego, Calif.

TEXAS CENTENNIAL CENTRAL EXPOSITION

The main feature of the exhibit at the exposition in Dallas consisted of a painted mountain and lake background, incorporating a miniature falls in the distance, over which water ran into a pool stocked with bass, crappie, and other warm-water fishes. The foreground was built up with rocks, trees, bushes, and other vegetation. A mechanically-operated model of an angler fishing in the pool near a miniature electrically-operated campfire gave a realistic appearance to the display. The entire exhibit was lighted to give the effect of sunrise to sunset at regular intervals, and during the dark period there was an illusion of clouds floating through the sky.

Another part of the display consisted of a series of dioramas in "illuvision," depicting the oyster and shrimp fisheries of Texas, panels describing the life history of the oyster and the mussel-shell fishery and manufacturing of pearl buttons from mussel shells, and a series of colored transparencies depicting the various activities of the Bureau's divisions.

The exhibit which was erected in the Federal Building occupied a space of about 420 square feet, with an 11-foot ceiling. The Bureau was allotted $5,500 for its construction and maintenance. The exhibit was very popular with the visitors, and on some days up to 8,000 people viewed it.

This exhibit will remain on display during 1937 as the exposition is being continued another season.

GREAT LAKES EXPOSITION

The main feature of the exhibit at this exposition in Cleveland consisted of a mechanically-operated diorama in a case (2 feet wide, 7 feet long, 7 feet high), depicting the effect of thermal conditions in Lake Erie on the commercial capture of fish. Enclosed in other cases of approximately the same size as the above were displays showing the many uses to which fishery products are put in the arts and industries, methods for catching Great Lakes' fish, culture of fish, preservation of textile fishing gear, food value of fish, the Alaska fur-seal industry. A framework above the cases mounted a series of colored transparencies of Bureau activities.

The entire exhibit which was erected in the Hall of Progress occupied a space of about 300 square feet, with a 17-foot ceiling. The Bureau was allotted $2,000 for its construction and maintenance. As with the Dallas exhibit, it was most popular with the visitors. On some days in excess of 5,000 people viewed it.

This exhibit will remain on display in 1937 as the exposition will continue another season.

CALIFORNIA PACIFIC INTERNATIONAL EXPOSITION

At the close (after two seasons) of the California Pacific International Exposition at San Diego, Calif., in the fall of the year, members of the Division dismantled the Bureau's exhibit on display there and shipped the material to storage in Washington, D. C., and elsewhere.

This exhibit, which was erected in the Federal Building, occupied a space of about 225 square feet and the Bureau was allotted $2,500 for its construction and maintenance. A brief description of the exhibit is given in the report of this Division for the year 1935. We are informed that this display received very favorable comment from visitors, even though it was placed in rather crowded quarters.

ECONOMIC AND MARKETING INVESTIGATIONS

There is a recognized need for economic and marketing studies as aids to the industry in merchandizing its commodity. Such studies have been made by the Division in the past and are being continued now as far as possible with the limited funds available; however, they have not been on a scale commensurate with so important an industry, and one which is in such obvious need of these services.

The need for information along economic and marketing lines long has been realized by the fishery industry. Therefore, it endorsed,

through the Fishery Advisory Committee of the Secretary of Commerce, H. R. 8055, a bill introduced in the Congress by Hon. S. O. Bland of Virginia. The bill, however, which had for its purpose the conduct of fishery economic research and market news and extension services by the Bureau of Fisheries, failed to become law.

FISHERY TRADE IN SAN FRANCISCO BAY AREA

This study conducted by Dr. Barton DeLoach, assistant fishery economist of the Bureau, was made for the purpose of providing market information on the supply of fresh and frozen fishery products in the San Francisco Bay area, marketing channels, nature of the consuming market, and on trade practices and problems.

The survey revealed, among other things, that about 40,000,000 pounds of fresh and frozen fish (round weight) are consumed in the area annually, making a per capita consumption of about 31 pounds or about 20 pounds in the edible portion or dressed weight. If the residents here consumed canned and cured fish at the rate of the average per capita of the United States—about 5 pounds (edible portion)—the total per capita consumption of all kinds of fishery products in the area then would be about 25 pounds. The average per capita in the United States of all kinds of fishery products is about 13.3 pounds.

The consumers' demand for fish by species is principally for fillet of "sole", halibut, salmon, and certain species of rockfishes. About two-thirds of the trade is done in these varieties.

About 90 percent of the fish handled in the area originates along the California coast, much of it being assembled in the branch houses of the various San Francisco wholesale firms located at several of the important fishing ports of the State. Only a very small amount of the fish handled is marketed to out-of-State points.

From time to time quantities of certain fish are frozen and placed in cold storage pending sale when these fish are out of season or to preserve surplus supplies. The survey revealed that the average monthly cold-storage holdings of frozen fish in the Bay area equalled about 20 percent of the average monthly supply of fresh fish entering the market.

As to the location of the wholesale markets, the investigator found them well situated with respect to the landings of fish by vessels and the area to be served.

There is some evidence that as local fishing grounds for certain popular species have become less productive, fishing activities for these fishes have been conducted farther and farther from port. This has tended to increase costs of production. In order to relieve this situation, it was suggested that attention be directed toward finding a market for some of the lesser-known species found nearer the San Francisco Bay area.

The retailing of fish is done by exclusive fish dealers, meat markets, chain stores, and peddlers. Except for the exclusive retail fish dealers there is a tendency for the retailers to handle only a few well-known varieties. This has had a tendency to restrict consumption of fish in the area.

Consumers in the area seem to prefer a white-meated fish with a mild flavor. They also desire to purchase filleted or steaked fish—free from excess bones and other inedible portions. This probably accounts for the large demand for fillet of "sole", halibut, and salmon.

The sale of fish by restaurants is rather large in the downtown areas, but in the outlying districts offerings are somewhat restricted. It has also been found that the use of fish by public institutions in the area is not large.

Considerable quantities of crabs are marketed in the area. Most are produced by a cooperative crab fishermen's organization with headquarters in San Francisco.

MARKETING SHAD ON THE ATLANTIC COAST

At the organization meeting of the Atlantic Coast States Shad Conference in February 1937, at Atlantic City, N. J., it was indicated by various State fishery officials present that the popularity of shad is waning and that this is adversely affecting the income of shad fishermen. In order to determine what steps might be taken to improve the situation, the Conference requested the Bureau to conduct a study of the marketing of shad along the Atlantic Seaboard. In compliance with the request, the Bureau undertook the study, assigning Fred F. Johnson, Assistant Chief of the Division, to the work.

In his report on the study, Mr. Johnson shows that the annual supplies of Atlantic coast shad have consistently decreased for the past 40 years. The most recent data, which are represented by composite statistics for the years 1934 and 1935, show a catch of about 8,200,000 pounds. This is about one-sixth of the catch of 40 years ago. Thus, one of the important problems in connection with this species is that of increasing the supply. To accomplish this, studies to alleviate the effects of stream pollution and obstruction and intensive programs of artificial propagation should be primary objectives of interested agencies.

In addition to stressing the need for augmenting present supplies of this species, the report includes, among other data, information on the natural history and culture of the shad, the wholesale trade, shad products, recipes, and boning methods. It also includes the results of a study conducted among operators of 95 retail stores, operators of 71 public eating houses, and 342 housewife consumers located in several Eastern cities. This latter study was designed to develop a comparison of the current popularity of shad with that of former years; the importance of the consumption of shad through retail stores and public eating houses; the factors adversely affecting the consumption of shad; the purchasing and dietary habits of consumers with respect to fish but with particular reference to shad; and allied considerations.

The study brought out a number of interesting facts which include the following: (1) As the shad season progresses and supplies increase, the price fluctuates downward rapidly from the early season high prices, with some recovery in prices toward the end of the season; (2) the sale of shad is uniformly reported as increasing by public eating houses serving "absolutely boned" shad. Public eating houses serving shad in other forms usually report increases; (3) decreased sales by retail stores more than offset increases in public eating houses; (4) while many retail stores will sell half shad or shad fillets, the practice is seldom advertised and unknown to most housewife consumers; (5) in many cities boned shad are practically unknown, and in all cities the sale is limited; (6) where retail dealers bone shad, the methods are usually so slow that the cost is prohibitive of any considerable sales; (7) shad can be completely and quickly boned with

probably no more loss of flesh than is left by the average person consuming unboned shad; (8) the whole roe shad generally is too large for economical use by small families of two and three persons; and (9) families of two and three persons comprise nearly half of the families of this country.

FROZEN-FISH SITUATION

It is customary for the amount of frozen fish held in cold storage to reach a minimum around April of each year. Thereafter the prosecution of our commercial fisheries becomes more intensive, and much of the surplus of the species of fish which are customarily marketed fresh is frozen and stored for later consumption. From April until November quantities of fish frozen usually exceed withdrawals. In November, fishing operations usually decrease, and the margin of withdrawals over quantities frozen again results in minimum holdings by April.

During 1936 this customary trend was apparent insofar as April being the month of minimum holdings was concerned; also surpluses from fishing operations represented by quantities frozen exceeded withdrawals following April. However, the margins of quantities frozen over withdrawals were much larger than in preceding years, and where holdings normally begin to decrease in December, an increase was shown during this month in 1936.

By February 15, 1937, the total holdings of frozen fish reached about 70 million pounds as compared with 45 million pounds on the same date in the previous year. According to the trade this situation developed because of the mild open winter of 1936–37. This allowed almost continuous fishing operations and also resulted in a slackening of demand for frozen fish. The flood conditions in the Middle West during the winter also had an effect in retarding consumption in an area which normally consumes large quantities of frozen fish at this season of the year.

Realizing that these huge stocks of surplus frozen fish were hindering the normal conduct of the trade, appropriate legislation was introduced at the first session of the Federal Congress, and enacted into law to authorize the Federal Surplus Commodities Corporation to purchase up to 1 million dollars worth of surplus fish over a period of 90 days from the approval of the act, the fish purchased to be distributed to relief clients.

Statistics collected and/or published by the Bureau and statistical analyses prepared by members of the Division on the frozen-fish trade were most valuable to members of the trade and to Congress in showing the condition and trend of the frozen-fish industry. The demand on the Bureau for certain statistical bulletins exhausted the regular supply on hand, and reprints had to be made. This is additional concrete evidence that statistics showing conditions and trends are useful to the fishery industry.

The buying program instituted by the Federal Surplus Commodities Corporation under the terms of the legislation, has resulted in great good to the industry in general. Fishing operations were resumed on a more normal basis and a greater demand has been created for fish in some areas that normally were not large users of this food product.

RETAIL SALE OF FISHERY PRODUCTS

A study was made during the year by Fred F. Johnson, Assistant Chief of the Division, to determine the order of importance of the six species of fish or shellfish leading in the retail sales of about 60 cities of this country. The study was based on replies to questionnaires which were forwarded to retail and wholesale dealers in fishery products, fishery associations, State fishery agencies, Chambers of Commerce, and field representatives of the Bureau of Foreign and Domestic Commerce, and the Bureau of Fisheries. The survey was designed primarily to develop basic information on the varieties of fish and shellfish predominating in retail sales in important centers of population throughout the country, in order that the feasibility of inaugurating a service for the current collection of retail prices of these commodities might be investigated. This study is now under way.

Apart from its value in connection with the development of a system for the collection of retail prices, the study was most interesting in showing the geographical variation in preferences for the several species. In general it was brought out that the most important of the six species predominating in the retail sales of cities close to important producing waters, are usually the species taken in abundance in these waters; but in cities located farther inland the number of sources increases. However, such species as haddock, halibut, salmon, shrimp, and oysters appeared among the six species leading in retail sales in many inland cities as well as in those close to their natural habitats.

NORTH PACIFIC HALIBUT FISHERY

With an alarming decline in the productivity of the North Pacific halibut grounds, fished in common by vessels of Canada and the United States, steps were taken by treaty between the two Governments to conserve and sustain this valuable fishery resource. Under the terms of the treaty the International Fisheries Commission (Halibut Commission) of the United States and Canada was formed, with authority, among other things, to regulate the amount of halibut that can be taken from any fishing grounds or banks in convention waters of the North Pacific which extend westerly from the United States and Canada. This measure was adopted to allow natural spawning and reproduction of the halibut to replete the fishery.

During the past few years the Commission has set the limit on the take by fishermen of both countries at around 46,000,000 pounds, and the landings have about equaled this figure each year. Even though this is somewhat less than the annual landings in many of the years during the heyday of the fishery (around 65,000,000 pounds were taken from area 2 alone in 1 year), the industry has had some difficulty in marketing at a profit the fish landed. In fact disputes between the fishermen and buyers, from time to time, over price ex-vessel has resulted in curtailing fishing operations with consequent lowering of incomes to the fishermen who depend upon this fishery for a livelihood.

It is anticipated that as the reserve brood stock of halibut is restored on the banks, the Commission may set a higher limit on the annual take. If this is done new marketing problems may be faced by the industry.

In order to aid the industry at this time in disposing of the present catch of halibut and to assemble data which may be useful to the industry in expanding the markets for halibut, should a higher limit

be set on the take, the Commission suggested that the Bureau make an economic study of the factors involved in the production and marketing of Pacific coast halibut. Believing that such a study would be timely and worth-while, the Bureau undertook the investigation, detailing George Roger Chute, assistant fishery economist to conduct the work.

The investigation is now in progress. One of its important phases is an analysis of the distribution of halibut during 1935. This is revealing the places of concentrated market and the areas of minimum consumption. Another phase is covering the competitive standing of halibut with other species of fish selling at a lower price, and the effect this has had in curtailing the markets for Pacific coast halibut in certain areas, formerly using large quantities of this fish.

The investigation also is covering a study of halibut vessel operation, transportation, warehousing, merchandizing practices, consumer attitude toward halibut, and a chronology of the fishery from its inception on the North Pacific. Parts of the latter material are vivid and novel, and will be admirable for use in connection with a radio campaign to acquaint the public with halibut and halibut fishing.

COOPERATIVE MARKETING

During the past year the work of the cooperative marketing unit, in charge of L. C. Salter, fishery economist, charged with the administration of Public, No. 464 of the Seventy-third Congress, second session, an act authorizing associations of producers of aquatic products, has consisted of (1) conducting research in the field of cooperative activity among fishermen and assembling data and other information relative to the cooperative marketing of fish and fishery products, to learn whether existing fishery cooperatives were operating under the terms of the act; (2) making studies and analyses of the organic structure and operations of fishery associations with the view to furnishing advice and counsel to associations and groups of fishermen contemplating the organization and operation of associations; and (3) assembling literature on cooperative enterprises, and preparing articles and other publications pertaining to this general subject. During the year there have been no complaints, nor other occasions or reasons to warrant any legal action being taken under the provisions of the act.

The above types of work have been of considerable value to existing fishery groups in effectuating the most efficient operation of cooperative associations as well as to groups of fishermen contemplating the organization and operation of cooperative associations. One important fact revealed by this work is that no legislation has been enacted by any of the States specifically providing for the organization and operation of fishery cooperative marketing associations, and in no instance was it found that State departments were engaged in encouraging or assisting fishermen to organize and operate marketing associations.

During the year the fishery associations known to be in existence in 1936 were circularized by questionnaire with the intent of gaining information as to their official location, cooperative status, and nature of their operations. In all, the questionnaire was mailed to about 100 fishery organizations located throughout the commercial fish-producing States. Answers were received from 38 associations. They indicated that 14 were engaged in the cooperative marketing of fishery

products or the cooperative purchasing of fishery equipment and supplies, and that 6 were performing semicommercial functions. The remainder of those replying, or 18, were engaged primarily in activities pertaining to fishery conservation and legislation, and promotional or protectional activities in the interests of fishermen. With but few exceptions, the associations restricted membership to persons engaged in the fisheries and provided for voting on the basis of membership rather than by stock or membership capital held in the association. The exceptions were among those classed as semicommercial and noncommercial in character.

In order to determine further the cooperative status of commercial and semicommercial fishery organizations and the nature and extent of their activities, a rather broad, personal investigation is in progress. To date this has included visits to associations located on the Pacific coast and in the North Atlantic States. On this work, particular attention is being given to learning the functional activities of the associations and how the Bureau might be of service in connection with their operations. The study is being continued to cover associations located in the South Atlantic and Gulf States and in those States around the Great Lakes. The survey so far has permitted detailed study of more than 60 associations and has revealed that 23 of these are engaged in commercial functions such as the marketing of fish or fishery products, or the purchasing of supplies and equipment, and the remaining 37 are engaged in functions relating to the general welfare of their members. Many of the associations in the latter group are contemplating engaging in commercial activities on a cooperative basis.

Another study in progress and being conducted along with the above-mentioned investigation relates to financing the fishing enterprise. Its purpose is to obtain information on the relationship between present methods for financing this type of enterprise and its effect on the freedom of fishermen to market their catch to the best advantage. This study will be made in the major commercial fish-producing areas of the United States.

In order to aid the Bureau in its general administrative work of the Cooperative Marketing Act, a study of cooperative activity among fishermen in foreign countries also is in progress. The Bureau of Foreign and Domestic Commerce of the Department of Commerce is aiding materially in this study by collecting basic data on conditions in most of the important countries of the world; and, also, by placing at our disposal files on this subject located in Washington, D. C. Information obtained on this study covers (1) the nature and extent of fishery cooperative marketing, a list of such associations, and their aims and purposes; and (2) the extent to which governments aid or assist fishery cooperatives by subsidies, credit, and departmental or institutional aid. In connection with this study information also is being obtained from the same countries relative to grades and standards for fish and fishery products marketed in the various foreign countries, and governmental regulation pertaining thereto.

Cooperative marketing is a practice of long standing in many of the countries studied. Although most of the historical accounts date back as far as the latter part of the nineteenth century, fishermen in some countries have been conducting associations in various capacities for a number of years for which there are no definite records. Beginning with the early part of 1900 and to a greater extent just prior to and

following the World War, various countries enacted legislation pertaining to the fisheries and fishermen's associations. During the postwar period efforts were intensified to further encourage and assist marketing and other activities by fishermen's associations through governmental aid. Practically all of the countries studied now provide aid to fishermen's associations in the form of loans, grants-in-aid, and institutional services of an educational character. The associations are also recipients of various forms of subsidies provided for the fishery industries generally in various countries. The purposes of the associations are for the most part to perform cooperatively the functions necessary in the processing and merchandising of fish and fishery products, and to act in a protective capacity for the benefit of members.

It is deemed advisable to relate at this point that existing fishery cooperative associations in this country usually were formed on the initiative of fishermen and apparently without advice and counsel from other agencies. For this reason, some of these associations are lacking in the proper organization structure, and in others the operating policies and procedures are not conducive to obtaining the maximum or most desirable results. In most instances, however, the management and boards of directors of these associations are conscious that improvements might be made toward better organization and are anxious for assistance. Some have applied to the Bureau for such assistance, and insofar as time and facilities permit, we have made studies and analyses of the respective associations with the view to offering advice and counsel pertaining to the general organic structure of fishery cooperative associations, management, operating policies, and merchandising. During the past year service of this character was rendered to the following associations: Fishermen's Cooperative Association, Seattle, Wash.; Fishermen's Packing Corporation, Everett, Wash.; LaConner Fishermen's Cooperative Association, LaConner, Wash.; Willapa Oyster Growers' Cooperative Association, Seattle, Wash.; Pacific Coast Oyster Growers' Association, Olympia, Wash.; Union Fishermen's Cooperative Packing Co., Astoria, Oreg.; Sunset Fish Company Cooperative, Wheeler, Oreg.; Santa Cruz Fisheries, Inc., Santa Cruz, Calif.; Fishermen's Cooperative Association, San Pedro, Calif.; San Diego Fishermen's Association, San Diego, Calif.; North Carolina Fisheries, Inc., Morehead City, N. C.; The Great Atlantic Fish Exchange, Willis Wharf, Va.; United Commercial Fishermen's Associations of New Jersey, Wildwood, N. J.; Bivalve Cooperative Company, Inc., Bivalve, N. J.; O. K. Fishery Cooperative Association, Wildwood, N. J.; Independent Fish Company, Inc., Barnegat City, N. J.; Federated Scallop Producers Cooperative Association, Brooklyn, N. Y.; Southern New England Fishermen's Association, Mystic, Conn.; New England Oyster Growers' Exchange, Inc., Warren, R. I.; and the Fisherman's Relief Corporation, Portland, Maine, in connection with associations in Maine sponsored by it, including Frenchmen's Bay Cooperative Association, South Gouldsboro; Beals Cooperative Association, Beals Island; and Central Eastern Cooperative Association, Portland.

Some requests have come to the Bureau for direct assistance in forming fishery cooperative associations. For the most part, all available information was supplied by correspondence or with prepared literature. In two instances, however, direct assistance was made available to groups of fishermen interested in organizing

associations. One of these consisted of a group of oyster planters near Bay City, Oreg., that contemplated an association for the mutual planting, cultivating, and harvesting of oysters; the cooperative purchasing of oyster seed, supplies, and equipment; and the cooperative processing and marketing of oysters. The second consisted of a group of sponge fishermen at Key West, Fla. that has been planning the organization of a sponge cooperative covering the functions of production and marketing. At this writing neither of these groups has perfected its organization set-up.

From the number and nature of written requests forwarded to the Bureau for information on cooperative marketing, and from impressions gained in personal contact with fishermen and others in the field, it appears that there is widespread interest in forming and operating fishery cooperative marketing or purchasing associations. Further, this interest has been accelerated to such an extent that during the past year members of existing fishery cooperative associations made definite steps looking forward to the development of fishery cooperative councils. It is their belief that through these councils they might be able to coordinate their efforts, advance the cooperative marketing of fishery products, develop a source of information on the subject, and in general improve conditions for their mutual welfare.

The increased activity among fishermen ultimately may result in additional requests to the Bureau for information and assistance. In order to comply with such requests, it appears that the rendering of such aid in the near future will comprise a major activity of the cooperative marketing unit.

FISHERY COMMITTEE FORMED WITHIN NATIONAL ASSOCIATION OF MARKETING OFFICIALS

For a number of years the National Association of Marketing Officials has been interested in various aspects of the marketing of fishery products. This association is composed of State officials engaged in work relating to the marketing and handling of agricultural products and with this wide experience the association is in a position to materially aid in improving marketing conditions in the fishery industry.

From time to time members of the Division's staff, at the request of the Association, have addressed its annual meetings. In December 1932 the writer addressed the group at a meeting in Washington, D. C., placing before it the problems surrounding the marketing of fishery products. In December 1933, J. R. Manning, senior technologist of the division, addressed the group at a meeting in Washington, D. C., on the standardization of fishery products. In October 1936 L. C. Salter, economist of the division, addressed the group at a meeting in Nashville, Tenn., on the cooperative marketing of fishery products.

During the past year the fishery problems placed before the association became of sufficient importance to warrant the creation of a special committee to study and report on matters pertaining to the marketing, standards, and grades for fishery products. The committee was appointed at the Nashville meeting. Its members are: J. H. Meek, Director, Division of Markets, Virginia, chairman; Charles M. White, Chief, Division of Markets, Maine; and L. M. Rhodes, Commissioner of Markets, Florida. Members of the Division's staff are cooperating in the work of the committee.

STATISTICAL INVESTIGATIONS

Fishery statistics are collected by the Bureau to serve two principal purposes—first, biological, and second, economic. For this reason the Bureau must plan its statistical surveys to obtain comprehensive data for furnishing a complete and reliable picture of the condition and trend of the fisheries. The collection and compilation of the great mass of data necessary, involves many problems. The fisheries are broad in scope, including over 160 varieties of aquatic products which enter into commercial production. These, many of which are migratory, are taken by a great variety of types of gear in areas along our seacoast and in our interior lakes and streams. If the biological aspect is to be served, complete annual statistics are needed on each of these phases in every section. If the economic aspect is to be served, statistics are needed not only on the phases listed above relative to the biological aspect, but also on the price structure, the processing function, and on marketing and distributing.

Statistics on these latter phases of the industry should be collected and published as soon as possible after the close of the business transactions in order to be of maximum value to the industry and others interested in the fisheries. However, because of limited funds and personnel it has not been possible to collect and publish these figures as currently as desired. For the same reason it has not been possible to collect statistics on the fisheries of the entire United States on an annual basis.

BIOLOGICAL ASPECT

The biological aspect must consider two problems—the conservation and sustained supply of the resource, and the prediction of future trends or yield. Since our fisheries are usually prosecuted in areas not under private ownership, the problem of the conservation of these fisheries is of national concern. It, therefore, is important that close watch be kept of the condition of the various fisheries to detect depletion so that remedial measures can be promulgated timely and wisely. For this reason it is imperative that current statistical data be obtained on the yield of our fisheries.

These statistics then furnish the biologist with the background upon which to base his prediction of future trends and yields. This he does by coupling the statistical data with studies of the life history of the species. Difficulty is experienced in making these predictions because the supply (or population) of the species cannot be seen, as is the case with farm animals or crops. The more complete and more reliable the statistics on yield are, the better foundation the biologist has for conducting his studies. The Bureau, therefore, aims to obtain a complete picture of each individual fishery to further these biological studies.

ECONOMIC ASPECT

When the fishery has been conserved and trends and yields of the fishery have been predicted, the problem still remains of supplying the fishery trade with the information so essential to the conduct of its business activities. In these days of increased competition the very existence of the fishery industry must depend upon reliable economic statistical information. Such material has been especially valuable during the past few years, when it has been used in national planning. The Bureau, therefore, aims to make its statistical surveys

so complete that the industry and the various governmental organizations may turn to it for reliable fishery statistics.

SURVEYS CONDUCTED

The statistical surveys during 1936 were conducted under the immediate supervision of Edward A. Power, assistant statistician, and the general direction of Fred F. Johnson, Assistant Chief of the Division. These surveys included the collection and dissemination of statistics of the commercial catch and its value, operating units, and employment in the fisheries. In addition, data were collected on employment and compensation of those engaged in the fisheries as well as products of fishery wholesale and manufacturing establishments.

As previously mentioned, limited funds made it impossible to cover all the fishing areas of the country during the past year for 1935. However, the following areas were surveyed: New England States, Middle Atlantic States, Chesapeake States, and Pacific Coast States. Statistics of the fisheries of Alaska also were collected by the Alaska Division of the Bureau. Summaries of the production in those sections which were not surveyed during the year are included for the most recent years available in part 2 of this report.

In addition to the above, statistics were collected on the following special phases: The landings of fish by American fishing vessels at the ports of Boston and Gloucester, Mass., Portland, Maine, and Seattle, Wash. (published monthly); catch of mackerel in the North Atlantic fishery; cold-storage holdings of frozen and cured fish and amount of fish frozen, which are furnished by the Bureau of Agricultural Economics (published monthly); production, consumption, and holdings of marine-animal oils of the United States and Alaska (published quarterly by the Bureau of the Census); production of canned fishery products and by-products of the United States and Alaska; transactions on the sponge exchange at Tarpon Springs, Fla.; volume of fishery products handled at the Municipal Fish Wharf and Market, Washington, D. C.; and the volume of the United States foreign trade in fishery products, furnished by the Bureau of Foreign and Domestic Commerce.

The following statistical and marketing agents assisted in the collection and compilation of the statistical data: H. F. Brown (deceased), F. F. Dimick, W. H. Dumont, R. L. Greer, V. E. Heffelfinger, H. J. Kumin, B. E. Lindgren, W. H. Rich (retired), C. J. Robbins, V. J. Samson, and C. B. Tendick.

The reader is especially referred to the section in the latter part of this report entitled "Statistical survey procedure", which gives in detail the methods employed in the collection of fishery statistics and other pertinent information.

COLLECTING STATISTICS OF THE ANGLERS' CATCH

The need for the collection of statistics of the anglers' catch was stressed in a paper prepared during the year by Fred F. Johnson, Assistant Chief of the Division, and read over the Rod and Stream Program of Radio Station WMAL in Washington, D. C. The paper brought out the importance of closely observing the various fisheries on which both sport and commercial fishermen depend, not only in order

to detect depletion so that remedial measures can be taken before a fishery has been destroyed, but also to avoid unduly penalizing fishermen by the enactment of unwise and unnecessary restrictive legislation. These observations depend largely upon the availability of adequate and current statistics of yield, since such data furnish to the biologist the background upon which to base his estimate of the supply or population, and predictions of future trends and yields. This he does by correlating statistical data of yield with studies of the movements, mortality, and reproductive habits of each species. Fishery statistics not only furnish the basic information for determining depletion and consequently make wise and timely legislation possible, but they have another most important value to the angler and commercial fisherman alike, in that they indicate the need for the planting of fish and following such planting the extent to which these operations have been successful.

While surveys for statistics of commercial catches have been conducted by State fishery agencies and this Bureau in programs of varying degrees of adequacy for many years, data on the sportsmen's catch have been rarely collected. To obtain this information from the angler the cooperation of the anglers themselves is required in recording and transmitting through suitable means to proper officials the records of their catches; such records to include among other things, data on species, size, number taken, and location of fishing. Considerable educational work would no doubt have to precede any entirely voluntary plan to obtain catch records of anglers.

Several attempts have been made by State agencies to collect statistics of the anglers' catches for specific streams or lakes. Various degrees of success have been reported, depending on the methods used. In one instance a State passed a law setting aside certain "test waters." To fish in these waters anglers were required to take out a permit, issued without charge, and were further required, under penalty of fine, to report their catches daily on cards provided for the purpose. A large sign was placed near these waters, giving necessary instructions for filling in the cards, and conspicuously painted boxes were provided at intervals along the stream to receive the completed cards. This project was initiated and the records analyzed by the staff of the Division of Scientific Inquiry as a part of its program of research on fishery management in interior waters. Excellent results were reported in this test. Another set of satisfactory records was obtained through the efforts of State wardens. No attempt was made by these wardens to obtain catch reports from all anglers on a specific stream, but instead they contacted and obtained the cooperation of a few conscientious fishermen in supplying information on their catches. In another instance very complete statistics were obtained on the anglers' catch by enlisting the aid of the personnel of a Civilian Conservation Corps Camp. These men were equipped with printed questionnaires which provided for the listing of the necessary information, which was obtained from the fishermen upon the completion of each day's fishing.

It is suggested that individuals and organizations interested in the conservation of our fisheries would do well to give careful consideration to sponsoring some method for recording the sportsmen's catches, such records to form the basis for maintaining the balance between the catch and the supply.

TECHNOLOGICAL INVESTIGATIONS

Food technology is becoming more and more important each year. With ever-increasing recognition, on the part of public health authorities and others concerned, of the vital role played by diet in the maintenance of the general health and well-being of the people, the science of food manufacture, preservation, and handling in wholesale and retail marketing channels has assumed a place of paramount significance. A generation ago applied science had little part in our food industries. Today we make use of the sciences of chemistry, bacteriology, pharmacology, engineering, and general food technology in the fishery industries to provide better food for man; and to utilize the byproducts of the fisheries as food of vastly improved quality for domestic animals.

LABORATORIES

During 1936 the Division carried on its technological studies under the direction of Dr. J. R. Manning, senior technologist, at its laboratories located in Washington, D. C., College Park, Md., and Seattle, Wash. In addition, certain cooperative investigations were conducted by members of our technological staff in the laboratories of the State Medical College at Charleston, S. C.; George Washington University, Washington, D. C.; University of Maryland and Maryland State Agricultural Experiment Station at College Park, Md.; Western Maryland College, Westminster, Md.; Bureau of Chemistry and Soils, United States Department of Agriculture, Seattle, Wash.; and the University of Washington, Seattle, Wash. In December 1936, the Bureau began the construction, on the same grounds as its main laboratory building in Seattle, of a new technological byproducts laboratory building. This building will be completed and ready for occupancy early in 1937.

Because of the lack of suitable laboratory facilities it was not possible in 1936 to continue our studies on the smoking of fish. In general, inadequate laboratory facilities are hampering or preventing the conduct of several other types of technological research. At present we are conducting this research in cramped quarters.

PRESERVATION OF FISHERY PRODUCTS FOR FOOD

Experimental work during 1936 in the preservation of fishery products for food was conducted in the Bureau's laboratories at College Park, Md., Washington, D. C., Seattle, Wash., and in the Seattle laboratory of the Bureau of Chemistry and Soils, United States Department of Agriculture. The investigations in the College Park laboratory were carried on under the supervision of James M. Lemon, associate technologist in charge, assisted by W. T. Conn, assistant technologist; Dr. Francis P. Griffiths, junior bacteriologist (part of the year); S. R. Pottinger, junior technologist; M. E. Stansby, junior chemist; Joseph E. Puncochar, junior bacteriologist; W. J. Hart, Willis H. Baldwin, William B. Lanham, Jr., and Hillman C. Harris, research associates and student assistants; in the Seattle laboratory under the supervision of R. W. Harrison, associate technologist in charge, assisted by Leslie Lowen, Richard Crosby, and Robert Rucker, research associates and student assistants; and in the Washington laboratory by Norman D. Jarvis, assistant technologist in charge of experimental canning investigations, and Agnes I. Webster, fish cookery expert.

The project on freezing oysters in the Bureau's Seattle laboratory and in the Seattle laboratory of the Bureau of Chemistry and Soils was carried on by Dr. Francis P. Griffiths, junior bacteriologist, under the supervision of Roger W. Harrison, associate technologist in charge, with the assistance of H. C. Diehl, in charge of the Bureau of Chemistry and Soils laboratory.

ELECTROMETRIC TESTS FOR THE FRESHNESS OF FISH

During the early summer months of 1936 one of the large firms packing frozen fish became interested in the possibilities of the commercial application of the electrometric method for determining the relative freshness of haddock, cod, and pollock developed by M. E. Stansby and J. M. Lemon of our staff. This method has been described in detail in previous annual reports of this Division and was originally published in a separate report.[3] This firm is interested in making use of this method for determining quality or relative freshness in its purchases of the above-mentioned species of fish and requested the Bureau to send one of its technologists to give its chemists a practical demonstration of the usefulness of the method. M. E. Stansby was assigned to this demonstration for a period of 2 weeks. During this time he instructed one of the chemists in the employ of the company in the method of making these tests. Several modifications of the method were developed which show considerable promise for application in large-scale operations for classifying fish as to quality or relative freshness. In the commercial test fish were selected on the basis of the test, frozen, and placed in cold storage, and samples later were examined from time to time to determine the keeping qualities of the various grades as shown by the electrometric test. This demonstration indicated that it is possible to use this test commercially to determine the quality of fish and further emphasized the fact that only first-quality fish should be frozen if it is to remain in cold storage for any length of time.

STUDIES OF RANCIDITY IN FISH

In this field attention was concentrated on the development of methods for retarding oxidation or rancidity of the oils in fatty fish. Boston mackerel was used in the experimental work. In commercial practice oxidation of the body oil of this fish makes it difficult to keep it in first-class condition when held in cold storage.

In this study it was observed that considerable variation occurs in the quantity of oil contained in individual mackerel taken at a certain season. There is also a variation with the season. Seasonal variations, however, occur to a greater extent in the larger fish, while there seems to be a fair degree of consistency in the oil content of the smaller fish of this species throughout the season. This may be illustrated by one set of the samples examined at the beginning of the season in April. The large size fish had an oil content of only 2 percent in the flesh. As the season progressed the oil content of other fish examined increased and by the latter part of August it mounted to approximately 20 percent. It then began to decline until it had gone down to approximately 8 percent at the end of the season in December.

[3] "An electrometric method for detection of relative freshness of haddock", by Maurice E. Stansby and James M. Lemon, U. S. Bureau of Fisheries, Gloucester, Mass. Reprinted from Analytical Edition, Industrial and Engineering Chemistry, vol. 5, p. 208, May 15, 1933.

During this same period the smaller fish of this species (approximately two-thirds the size of those mentioned above) showed an oil content of 9 percent at the beginning of the season, 11 percent in the middle of the season, and 9 percent at the end of the season. While the above figures represent composite results, there was considerable variation in the oil content of individual fish in both groups. The extremes of individual variation were from 2 to 30 percent while the average individual variation was 6 to 22 percent.

Samples of the oil from the flesh of Boston mackerel were stored at different temperatures to determine, if possible, the temperature at which the least rancidity developed. This study to date indicates that the lower the temperature the slower the development of rancidity. It was observed that the oil stored at temperatures below zero degrees centigrade showed very little evidence of rancidity, but another type of odor and flavor, entirely foreign from fresh oil, resulted, somewhat similar to a burnt odor or flavor. Simultaneously with the development of this odor the oil definitely changed from a clear amber to a reddish color.

As described in last year's annual report of this Division, the Bureau established a cooperative research program with the Musher Foundation, Inc., New York City, whereby chemists or technologists employed by this organization would work on the problem of oxidation or rancidity in fishery products in the Bureau's laboratories, and under the supervision of the Bureau's technologists. In connection with the preservation of Boston mackerel, the Musher Foundation had prepared in New England, under the supervision of S. R. Pottinger of the Bureau's technological staff, a series of samples of salt mackerel packed in barrels and pails. Since our cooperative problem with this organization involves the testing of cereal flours as inhibitors or antioxidants, two sets of samples were prepared, one set containing oat flour and the other packed in accordance with commercial practice, without the oat flour. The percentage of oat flour added to these samples varied between 2½ and 30 percent. In tests of these samples at the College Park laboratory for quality, the oat flour appeared to have a considerable antioxidant effect. However, it was found that in repacking the mackerel from barrels to pails no additional advantage was obtained by using the oat flour in the brine used in the pails.

The brine solution used in these packs interfered with accurate chemical tests to indicate the exact preservative effect of the oat flour. However, in actual cooking tests the results thus far indicate that the samples of salt mackerel treated with oat flour have a very palatable flavor. There was little difference in the appearance of the two sets of samples. In other words, the oat flour did not detract in any way from the pleasing appearance of the treated fish.

VARIATION IN THE FAT CONTENT OF HALIBUT

As mentioned in our report for 1935, the reason the bellies of some halibut turn bluish and mottled in color when frozen is because of a lack of fat storage under the skin. This makes the belly skin more or less transparent when the fish is in a frozen condition. Extreme variation in fat content of halibut results in marketing losses and may have relation to the biological work of the International Fisheries Commission in its study and regulation of the halibut fishery. In an effort to determine whether this lack of fatness, which might be

attributed to undernourishment, was characteristic of any particular fishing locality, samples of small, medium, and large halibut were obtained by the Commission and analyzed in our Seattle laboratory. Samples were taken periodically over the fishing season from area no. 2 where the halibut tend toward localization and area no. 3 where the halibut are known to be migratory. To date chemical analyses have been made of the fat content of the halibut taken from area no. 3. These failed to disclose any consistent relation between fat content and locality of capture.

It was found that the fat content of large halibut was in general higher than that of medium halibut and medium halibut likewise had a higher fat content than small halibut. There were, however, quite wide variations in fat content in each size group.

USE OF ANTIOXIDANTS IN PRESERVING FOOD-FISH PRODUCTS

As a part of the studies being carried on by the research associate of the Musher Foundation in our Seattle laboratory, a series of samples of frozen salmon and halibut, mild-cured salmon, kippered salmon, canned salmon, and Alaska salt herring were prepared in which cereal flours or cereal flour extracts were added for the purpose of retarding the development of rancidity. These are being stored pending observation from time to time. To date examinations on samples of canned salmon showed that where oat flour was used or where an extract of oat flour was sprayed on the inside of the can, there was a noticeable lessening of the characteristic fish odor and taste of the treated product. Whether this difference in odor and taste will continue after extended storage periods cannot be stated at this time.

IDENTIFICATION OF CANNED SALMON

From time to time regulatory bodies and others associated with the marketing of canned salmon are called upon to check the identity of the species of salmon used in canning. At present this is done largely on the basis of experience in judging the appearance of the canned product. Some years ago, however, there appeared in the literature an article[4] suggesting the possibility of identifying the various species of salmon by the iodine number of the oil in the flesh. In recent studies by the Bureau in which the physical and chemical characteristics of salmon waste oils were determined a similar grouping according to iodine number was observed. It was noted also that the refractive index and iodine number of each sample were very closely correlated. In view of the fact that the determination of refractive index might provide a very simple means for checking identity, technologists of our Seattle laboratory have begun the collection of samples of oil from canned salmon for the purpose of determining the probable merit of the method as a positive means of identification.

CANNING AQUATIC PRODUCTS

During 1936 the experimental studies in canning were continued with special attention to the development of improved methods for canning fishery products in the home or under noncommercial condi-

[4] "The determination of the hexabromide and iodine numbers of salmon oil as a means of identifying the species of canned salmon", by H. S. Bailey and J. M. Johnson, *Journal of Industrial and Engineering Chemistry*, vol. 10, pp. 999–1001 (1918).

tions. In general, data obtained during the year indicated the unsuitability of large-size containers such as quart jars for the home canning of fishery products. Attempts were made to develop a method for home canning of oysters, but our experiments indicated that it is somewhat doubtful whether conditions or equipment available in the usual home would justify the safety and economy of this procedure.

Certain shellfish, such as the mussel, are widely used in Europe, but largely unknown in this country, although the mussel is found in quantities along certain portions of our coast. Therefore, a series of packs of canned mussels was made to explore the possibility of a wider use of this mollusk. Examination of this series has not been completed, but it has been determined that canned products of good quality may be prepared from the mussel if a supply of large-size mussels can be obtained. Mussels smaller than 650–700 per bushel were found to be too small for economical canning.

In addition to the above-mentioned preparations, experimental packs during 1936 have included clams, clam chowder, surf clams, crab gumbo, oysters, shrimp, salmon, mullet, carp, finnan haddie, spiced mackerel, fish roe, and pet food. A report entitled "Canning Crab Gumbo" (special memorandum no. 1607–21), by Norman D. Jarvis, assistant technologist, was published and attracted considerable attention. One firm is considering packing this as a commercial product.

The review of existing commercial methods for canning sea foods, begun during the previous year, was continued in 1936. Considerable material has been collected and the section dealing with the principles on which canning is based has been completed. It is intended that this manuscript, when published, will be a complete review or bibliography on the entire fishery products canning industry. Several years will be required for the completion of this work.

During the first 2 months of 1936, our technologist in charge of experimental canning was again detailed to assist the North Carolina Fisheries, Inc., Morehead City, N. C., a cooperative organization of North Carolina fishermen, in development of processes and in plant operations with respect to the filleting, smoking, and salting of fishery products and in connection with studies of the possibilities for canning fishery products of that locality.

At the request of the Extension Service of the United States Department of Agriculture, a short course in the canning of fishery products was given in our Washington Laboratory to Miss Lorada Curtis, Extension Agent for the State of Alabama.

LOW-TEMPERATURE PRESERVATION OF PACIFIC OYSTERS

Pacific, or Japanese oysters, *Ostrea gigas*, are grown mainly in the State of Washington, and although the industry has not approached its potential output, producers have begun to feel the limitations of present markets. Greater opportunity for expansion might be expected by extending the normal season of consumption and by reaching more distant and more heavily populated consuming centers. An aid in accomplishing this would be the application of low-temperature preservation.

In view of the meager data of fundamental nature dealing with the preservation of Pacific oysters, Dr. Francis P. Griffiths was detailed from the College Park technological staff to Seattle, and was assigned

to investigate this problem. The immediate purpose of the investigation was to determine the maximum length of time oysters could be kept in a fresh unfrozen condition and to study the effects of freezing and cold storage of frozen oysters, as indicated by the quality and keeping properties of the thawed product. Inasmuch as our Seattle technological laboratory was not equipped for this type of work, H. C. Diehl, in charge of the Frozen Pack laboratory of the Bureau of Chemistry and Soils, United States Department of Agriculture, extended to our technologist the use of its facilities at the Spokane Street Terminal of the Seattle Port Commission.

The results of this study indicated that: (1) If fresh oysters of maximum quality are packed in ice in airtight containers they will remain in good condition for not more than 10 to 12 days, provided the container is in sufficiently good contact with the ice to maintain the contents at 32° F.; (2) there is a possibility of further extending the freshness of unfrozen oysters if kept between 30 to 31° F.; (3) oysters freeze at a temperature of between 29 and 30° F.; (4) oysters frozen in closed containers in brine at 0° F., and in air at −25° F. appeared to be in good condition when thawed after 6 weeks and kept fresh for about 5 days; (5) oysters of poor quality when frozen and thawed dripped considerably and presented an unappetizing appearance.

Unfortunately, we were not able to continue the storage studies beyond a period of 6 weeks because the technologist carrying on the work resigned. In view of this, the data obtained can be considered as indicative only and in no sense conclusive.

BACTERIOLOGICAL STUDIES

Our bacteriological studies have been closely correlated with other investigations of our technological staff as many of the latter investigations require a knowledge of the action of bacteria. These studies have included examinations of the experimental packs of canned fishery products to determine which processes produce sterility; bacterial counts on samples used in experiments on freezing oysters; studies of the role of bacteria in the different types of decomposition or spoilage described in preceding paragraphs, with special reference to the studies on mackerel; determinations of the effectiveness of formaldehyde and other chemical preservatives in preventing or retarding the development of bacterial spoilage in fishery byproducts; and other miscellaneous bacterial control problems.

DISINFECTANTS FOR SPONGES

As described in the 1935 report of this Division, at the request of the sponge industry, two student assistants employed by the National Youth Administration were assigned through the courtesy of George Washington University, Washington, D. C., in 1934, to develop a simple and inexpensive disinfectant which could be used for sterilizing sponges after use. This study was carried on during 1935 and until June 1936 in the laboratories of George Washington University as a cooperative investigation of this Bureau and of that institution. A disinfectant, consisting of a mixture of 1 percent of formalin, 1 percent of phenol, and 0.5 percent of chlorine solution in water has been found to be effective in sterilizing sponges for the purpose described above. This disinfectant could be prepared by the housewife or it could be compounded by any drug store for sale along with sponges.

PHARMACOLOGICAL STUDIES

Previous pharmacological studies by our staff have shown that the arsenic which occurs in shrimp is in a stable undissociated organic state. It is readily soluble in water and is rapidly eliminated by the kidneys. Further studies on the nature of this compound are being continued with the cooperation of Dr. C. W. Colver, Professor of organic chemistry at Kansas State College, who is attempting to isolate and identify this compound.

PRESERVATION OF FISHERY BYPRODUCTS

As in previous years, during 1936 there was great demand for information on the manufacture and utilization of byproducts from fish waste and other waste materials resulting from our harvest of products from the sea. During this past year, investigations concerning the preservation of fishery byproducts were carried on in our Seattle technological laboratory under the supervision of R. W. Harrison, associate technologist in charge, with the assistance of A. W. Anderson, assistant technologist, and Leslie Lowen, Richard Crosby, and Robert Rucker, research associates and student assistants; and in our College Park technological laboratory under the supervision of James M. Lemon, associate technologist in charge, with the assistance of S. R. Pottinger, junior technologist, M. E. Stansby, junior chemist, Joseph E. Puncochar, junior bacteriologist, and Harold E. Crowther, R. H. Flowers, and C. E. Swift, research associates and student assistants. Mr. Crowther is a bacteriologist and Messrs. Flowers and Swift are chemists, employed by the Aquacide Co., Washington, D. C., and assigned in a cooperative investigation to the Bureau's laboratories.

UTILIZATION OF SALMON CANNERY TRIMMINGS

In view of the importance of the problem surrounding the profitable use of salmon trimmings which has been mentioned in previous reports, the Bureau has continued its studies on ways and means of assisting the salmon industry toward greater and more profitable utilization of this material. Our investigations are demonstrating that the potentialities of the products obtainable from salmon trimmings are not fully appreciated and indicate the need for a further educational program. The value of fats and oils to consuming industries is influenced by their biological, physical, and chemical properties. Thus oils rich in vitamins are eligible and in demand for consumption in human and animal nutrition, in contrast with oils not possessing these properties. Likewise a certain industry may require fats and oils having a high iodine number while an oil not possessing this property may be of equal utility to another industry. More complete knowledge of the properties of salmon oils will not only serve in directing them into the most useful field of consumption but may also suggest new uses for them.

A study of the vitamin content of oils from cannery trimmings of salmon from the Columbia River and Puget Sound regions reveals that salmon oils are equal or superior to cod-liver oil as sources of vitamins A and D for human and animal nutrition. This work was done in cooperation with Dr. Arthur D. Holmes of the E. L. Patch Co., Boston, Mass. Another report is being prepared in which salmon wastes from Alaska cannery operations are evaluated as sources of vitamins.

Some 200 samples of salmon oil have been examined to determine their physical and chemical properties. These data which are now being assembled in report form will indicate to both producing and consuming industries the variation in nature of oil obtainable from the different portions of the waste and from the several species of salmon. For example, the oils varied in iodine number from as low as 104 to as high as 225, depending upon the portion of waste and the species from which they were prepared. The former oils had some properties closely resembling certain edible vegetable oils while the latter were more unsaturated than the majority of the best drying oils. With such differences in the nature of these oils it is readily apparent that present conceptions of salmon oil are not consistent with maximum utility.

EXTRACTION OF OIL FROM HALIBUT LIVERS

Increasing interest in fish-liver oils as concentrated sources of vitamins A and D has led to a rather general use of many types of fish livers for this purpose. Fat livers, such as those obtained from cod and haddock and related species give up oil readily by simple heat treatment. As a general rule the more concentrated vitamin oils are found in fish having lean livers which offer difficulty in extraction.

In our last report reference was made to work on the extraction of oil from halibut livers in connection with the preparation of authentic halibut-liver oil samples for study by the Food and Drug Administration and the Bureau of Chemistry and Soils. However, because of the increasing number of requests for information on methods of extracting oil from lean livers, these studies were continued during the past year. As a result a rather simple method with several modifications has been developed. This method in general involves a special mechanical disintegration of the liver, conversion of the liver into a soluble metaproteinate, and separation of the oil from the solution by centrifuging. The entire treatment requires less than an hour, does not require expensive chemicals or equipment, and gives good yields of a pure high quality oil. Details of the method together with data on the nature and variation of oil in halibut livers and related livers are now being assembled in form for publication during the coming year. An application for a public-service patent covering the process has been made.

PREVENTING RANCIDITY IN FISH AND FISH-LIVER OILS

Beginning November 1, 1935, the Musher Foundation, Inc., New York, appointed a research associate in our Seattle Laboratory for the purpose of studying the prevention of rancidity and general deterioration of fish oils, fish-liver oils, and other fishery byproducts, by treatment with, or incorporation of, especially prepared cereal flours for which the Foundation holds patents. This work was continued during 1936 and further expanded to include some preserved fishery food products.

Due to the unsaturated nature of the fatty components of fish, fish oil, and fatty fish are unusually susceptible to oxidative rancidity with the resultant development of off odors and flavors. Numerous chemical compounds have been found to possess antioxidant properties, i. e., retard oxidative rancidity, but most of these are not suitable for use in foods. Accordingly, food industries are anxious to find

antioxidant materials which will meet food regulatory requirements. The so-called natural antioxidants of certain edible materials are at present receiving widespread investigation. The cereal flours come under this classification.

In experiments carried on in our laboratories the addition of oat flour to fish oils was found to increase the fresh life of fish oils up to 60 percent as determined by peroxide formation and organoleptic test. The oat flour however did not prolong the induction period preceding autocatalytic peroxide formation but instead appeared to decrease the rate of peroxide formation. Further, the oat flour did not retard materially oxidative destruction of vitamin A. These data and related information were incorporated in a paper presented at the Pittsburgh meeting of the American Chemical Society and will appear shortly in the Journal of Industrial and Engineering Chemistry.

More recent work with cereal mixtures and cereal extracts indicates the possibility of much greater protection against rancidity than demonstrated by oat flour alone. These data show also that vitamin A protection is obtained with the latter materials and is closely associated with prolongation of the time preceding autocatalytic peroxide formation.

DETERMINING THE FAT CONTENT OF FISH MEAL

In Investigational Report No. 1 of the Bureau of Fisheries, entitled "The Menhaden Industry", which was published in 1931, data were given which demonstrated the fact that the extractable fat in fish meal decreased during storage. This was attributed to some of the oil becoming oxidized and consequently less soluble in the test solvent.

This condition together with the fact that uniform methods of determining fat in fish meal are not followed in testing laboratories has given rise to an aggravating situation. The Bureau has undertaken an investigation of the problem because of its relation to the sale and distribution of fish meal. The studies are concerned with the relative efficiency of various solvents as concerned with degree of extraction and rate of extraction, the nature of the material extracted, and the relation of oxidation of the oil in meal to the efficiency of the various solvents. Attention will be given also to the possibility of determining and reporting fat content in a manner which will be indicative of the nature of the fat in the meal. A discussion of the problem and scope of work contemplated was given before the meeting of the Association of Official Agricultural Chemists in Washington, D. C., in December 1936, but the actual experimental work has not progressed to a point warranting discussion here.

CHEMICAL PRESERVATION OF FISH AND FISH WASTE

As in 1935, we continued during 1936 in our College Park laboratories a cooperative investigation with research associates employed by the Aquacide Co., Washington, D. C., in making tests of various chemical preservatives used on raw fish and raw fish waste in the production of fish meals and oils. In some cases, the meals and oils made from these chemically preserved samples were tested with respect to edibility and palatability on albino rats in our nutrition laboratory. The results of these experiments have been exceedingly encouraging and show clearly that fish may be preserved in relatively dilute chemical solutions. The products which were studied included salmon, menhaden, cod, and haddock waste, redfish waste, sea herring,

and the livers of various fish including cod and related species, halibut, swordfish, and California tuna. Many of these experimentally prepared products were chemically preserved at sea and forwarded to our College Park laboratories for tests. These samples were tested bacteriologically for evidence of decomposition and the finished products, such as oil and meal, were tested chemically and nutritionally.

It has been found that certain of the volatile aldehydes, particularly acetaldehyde, readily sterilize the raw material and may be removed by the application of heat in the conventional rendering process. It has also been found that on the application of heat through material preserved in some of the aldehydes, the material becomes increasingly firm, thus reducing to a considerable extent the softening action of cooking ordinarily encountered in the rendering of fish waste.

In view of the progress being made in the United States and abroad looking toward the utilization and preparation of special glandular and pharmaceutical products from the vital organs of fish, the above cooperative arrangement was extended to include some preliminary studies in that field. Entrails or vital organs of cod or related species preserved at sea were received at the laboratory and segregated according to organs. The initial work was confined to a study of the pyloric caeca and the male gonads. The work on pyloric caeca was in the nature of a continuation of similar studies done by W. W. Johnston of the Biological Board of Canada. Mr. Johnston discovered that the pyloric caeca of fish, when promptly dehydrated, are exceptionally effective as bates for tanning of leather. The object of our experiments with pyloric caeca was to determine whether chemically preserved pyloric caeca may be used in the production of bates in the same manner as fresh pyloric caeca. The difficulty in the handling of this product heretofore has been that some trouble was encountered in dehydrating this material at sea on commercial fishing vessels. Preliminary work on male gonads has been undertaken for the purpose of determining whether protamine may be produced from the chemically preserved raw material. The difficulties of producing protamine from the raw material at sea have been substantially the same with respect to dehydration of the raw material, as was encountered in the production of bates for tanning from pyloric caeca.

Although the above-described phase of this cooperative project on the utilization of fish organs is in a preliminary stage, it is anticipated that, with the finding of new and useful products obtainable from the various organs, it will be profitable for the cod and haddock fishermen to save the entrails and other vital organs now discarded at sea. Up to the present, it has been customary for the fishermen occasionally to save some of the livers and it is now hoped that it can also be made profitable to fishermen to save other vital organs as well.

NUTRITIVE VALUE OF AQUATIC PRODUCTS

The importance of conducting studies of the nutritive value of aquatic products is readily recognized when it is realized that the fisheries constitute a basic food industry. For this reason food research is the major part of the Bureau's technological investigations. Not only is it necessary to determine the fundamental chemical composition and nutritive value of aquatic products as a foundation for truly evaluating their economic and dietary importance, but nutrition tests constitute the only true yardstick or standard of measurement for

determining the value of technological improvements in methods of manufacture, preservation, handling, and storage of such products.

During 1936, nutrition investigations were conducted in the Bureau's College Park laboratory, in the laboratories of the State Medical College, Charleston, S. C., in the laboratories of the University of Maryland, and the Maryland State Agricultural Experiment Station, and in the laboratories of Western Maryland College, Westminster, Md., by E. J. Coulson, Charles F. Lee and Dr. Francis P. Griffiths of our technological staff; William B. Lanham, Jr., and Miss Thelma Chell, student assistants; Dr. Roe E. Remington, Nutrition Department, State Medical College, Charleston, S. C.; Prof. Samuel B. Scofield, of the chemistry department of Western Maryland College; and Dr. W. C. Supplee and M. H. Berry of the Staff of the University of Maryland and the Maryland State Agricultural Experiment Station.

VITAMIN CONTENT OF FISH-LIVER OILS

Determinations of vitamins A and D on approximately 25 samples of halibut liver oil were completed during the past year in connection with our cooperative arrangement with the Bureau of Chemistry and Soils and the Food and Drug Administration of the United States Department of Agriculture. As a result of these determinations a large variation was found in the vitamin potency of the halibut-liver oils tested, ranging from 5,000 to 210,000 vitamin A units per gram, U. S. P. X. and from 600 to 3,000 vitamin D units per gram U. S. P. X. Most of the samples, however, averaged around 30,000 to 70,000 vitamin A units per gram and 1,200 to 1,600 vitamin D units per gram according to U. S. P. X. tests.

The Bureau's nutrition laboratory at College Park also completed vitamin studies of the salmon oil samples submitted by our Seattle laboratory and referred to elsewhere in this report.

VITAMIN CONTENT OF FRESH FISH FLESH

An investigation of the amount of vitamin A in the edible portions of fresh fish and shellfish was begun during 1936. This covered tests of sea trout, clams, oysters, shrimp, striped bass, and bluefish, and indicated that the vitamin potency of these foods varied from less than ½ to 5 units of vitamin A per gram. The different species ranked as follows in vitamin potency: Oysters highest, clams a close second, shrimp third, then sea trout and bluefish (about equal), and finally striped bass showing almost no vitamin A. Oysters are approximately 6 to 10 times as high in vitamin A as sea trout and bluefish, possibly due to the fact that the entire body of the oyster (which is edible) was tested.

It should be emphasized that these are preliminary tests and that definite conclusions should not be drawn until more complete data are available.

NUTRITIVE VALUE OF SHELLFISH

At the request of Dr. A. C. Hunter of the Food and Drug Administration, U. S. Department of Agriculture, E. J. Coulson of our technological staff summarized the literature on the nutritive value of shellfish, including complete references. From this a report was then prepared by Dr. Roe E. Remington, Department of Nutrition, State

Medical College, Charleston, S. C., and Mr. Coulson, which was submitted to Dr. Hunter for inclusion as a chapter in a book to be published by the American Public Health Association, entitled, "Standard Methods for the Examination of Shellfish."

CHEMICAL COMPOSITION AND NUTRITIVE VALUE OF FISH PROTEINS

This investigation, begun during the latter part of 1935, has consisted of a detailed study of fish proteins. Because of their importance in nutrition as constituents of these proteins, the amounts of the amino acids, cystine, tryptophane, arginine, histidine, and lysine were determined in the following species of fish and shellfish: Boston mackerel, Spanish mackerel, cod, shad, shrimp, croaker, halibut, red snapper, oysters, clams, and haddock. Also the same amino acid determinations, except cystine, were made on casein, a protein which is generally used as the standard or control protein in all determinations of this character.

Studies of the metabolism or biological value of some of these fish proteins were carried on in our nutrition laboratory by the use of albino rats. Casein was used as the control protein in making these feeding tests. At the present time, these studies have progressed far enough to indicate the relative biological value of the protein in three species of fish. The protein of Boston mackerel, Spanish mackerel, and haddock were compared with respect to each other and with reference to casein as to their value in growth promotion, maintenance of body weight and digestibility. Synthetic diets containing 9 percent of fish protein produced approximately the same gain in weight per gram of protein eaten for each of the above-named species of fish. All three of them proved superior to casein. However, in diets containing 18 percent of protein, the fish proteins produced about equal growth to that of casein. The data on maintenance of body weight indicated that all three of the fish proteins were superior to casein and Boston mackerel probably was the best of the lot. Haddock was the most completely digested fish protein and was closely followed by Spanish and Boston mackerel in this respect.

MINERAL CONSTITUENTS OF FISHERY PRODUCTS AND BYPRODUCTS

Studies of the mineral constituents of fishery products and byproducts were continued by E. J. Coulson, assistant pharmacologist of the Bureau's technological staff, stationed in the laboratories of the State Medical College, Charleston, S. C., with special reference to the role of these mineral constituents in nutrition. Chemical determinations of the amount of calcium, phosphorous, magnesium, iron, copper, sulphur, iodine, and arsenic were made in the principal commercial species of fish and shellfish during the past year. With the resignation of Mr. Coulson, this work is being continued by another investigator.

The principal mineral nutrients of value to man and animal are calcium, phosphorus, iron, copper, iodine, and sulphur. It has been known for a long time that most fishery products are exceptionally good sources of these minerals and the above described studies further verify and amplify this information.

MENHADEN OIL FOR POULTRY FEEDING

The cooperative studies of menhaden oil for use in poultry feeding, as described in last year's report of this Division, were continued by Dr. W. C. Supplee of the Chemistry Department of the University of Maryland and our nutrition laboratory. These tests were made on both albino rats and baby chicks. They continued to show that menhaden oil is at least equal to the average cod-liver oil as a source of vitamin D for poultry feeding.

MENHADEN MEAL FOR CATTLE FEEDING

The studies of the relative value of steam-dried and flame-dried menhaden meal described in the 1935 report of this Division, in the dairy ration, carried on by the Maryland State Agricultural Experiment Station in cooperation with our technological staff were completed. The results of these feeding experiments extended over a period of 2 years, and were published in the October 1936 issue of the Journal of Dairy Science in a report entitled "Comparison of the feeding value of steam-dried and flame-dried menhaden fish meal", by M. H. Berry and J. R. Manning. The tests showed conclusively that menhaden fish meal is an excellent ingredient of the dairy ration. There was no significant difference in the relative nutritive value of the steam-dried and flame-dried meals. This is in contrast to tests conducted previously on smaller farm animals, such as swine and poultry, where the steam-dried menhaden fish meal was found to be superior to the flame-dried product.

OILY FISH MEALS IN ANIMAL FEEDING

During the year the Bureau continued its cooperation with the Department of Poultry Husbandry at the State College of Washington for the purpose of studying the nutritive value of fish meals. As mentioned in our last report attention was being given to vitamin A and D retention in fish meals. Experimental salmon meals were found to provide adequate vitamin D in the poultry ration and if stored properly showed no apparent destruction of this vitamin after 1 year. The use of antioxidants in fish meals is being investigated also.

FISH COOKERY STUDIES AND DEMONSTRATIONS

In recent years there has been a great demand on the Bureau of Fisheries from housewives, proprietors of public and institutional eating places, and others for fish cookery recipes and instructions. To meet this demand, the Bureau has continued its researches on the development of practical and economical recipes for cooking fish and also has given fish cookery lectures and demonstrations to interested groups of people.

During the past year Agnes I. Webster, fish cookery expert of the Division, continued her researches in our fish cookery laboratory toward developing economical recipes using fish for mass feeding in school and institutional dining rooms. Many of the recipes developed are now being tested on a quantity basis in the school lunchrooms in Baltimore, Md. In connection with this program a series of cards or posters were prepared, telling in brief the food value of fish and

shellfish. These are being used on the counters in the lunchrooms of the cooperating schools in Baltimore to arouse the interest of the school children in eating the fish dishes offered for sale.

Miss Webster also conducted a series of experiments in the cooking of hard, frozen fish (i. e. frozen fish that had not been thawed) and succeeded in developing tasty recipes for cooking frozen swordfish, whiting, pollock, Boston mackerel, halibut, bluefish, and others. By the methods developed the juices which are frozen in the flesh of the fish are not lost in the cooking process.

Other laboratory work included the development of methods for boning fish; for the utilization of fish trimmings and carcasses in making stock or glaze, which end-products later can be used in the preparation of soups, sauces, and the like; and for elimination of odors in the cooking of fish. All of this work has been aimed toward developing technique which can be used to overcome some of the popular misconceptions and prejudices surrounding fish, which have hitherto retarded consumption.

During a considerable portion of the year the Bureau cooperated with the Department of Agriculture of the State of Massachusetts and the fishery industry in that State in conducting a series of fish-cookery demonstrations and lectures for women, girls, school lunch-room managers, home-economics teachers, and college students. At these meetings, conducted by Miss Webster, she emphasized the food value of fishery products, ease and quickness in preparing such products for the table, how to remove bones from fish, how to utilize trimmings and carcasses for food purposes, and how to eliminate odors in cooking fish. An important part of each lecture consisted in acquainting those in attendance with the wide variety of fish available for purchase in Massachusetts, and seasons when they are in abundance.

Some 15,000 consumers were reached in the following cities and towns of Massachusetts:

City	Number of meetings	City	Number of meetings
Andover	1	Maynard	1
Athol	2	Milford	2
Boston	5	New Bedford	3
Bourne	1	Newburyport	1
Brockton	2	Newton Center	2
Charlton	1	North Adams	2
Chicopee	1	North Attleboro	1
Clinton	1	Northampton	2
Dalton	1	Orange	1
Fairhaven	1	Pembroke	1
Fitchburg	2	Pittsfield	2
Framingham	1	Quincy	1
Franklin	2	Rockport	1
Gardner	1	Roxbury	1
Gloucester	2	Salem	2
Great Barrington	2	Sharon	1
Greenfield	2	Shelburne Falls	1
Groton	1	Southbridge	2
Haverhill	2	South Hamilton	1
Holden	1	Springfield	5
Holyoke	3	Stoughton	1
Hyannis	1	Turners Falls	1
Lawrence	2	Ware	2
Lowell	3	Westfield	3
Marblehead	1	Worcester	3

Six fish-cookery lectures and demonstrations also were given in Washington, D. C., to groups of women in cooperation with the Consumers' Council of Washington, D. C., and one to a group of school lunchroom managers in Baltimore, Md.

RESEARCH ASSOCIATES AND STUDENT ASSISTANTS

Because of the relatively small size of the Bureau's technological staff and the rather broad field of research it must cover, it is only possible to undertake those problems which are of a fundamental nature and which promise to be of the greatest value to the largest number of persons (whose livelihood depends in whole or in part on the fisheries), and which are possible with the funds and personnel available. For this reason, the Division cannot, with present facilities, attack problems of special or restricted interest affecting certain products, processes, methods, or industries. However, the Bureau has available, by congressional authorization and under an arrangement similar to that of other scientific Government bureaus, facilities for research associates and student assistants in its laboratories. The salaries and expenses of these employees are paid by the firms or groups who are interested in the problems on which they are working and the investigations are carried out under the supervision of the Bureau's technologists in its laboratories and under its control. Thus the Bureau provides these industries and groups with laboratory, consulting, and library facilities which, in most instances, cannot be obtained elsewhere.

Within the limits of its facilities, the Bureau also has opened its technological laboratories to research students who are pursuing courses in universities and who are selecting investigational problems in the fisheries as their major study. This may prove of special benefit to the industry as it brings its problems to the attention of a large group of research workers who in turn may spread interest to applied fishery research.

The following research associates and student assistants carried on investigations under the supervision of our technological staff during the past year:

In the College Park laboratory, W. J. Hart, research associate, employed by the Musher Foundation, Inc., New York City, working on the problem of rancidity in fatty fish; George Tarrant, R. H. Flowers, C. E. Swift, Harold E. Crowther, and Joseph F. Puncochar (part time), research associates, employed by the Aquacide Co., Washington, D. C., working on problems in the chemical preservation of fishery byproducts; William B. Lanham, Jr., Hillman C. Harris, and Willis H. Baldwin, part-time graduate student assistants, employed by the Bureau of Fisheries and working on problems in the chemistry and metabolism of fish proteins; James W. McCurley, Roscoe Dwiggins, Robert D. Nichols, G. E. Linthicum, Amiel Kirshbaum, Raymond N. Miskimon, George W. Dorr, H. H. Hemsley, C. R. Langmaid, George W. Knepley, Walter Schauffele, Wade Wood, Ned Oakley, Abraham Scop, A. N. Chumbris, K. Krulevitz, Edward J. Kennedy, John Webster, and T. N. Scharf, student assistants provided by the National Youth Administration through the University of Maryland.

In the Seattle technological laboratory, Lyle Anderson and Leslie Lowen, research associates employed by the Musher Foundation, Inc.,

New York City, working on the problem of rancidity in fish livers, oils, and meals; Myron Thurman, Robert Rucker, and Richard Crosby, student assistants, provided by the National Youth Administration, through the University of Washington.

In the laboratory of the State Medical College at Charleston, S. C., Cecil Leroy Smith, chemist, provided by the Works Progress Administration through the State Medical College and assisting Mr. Coulson of our technological staff in studies of the pharmacology and nutritive value of mineral constituents in fishery products.

At Western Maryland College, Westminster, Md., Miss Thelma Chell, graduate student assistant, employed part time by the Bureau of Fisheries and studying the chemistry of fish proteins; William F. Coleman, Miss Helen H. Frey, and Miss Louella H. Mead, student assistants provided by the National Youth Administration through Western Maryland College and assisting Miss Chell in her study of fish proteins.

At George Washington University, Washington, D. C., William H. Conway and William J. P. Howard, senior medical students provided by the National Youth Administration through the university and working on the problem of the development of disinfectants for sponges for household use.

The details of the above problems have been described in the preceding pages.

EDUCATIONAL AND CONSULTING SERVICE

In addition to the research activities described in this report, our economic and technological staffs conduct, along with their regular duties, an educational and consulting service for those interested in the fisheries. During the past year the demand for this type of service has increased. Many requests have been received from groups and individuals to demonstrate improved methods developed in our laboratories for the handling and processing of fishery products, for instruction in fish cookery, and for aid in improving various marketing practices. Insofar as our facilities have permitted, we have complied with these requests, endeavoring to offer assistance first where the request has come from a large group or industry. We are not able to comply with all of the requests received because of insufficient personnel that could be spared from regular research work, and, because of inadequate funds to provide for the travel expenses of the demonstrators.

In regard to the above, it should be mentioned that the rendering of a demonstration service to the fishery industry has promise, among other things, of improving the quality of the pack and of increasing the consumption of fishery products. For instance, many persons engaged in the industry at remote points are unfamiliar with improved methods for handling fresh fish to assure it reaching consumers in prime condition. This often has resulted in delivering fish of inferior quality to the market, which have brought low returns to the producer. Proper instruction in the handling and preserving of fish should result not only in delivering higher-quality fish to the market, but also in improving the financial status of producers.

On the part of consumers, the nutritive value of fish and other aquatic foods is not generally recognized. As a class these foods are rich in protein and vitamins, and minerals in quantity and variety. The diet of our people should include generous amounts of these foods

so that the general health of the Nation will be conserved. Fish-cookery demonstrations should aid materially in educating consumers as to the wholesomeness of fishery products.

Some of the educational services rendered are discussed or referred to in previous paragraphs of this report. In brief, this work has covered the fields of commercial preserving of fishery products, fish cookery in the home, and the cooperative marketing of aquatic products.

Another phase of this service has consisted in answering thousands of letters directed to the Bureau on fishery subjects, and in supplying information to persons who have called at the Bureau, personally. Many of the latter came from foreign lands to seek fishery information which might be useful in the conduct of the industry in their native country.

PUBLICATIONS OF THE DIVISION

During the calendar year 1936 the following publications were prepared and addresses delivered by members of the Division's staff. These do not include the monthly statistical bulletins of the landings of fishery products at Boston and Gloucester, Mass., Portland, Maine, and Seattle, Wash., nor the monthly reports on cold-storage holdings of frozen fish and quantities of fish frozen. The fishery reports and circulars may be purchased at the prices shown from the Superintendent of Documents, Government Printing Office, Washington, D. C. The statistical bulletins and special or S-memoranda are distributed free of charge upon request to the Bureau. The special articles may be obtained frm the sources of publication.

Those wishing to receive current copies of this report and statistical bulletins issued by the Bureau should request that their names be placed on the Bureau's mailing lists nos. 128 for the annual statistical report, 128a for general statistical bulletins, and 128b for monthly cold-storage reports. Those desiring historical statistical data on the domestic fisheries for the period 1880 to 1929 should consult the report entitled "Fishery Industries of the United States, 1930", by R. H. Fiedler, appendix II to the report of the United States Commissioner of Fisheries for the Fiscal Year 1931. Statistical information for the years 1930 to 1934, inclusive, may be obtained from the annual reports of the Division for the years 1931 to 1935, inclusive.

DOCUMENTS, REPORTS, AND CIRCULARS

FIEDLER, R. H.

Fishery industries of the United States, 1935. 8°, 348 pp. Administrative Report No. 24. Appendix II to Report of Commissioner of Fisheries. 30 cents.

The story of oysters. 8°, 29 pp., 21 figs. Fishery Circular No. 21, 1936. 5 cents.

JARVIS, NORMAN D. and FRANCIS P. GRIFFITHS.

The home canning of fishery products. 8°, 16 pp., 5 figs. Investigational Report No. 34. 5 cents.

SALTER, L. C.

Organizing and incorporating fishery cooperative marketing associations. 8°, 38 pp. Fishery Circular No. 22. 5 cents.

SPECIAL ARTICLES AND ADDRESSES

BERRY, M. H., and J. R. MANNING.

Comparison of the feeding value of steam dried and flame dried menhaden fish meal. Bureau of Fisheries' Special Memorandum 2295–M, Washington, D. C. Reprinted from Journal of Dairy Science, vol. XIX, No. 10, pp. 663–669, October 1936, Columbus, Ohio.

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The modern fish retailer. Atlantic Fisherman, April–May 1936, Manchester, N. H.

COULSON, E. J.
Associate referee's report on copper. Published in Journal of the Association of Official Agricultural Chemists, vol. 19, pp. 219–228, May 1936, Washington, D. C.
Iodine content of fishery products and simple goiter. Bureau of Fisheries' Special Memorandum 3233, Washington, D. C.
Oysters and anemia. Bureau of Fisheries' Special Memorandum 3234, Washington, D. C.

FIEDLER, R. H.
Consider the fishes. Bureau of Fisheries' Special Memorandum 3232, Washington, D. C. Also published in Fish & Oyster Reporter, November 1936, Tampa, Fla.
Keep the fishermen fishing. Fishing Gazette, 1936 Annual Review Number, vol. 53, No. 7, New York, N. Y.
Marine Wealth of Texas. Southwest Business, July 1936, Dallas, Tex.
Washington's fish market. Address delivered over radio station WMAL, Washington, D. C., October 30, 1936.
Expansion of the fisheries. Fishing Gazette, October 1936, New York, N. Y.
Food value of oysters. Western Fisheries, October 1936, Vancouver, B. C.
Eat seafoods for health. Western Fisheries, December 1936, Vancouver, B. C.
The factory ship—Its significance to our world trade and commerce. Transactions of the American Fisheries Society, vol. 66, 1936. Washington, D. C.

HARRISON, ROGER W.
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Byproducts show increased value and importance to the fisheries. Fishing Gazette, September 1936, New York, N. Y.
Fishery byproducts in our daily life. Address before the Town Club, Seattle, Wash., November 25, 1936.
Fat in fish meals. Paper before the Feedstuff Section of the Association of Official Agricultural Chemists, Washington, D. C., December 2, 1936.

JARVIS, NORMAN D.
Salmon canning. Bureau of Fisheries' Memorandum S–340, Washington, D. C.
Alaskan Scotch-cured herring. Bureau of Fisheries' Memorandum S–342, Washington, D. C.
Canning crab gumbo. Bureau of Fisheries' Special Memorandum 1607–21, Washington, D. C.
Mild-curing, pickling, dry-salting, and smoking salmon. Bureau of Fisheries' Memorandum S–343, Washington, D. C.

JOHNSON, FRED F.
Surveying the fisheries statistically. Fishing Gazette, 1936, Annual Review Number, vol 53, No. 7, New York, N. Y.
Fishery statistics and angling. Address delivered over radio station WMAL, Washington, D. C., June 26, 1936.

LEMON, J. M., F. P. GRIFFITHS, and M. E. STANSBY.
Mutual extractor for laboratory use. Industrial and Engineering Chemistry. Analytical Edition, November 15, 1936, Easton, Pa.

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Technology in the Government service. Address before the Colgate University group at Brookings Institution, November 11, 1936, Washington, D. C.
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The nutritive value of shellfish. Address before the Chemistry Section, South Carolina Academy of Science, Rock Hill, S. C., April 25, 1936. Abstracted in Bulletin of the South Carolina Academy of Science, vol. 2 1936, Charleston, S. C.

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STATISTICAL BULLETINS

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Fisheries of the South Atlantic and Gulf States, 1934. Statistical Bulletin No. 1179.

Fisheries of the Pacific Coast States, 1934. Statistical Bulletin No. 1178.

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Fisheries of the United States and Alaska. Statistical Bulletin No. 1183.

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Landings by fishing vessels at the three principal New England ports, 1935—by months. Statistical Bulletin No. 1163.

Landings by fishing vessels at the three principal New England ports, 1935—by gear and fishing grounds. Statistical Bulletin No. 1164.

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Part 2. FISHERY STATISTICS

GENERAL REVIEW

Based upon available statistics for 1935, there was a large increase in the catch of fishery products in the United States and Alaska as compared with that of 1933. Statistics of the catch were collected for both 1933 and 1935 in the important New England, Middle Atlantic, Chesapeake, and Pacific sections and in Alaska, and when considering the combined catch of these sections alone, an increase of 45 percent in the volume and 34 percent in the value of the catch is indicated over 1933. Only three sections were surveyed in both 1934 and 1935. These were the Chesapeake and Pacific States, and Alaska. The Pacific States showed increases in both the quantity and value of the catch in the more recent year while decreases were reflected in the catches of the other two sections.

The total annual catch of fishery products in the United States and Alaska as based on the most recent surveys, amounted to 4,152,349,000 pounds, valued at $80,121,000. About 125,000 fishermen were employed in making this catch.

In 1935 in the United States and Alaska, the production of canned fishery products amounted to 672,755,960 pounds, valued at $74,999,034; the output of byproducts was valued at $29,839,277; and the production of frozen fishery products (excluding frozen packaged fish and shellfish), amounted to 93,566,495 pounds, estimated to be valued at $8,600,000. Based on the most recent surveys the production of

cured fishery products amounted to 120,516,387 pounds, valued at $15,691,380 and fresh and frozen packaged fish and shellfish 191,273,299 pounds, valued at $25,378,622. It is estimated that about 675,000,000 pounds of fresh fishery products (excluding fresh-packaged fish and shellfish), valued at about $53,000,000 were marketed during 1935. The total marketed value to domestic primary handlers of all fishery products in 1935 is estimated at $210,000,000.

Fishery products imported for consumption were valued at $36,231,959 and domestic exports were valued at $14,374,016.

New England States.—The commercial catch of fishery products in these States for 1935 showed an increase in both volume and value as compared with 1933 when the first preceding survey of the complete catch in these States was made. With the exception of the catches for 1929 and 1930 the volume of the catch in 1935 was the largest on record. There were large increases in both the volume and value of the combined landings of fishery products by vessels at Boston and Gloucester, Mass., and Portland, Maine, in 1935 as compared with 1934. There also were important increases in the production of sardines and frozen fish in 1935 as compared with the preceding year.

Middle Atlantic States.—The catch of fishery products in the Middle Atlantic States showed a large increase in both volume and value as compared with the catch in 1933 when the first previous survey was made. The volume of the catch in 1935 exceeded that of any previous year for which records are available since 1921. There was a decrease in the production of frozen fish in 1935 as compared with the preceding year, but a large increase in the catch of shad on the Hudson River in 1935 as compared with 1934.

Chesapeake Bay States.—In 1935 the catch of fishery products in the Chesapeake Bay States decreased in both volume and value as compared with the preceding year. The value of the production of menhaden products as well as the volume and value of the catch of shad in the Potomac River in 1935 increased over the preceding year.

South Atlantic and Gulf States.—No survey was made of the commercial catch of fishery products in the South Atlantic and Gulf States during 1935. In 1934 there was a large increase in both the volume and value of the catch as compared with 1932 when the first preceding survey of the catch was made. There were increased packs of canned shrimp and oysters in 1935 as compared with the preceding year.

Pacific Coast States.—The commercial catch of fishery products in these States for 1935 was the largest of any year on record and the value of the catch exceeded that of any previous year except 1929. The value of manufactured fishery products produced in the Pacific Coast States was 25 percent greater than the value of the production for the previous year.

Lake States.—No survey has yet been made for statistics of the catch of the fisheries of the Great Lakes and the international lakes of northern Minnesota for 1935. In 1934, when the most recent survey was made, the catch of fish in this section exceeded any year since 1918.

Mississippi River and tributaries.—The most recent complete statistics of the catch of the Mississippi River and tributaries are those collected for 1931. As compared with 1922, when the most recent preceding survey was made, there was a decrease in the catch. This decrease was reflected principally in a smaller catch of fresh-water mussels. A survey made for Lakes Pepin and Keokuk and the

Mississippi River between these two lakes showed an increase in 1935 as compared with the preceding year. The production of fresh-water mussel-shell buttons decreased in 1935.

Alaska.—The catch of fishery products in Alaska in 1935 decreased in both volume and value as compared with 1934. The pack of canned salmon was considerably less than in the preceding year. There also was a decrease in both the volume and value of the production of frozen fish; a decrease in the volume but an increase in the value of fresh fish; but increases in both the volume and value of the production of cured fish and fishery byproducts.

Fisheries of the United States and Alaska

SUMMARY OF CATCH: BY SECTIONS

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Product	New England, 1935, Area XXII		Middle Atlantic, 1935, Area XXIII		Chesapeake, 1935, Area XXIII		South Atlantic and Gulf, 1934, Areas XXIV and XXV		Pacific, 1935	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Fish	609,136	12,539	245,728	2,904	192,889	1,896	288,015	4,435	1,648,155	20,940
Shellfish, etc	46,294	5,445	33,710	3,512	72,938	3,628	159,899	5,559	22,357	1,994
Whale products									5,724	155
Total	655,430	17,984	279,438	6,416	265,827	5,524	447,914	9,994	1,676,236	23,089

Product	Lakes, 1934		Mississippi River and tributaries, 1931		Alaska, 1935		Total for the various years	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Fish	93,241	5,068	44,062	2,257	635,793	8,556	3,757,019	58,595
Shellfish, etc	3,170	56	38,321	640	2,543	147	379,232	20,981
Whale products					10,374	390	16,098	545
Total	96,411	5,124	82,383	2,897	648,710	9,093	4,152,349	80,121

NOTE.—The roman numerals appearing under the names of the sections are the numbers given these areas by the North American Council on Fishery Investigations. It should be explained that there are included under these areas craft whose principal fishing ports are in the respective areas but at times they may fish elsewhere.

OPERATING UNITS: BY SECTIONS

Item	New England, 1935	Middle Atlantic, 1935	Chesapeake, 1935	South Atlantic and Gulf, 1934 [1]	Pacific, 1935
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	5,023	2,499	2,118	2,914	7,087
On boats and shore	13,426	7,121	16,998	21,984	13,496
Total	18,449	9,620	19,116	24,898	20,583
Vessels:					
Steam	39	19	22		2
Net tonnage	5,977	2,000	2,480		41
Motor	582	368	125	710	1,034
Net tonnage	16,074	5,834	2,057	8,789	26,642
Sail		4	140	30	5
Net tonnage		29	1,694	298	2,170
Total vessels	621	391	287	740	1,041
Total net tonnage	22,051	7,953	6,231	9,087	28,853
Boats:					
Motor	4,457	1,830	6,576	6,309	5,256
Other	4,623	3,251	6,156	8,089	854
Accessory boats	857	177	86	198	689
Apparatus:					
Haul seines	140	260	408	852	236
Purse seines	157	38	29	40	427
Lampara nets					220

[1] Includes the fisheries of Lake Okeechobee, Fla.

Fisheries of the United States and Alaska—Continued

OPERATING UNITS: BY SECTIONS—Continued

Item	New England, 1935	Middle Atlantic, 1935	Chesapeake, 1935	South Atlantic and Gulf, 1934	Pacific, 1935
Apparatus—Continued.	*Number*	*Number*	*Number*	*Number*	*Number*
Otter trawls	479	175	23	3,051	41
Beam trawls					29
Paranzella nets					11
Gill nets	6,319	1,619	11,254	10,581	3,851
Trammel nets				425	47
Pound nets, trap nets, and weirs	457	577	2,541	1,551	59
Stop nets		68	5	9	
Fyke nets	303	1,655	3,272	490	1,628
Bag nets	148				10
Other nets [2]	457	489	3,181	14,486	595
Hooks, baits, or snoods	3,236,009	474,013	1,926,290	609,206	1,133,525
Fish wheels				33	
Eel pots and traps	3,016	5,849	13,761	790	
Brush traps				25,250	
Lobster pots and traps	289,487	17,449			6,258
Crab, crawfish, and turtle pots, and traps	6,107	10	56	2,654	27,336
Clam dredges	63	68		1	
Crab dredges		61	211		
Mussel dredges		9			
Oyster dredges	160	346	706	662	4
Scallop dredges	3,587	490		6	
Crab scrapes			716		
Tongs, rakes, shovels, hoes, forks, picks, etc	5,721	4,938	9,245	2,877	4,980
Diving outfits				53	21
Other apparatus [3]	1,505	8,729	141	4,473	59

Item	Lakes, 1934	Mississippi River and tributaries, 1931	Alaska, 1935	Total for the various years
Fishermen:	*Number*	*Number*	*Number*	*Number*
On vessels	1,703		[5] 9,208	30,552
On boats and shore	5,876	15,884		94,785
Total	7,579	15,884	9,208	125,337
Vessels:				
Steam	76		7	165
Net tonnage	1,716		547	12,851
Motor	414		838	4,071
Net tonnage	4,581		11,298	75,275
Sail				179
Net tonnage				4,191
Total vessels	490		845	4,415
Total net tonnage	6,297		11,845	92,317
Boats:				
Motor	1,720	4,426	1,257	31,831
Other	1,350	10,120	2,732	37,174
Accessory boats	18			2,025
Apparatus:				
Haul seines	254	1,013	196	3,359
Purse seines			860	1,551
Lampara nets				220
Otter trawls				3,769
Beam trawls			12	41
Paranzella nets				11
Gill nets	98,012	101	2,430	134,167
Trammel nets	123	518		1,113
Pound nets, trap nets, and weirs	9,008	374	458	15,025
Stop nets				82
Fyke nets	2,821	32,541		42,710
Bag nets				158
Other nets [2]		191		19,399
Hooks, baits, or snoods	726,986	2,459,179	(4)	10,565,208
Fish wheels			297	330
Eel pots and traps				22,916
Brush traps				25,250
Lobster pots and traps				313,144
Crab, crawfish, and turtle pots, and traps	2,710	456	3,785	43,114

[1] Includes persons in boat and shore fisheries.
[2] Includes dip nets, push nets, reef nets, scap nets, drag nets, cast nets, and drop nets.
[3] Number not determined.
[4] Includes periwinkle, cockle, and fish pots, harpoons, spears, and wire baskets.

Fisheries of the United States and Alaska—Continued

OPERATING UNITS: BY SECTIONS—Continued

Item	Lakes, 1934	Mississippi River and tributaries, 1931	Alaska, 1935	Total for the various years
Apparatus—Continued.	*Number*	*Number*	*Number*	*Number*
Clam dredges				132
Crab dredges				272
Mussel dredges		440		449
Oyster dredges				1,878
Scallop dredges				4,083
Crab scrapes				716
Tongs, rakes, shovels, hoes, forks, picks, etc.	142	3,994		31,897
Diving outfits	16			90
Crowfoot bars	685	4,480		5,165
Other apparatus [2]		3,781		18,688

CATCH: BY SECTIONS

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Species	New England, 1935		Middle Atlantic, 1935		Chesapeake, 1935		South Atlantic and Gulf, 1934 [1]		Pacific, 1935	
FISH	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Alewives	4,406	25	554	7	15,203	116	15,112	92		
Amberjack							4	(3)		
Anchovies	4	(3)							179	3
Barracuda									2,618	111
Black bass					36	3	424	25		
Bluefish	357	32	2,976	193	653	43	3,732	165		
Blue runner or hardtail							184	3		
Bonito	33	2	301	9	(3)	(3)				
Bowfin					5	(3)	1	(3)		
Buffalofish							19	1		
Butterfish	2,294	83	6,438	266	2,547	64	43	1		
Cabio or crab eater					49	3	7	(3)		
Cabrilla									122	5
Carp	52	4	494	36	692	33	109	4	236	4
Catfish and bullheads			120	8	768	27	3,480	117	290	32
Cero							4	(3)		
Cigarfish							4	(3)		
Cod	120,334	2,514	1,856	84	(3)	(3)			14,367	203
Crappie					6	(3)	462	12		
Crevalle	1	(3)	1	(3)			114	2		
Croaker	2,350	43	8,042	127	26,438	335	8,374	118		
Cunner	1	(3)	3	(3)						
Cusk	7,556	137								
Dolphin					(3)	(3)	8	(3)		
Drum:										
Black			9	(3)	63	1	2,550	69		
Red or redfish	2	(3)	39	1	38	1	3,365	156		
Eels:										
Common	420	33	619	69	409	33	63	3		
Conger	113	1	21	1						
Flounders	38,734	1,321	9,252	514	705	36	1,297	63	14,811	744
Flyingfish									38	1
Frigate mackerel	82	1	158	2						
Garfish							(3)	(3)		
Gizzard shad			2	(3)	330	4	24	(3)		
Goosefish	3	(3)	71	1						
Grayfish	35	1	116	2					832	12
Groupers			2	(3)			3,570	85	31	2
Grunts							49	1		
Haddock	194,606	4,276	1,323	61						
Hake	26,541	376	209	5	24	(3)			74	1
Halibut	2,925	252							27,368	2,171
Hardhead									78	4
Harvestfish or "starfish"					151	3	820	12		
Herring, sea	54,329	286	334	3	2	(3)			1,666	15
Herring smelt	13	(3)								
Hickory shad	(3)	(3)	3	(3)	73	2	158	7		
Hogfish							6	(3)		
Horse mackerel									9,984	43
Jewfish							47	1		

[1] Includes the fisheries of Lake Okeechobee, Fla.
[2] Includes periwinkle, cockle, and fish pots, harpoons, spears, and wire baskets.
[3] Less than 500 pounds or dollars.

Fisheries of the United States and Alaska—Continued

CATCH: BY SECTIONS—Continued

[Expressed in thousands of pounds and thousands of dollars that is, 000 omitted]

Species	New England, 1935		Middle Atlantic, 1935		Chesapeake, 1935		South Atlantic and Gulf, 1934		Pacific, 1935	
FISH—continued	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Kingfish (California)									769	18
Kingfish or "king mackerel"	(1)	(1)	13	1			2,661	117		
King whiting or "kingfish"	5	(1)	71	5	58	2	661	16		
Lamprey	2	(1)								
Launce	34	(1)	2	(1)						
"Lingcod"									2,321	75
Mackerel	61,950	1,249	3,082	91	54	2	(1)	(1)	146,427	1,120
Marlin									19	1
Menhaden	4,284	14	179,603	474	121,088	411	164,386	541		
Minnows	4	3								
Mojarro							19	(1)		
Mullet			99	4	54	2	30,485	812	14	1
Mummichog	6	1	13	1						
Muttonfish							199	9		
Paddlefish or "spoonbill cat"							1	(1)		
Permit							2	(1)		
Pigfish			(1)	(1)	11	(1)	187	3		
Pike or pickerel (jacks)			(1)	(1)	23	4	1	(1)		
Pilchard									1,163,213	4,606
Pilotfish	1	(1)								
Pinfish							211	2		
Pollock	33,394	547	22	1						
Pompano			4	1	(1)	(1)	442	79	6	3
Rock bass									365	21
Rockfishes									5,331	197
Rosefish	17,157	184								
Rudderfish									35	2
Sablefish									5,998	202
Salmon:										
Atlantic	40	10								
Blueback, red or sockeye									4,854	481
Chinook or king									29,432	1,970
Chum or keta									9,612	245
Humpback or pink									26,178	603
Silver or coho									29,375	1,367
Sawfish							18	(1)		
Sculpin									80	5
Soup or porgy	6,751	160	7,096	135	2,057	29	38	1		
Sea bass	3,416	122	2,089	106	226	9	257	10	631	34
Sea bass, white (California)									1,070	66
Sea catfish							105	(1)		
Sea robin	276	3	92	2						
Shad	727	40	1,329	132	3,683	359	2,497	330	2,414	68
Sharks	81	1	45	1	7	(1)	3,229	9		
Sheepshead, salt water							1,199	39	188	6
Silversides			70	3						
Skates	227	3	132	2	17	(1)	175	(1)	306	3
Skipper or "billfish"	(1)	(1)								
Smelt	729	86							4,400	113
Snapper:										
Mangrove							229	7		
Red			15	1			5,856	324		
Snook							428	11		
Spadefish							6	(1)		
Spanish mackerel			24	1	38	3	6,969	286	4	(1)
Splittail									38	1
Spot			19	1	425	15	4,906	75		
Squawfish									2	(1)
Squeteagues or "sea trout":										
Gray	327	15	10,140	321	14,756	194	7,742	181		
Spotted			3	(1)	116	8	8,711	544		
White							730	18		
Squirrel hake			25	(1)						
Steelhead trout									2,108	117
Striped bass	22	3	62	8	1,302	118	362	36	530	43
Sturgeon	5	1	20	3	7	1	73	6	80	2
Suckers	97	4	89	6	12	(1)			44	(1)
Sunfish			1	(1)	2	(1)	518	14		
Surffishes (perch)									262	14
Swellfish			5	(1)	1	(1)				

[1] Less than 500 pounds or dollars.

Fisheries of the United States and Alaska—Continued

CATCH: BY SECTIONS—Continued

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Species	New England, 1935		Middle Atlantic, 1935		Chesapeake, 1935		South Atlantic and Gulf, 1934		Pacific, 1935	
FISH—continued	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Swordfish	2,986	424	43	9					669	74
Tautog	259	11	43	1	2	(6)				
Tenpounder							29	(6)		
Thimble-eyed mackerel	46	(6)	245	4						
Tilefish	161	8	2,494	94						
Tomcod	17	1	7	(6)	1	(6)			1	(6)
Tripletail							1	(6)		
Tuna and tunalike fishes:										
Albacore									2,448	200
Bluefin or horse mackerel	538	14	24	2			4	(6)	25,173	1,145
Bonito									7,896	229
Skipjack									17,197	688
Yellowfin									72,252	3,620
Turbot							2	(6)		
Wahoo							2	(6)		
Whitebait			9	1					170	9
Whitefish, common									58	3
White perch	51	6	113	7	599	27	540	23		
Whiting	17,415	182	5,629	96	16	(6)				
Wolffish	2,934	60								
Yellow perch	3	(6)	13	1	142	8	17	(6)		
Yellowtail							81	5	8,149	284
Miscellaneous fish									222	3
Total	609,136	12,539	245,728	2,904	192,889	1,896	288,015	4,435	1,648,155	20,940
SHELLFISH, ETC.										
Crabs:										
Hard	3,106	59	1,297	40	37,028	841	18,013	265	7,604	635
King or "horseshoe"			3,135	9			500	1		
Soft and peelers	(6)	(6)	390	107	4,006	385	908	123		
Stone							81	6		
Crawfish									79	8
Lobsters:										
Common	10,852	2,520	643	139	1	(6)				
Spiny							351	17	1,345	214
Shrimp			194	13			119,318	3,068	3,572	61
Abalone									774	115
Clams:										
Coquina							6	1		
Hard	4,057	451	5,217	794	1,669	373	920	66	853	61
Pismo									49	10
Razor	583	14							1,013	158
Soft	9,801	561	1,834	143					48	10
Surf	1	(6)	837	37						
Mixed									75	4
Conchs			9	1			2	(6)		
Mussels, sea	117	3	98	6	23	1				
Octopus							2	(6)	150	7
Oysters:										
Eastern, market, public	64	11	346	51	17,255	1,083	12,170	731		
Eastern, market, private	9,940	1,199	14,465	1,677	12,645	937	6,657	410	65	31
Japanese, market									5,527	444
Western, market									338	208
Periwinkles and "cockles"	159	7								
Scallops:										
Bay	1,504	261	107	36			110	12	15	4
Sea	1,670	231	2,640	344			120	18		
Squid	3,544	57	2,423	67	290	5			835	24
Sea urchins	35	(6)								
Terrapin					6	2	17	2		
Turtles			21	1	15	1	69	1	2	(6)
Irish moss	8	(6)								
Sponges							655	838		
Bloodworms	283	38	24	20						
Sandworms	570	33	30	27						
Trepang									13	(6)
Total	46,294	5,445	33,710	3,512	72,938	3,628	159,899	5,559	22,357	1,994

6 Less than 500 pounds or dollars.

Fisheries of the United States and Alaska—Continued

CATCH: BY SECTIONS—Continued

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Species	New England, 1935		Middle Atlantic, 1935		Chesapeake, 1935		South Atlantic and Gulf, 1934		Pacific, 1935	
WHALE PRODUCTS [7]	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Meat									3,272	66
Oil, whale									2,452	89
Total									5,724	155
Grand total	655,430	17,984	279,438	6,416	265,827	5,524	447,914	9,994	1,676,236	23,069

Species	Lakes, 1934		Mississippi River and tributaries, 1931		Alaska, 1935		Total for the various years	
FISH	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Alewives							35,275	240
Amberjack							4	(8)
Anchovies							183	3
Barracuda							2,618	117
Black bass			14	2			474	30
Bluefish							7,718	433
Blue pike	8,509	445					8,509	445
Blue runner or hardtail							184	3
Bonito							334	11
Bowfin	9	(8)	428	10			443	10
Buffalofish	1	(8)	15,772	687			15,792	688
Butterfish							11,322	414
Burbot	396	7					396	7
Cabio or crab eater							56	3
Cabrilla							122	5
Carp	3,846	66	11,892	456			17,321	603
Catfish and bullheads	789	48	10,267	878			15,714	1,110
Cero							4	(8)
Chub	7,149	644					7,149	644
Cigarfish							4	(8)
Cisco	111	9					111	9
Cod					449	2	137,026	2,803
Crappie	1	(8)	41	3			510	15
Crevalle							116	2
Croaker							45,204	623
Cunner							4	(8)
Cusk							7,556	137
Dolly Varden trout					29	2	29	2
Dolphin							8	(8)
Drum:								
Black							2,628	70
Red or redfish							3,444	158
Eels:								
Common	65	2	7	(8)			1,583	140
Conger							134	2
Flounders					278	3	65,077	2,681
Flyingfish							38	1
Frigate mackerel							240	3
Garfish			73	1			73	1
Gizzard shad							356	4
Goldfish	68	1					68	1
Goosefish							74	1
Grayfish							983	15
Groupers							3,603	87
Grunts							49	1
Haddock							195,929	4,337
Hake							26,848	382
Halibut					10,895	608	41,188	3,031
Hardhead							78	4
Harvestfish or "starfish"							971	15
Herring:								
Lake	23,941	440					23,941	440
Sea					189,287	947	245,618	1,251
Herring smelt							13	(8)
Hickory shad							234	9
Hogfish							6	(8)

[8] Less than 500 pounds or dollars.

[7] The weight of whales caught was not determined; therefore, the weight of the manufactured products is shown.

Fisheries of the United States and Alaska—Continued

CATCH: BY SECTIONS—Continued

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Species	Lakes, 1934		Mississippi River and tributaries, 1931		Alaska, 1935		Total for the various years	
FISH—continued	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Horse mackerel							9,984	43
Jewfish							47	1
Kingfish (California)							769	18
Kingfish or "king mackerel"							2,674	118
King whiting or "kingfish"							795	23
Lake trout	10,112	1,200					10,112	1,200
Lamprey							2	(1)
Launce							36	(1)
"Lingcod"							2,321	75
Mackerel							211,513	2,462
Marlin							19	1
Menhaden							469,361	1,440
Minnows			1	(1)			5	3
Mojarro							19	(1)
Mooneye	26	(1)	3	(1)			29	(1)
Mullet							30,652	819
Mummichog							19	2
Muttonfish							199	9
Paddlefish or "spoonbill cat"			951	43			952	43
Permit							2	(1)
Pigfish							198	3
Pike or pickerel (jacks)	559	18	5	(1)			588	22
Pilchard							1,166,218	4,606
Pilotfish							1	(1)
Pinfish							211	2
Pollock							33,416	548
Pompano							452	83
Quillback			268	11			268	11
Rock bass	23	2					388	23
Rockfishes					8	(1)	5,339	197
Rosefish							17,157	184
Rudderfish							35	2
Sablefish					832	23	6,830	225
Salmon:								
Atlantic							40	10
Blueback, red or sockeye					73,516	1,940	78,370	2,421
Chinook or king					16,010	370	45,442	2,340
Chum or keta					84,998	866	94,510	1,111
Humpback or pink					241,110	3,430	267,288	4,033
Silver or coho					18,470	364	47,845	1,731
Sauger	1,174	58	3	(1)			1,177	58
Sawfish							18	(1)
Sculpin							80	5
Scup or porgy							15,942	325
Sea bass							6,619	281
Sea bass, white (California)							1,070	66
Sea catfish							105	(1)
Sea robin							368	5
Shad							10,650	929
Sharks							3,362	11
Sheepshead:								
Fresh water	2,232	38	3,905	143			6,137	181
Salt water							1,387	45
Silversides							70	3
Skates							857	8
Skipper or "billfish"							(1)	(1)
Smelt	1,029	16					6,158	215
Snapper:								
Mangrove							229	7
Red							5,871	325
Snook							428	11
Spadefish							6	(1)
Spanish mackerel							7,035	290
Splittail							38	1
Spot							5,350	91
Squawfish							2	(1)
Squeteagues or "sea trout":								
Gray							32,965	711
Spotted							8,830	552
White							730	18
Squirrel hake							25	(1)
Steelhead trout	2	(1)			11	1	2,121	118
Striped bass							2,278	298
Sturgeon	36	9					221	22
Sturgeon, shovelnose			87	8			87	8

(1) Less than 500 pounds or dollars.

Fisheries of the United States and Alaska—Continued

CATCH: BY SECTIONS—Continued

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Species	Lakes, 1934		Mississippi River and tributaries, 1931		Alaska, 1935		Total for the various years	
FISH—continued	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Suckers	5,616	136	315	13			6,173	159
Sunfish	18	(1)	22	1			561	15
Surffishes (perch)							362	14
Swellfish							6	(1)
Swordfish							3,698	507
Tautog							304	12
Tenpounder							29	(1)
Thimble-eyed mackerel							291	4
Tilefish							2,655	102
Tomcod							26	1
Tripletail							1	(1)
Tullibees	156	(1)					156	(1)
Tuna and tunalike fishes:								
Albacore							2,448	200
Bluefin or horse mackerel							25,739	1,161
Bonito							7,896	229
Skipjack							17,197	688
Yellowfin							72,252	3,620
Turbot							2	(1)
Wahoo							2	(1)
White bass	688	25	3	(1)			691	25
Whitebait							179	10
Whitefish:								
Common	6,276	804					6,334	807
Menominee	229	12					229	12
White perch							1,303	63
Whiting							23,060	278
Wolffish							2,934	60
Yellow perch	16,099	695					16,274	784
Yellow pike	4,081	393	5	1			4,086	394
Yellowtail							8,230	239
Miscellaneous fish							222	8
Total	93,241	5,068	44,062	2,257	635,793	8,556	3,757,019	58,595
SHELLFISH, ETC.								
Crabs:								
Hard					960	82	68,008	1,922
King (Pacific coast)					2	(1)	2	(1)
King or "horseshoe"							3,635	10
Soft and peelers							5,304	615
Stone							81	6
Crawfish	36	3	29	(1)			144	11
Lobsters:								
Common							11,496	2,659
Spiny							1,696	231
Shrimp			49	4	691	26	123,824	3,172
Abalone							774	115
Clams:								
Coquina							6	1
Hard					32	1	12,748	1,746
Pismo							49	10
Razor					858	38	2,454	210
Soft							11,683	714
Surf							838	37
Mixed							75	4
Conchs							11	1
Mussels, sea							238	10
Mussel shells	3,134	51	37,255	422			40,389	473
Octopus							152	7
Oysters:								
Eastern, market, public							29,835	1,876
Eastern, market, private							43,772	4,264
Japanese, market							5,527	444
Western, market							338	206
Periwinkles and "cockles"							159	7
Scallops:								
Bay							1,736	313
Sea							4,430	593
Squid							7,092	183
Sea urchins							35	(1)
Terrapin			19	(1)			42	4
Turtles			94	3			201	6
Frogs			875	131			875	131
Irish moss							8	(1)

[1] Less than 500 pounds or dollars.

Fisheries of the United States and Alaska—Continued

CATCH: BY SECTIONS—Continued

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Species	Lakes, 1934		Mississippi River and tributaries, 1931		Alaska, 1935		Total for the various years	
SHELLFISH, ETC.—continued	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Sponges							655	838
Pearls and slugs		2		80				82
Bloodworms							307	58
Sandworms							600	60
Trepang							13	(6)
Total	3,170	56	38,321	640	2,543	147	379,232	20,981
WHALE PRODUCTS [7]								
Meat							3,272	66
Fertilizer					2,678	31	2,678	31
Oil, sperm					1,446	46	1,446	46
Oil, whale					6,250	313	8,702	402
Total					10,374	390	16,098	545
Grand total	96,411	5,124	82,383	2,897	648,710	9,093	4,152,349	80,121

CATCH: BY STATES [8]

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

State	Marine and coastal rivers		Mississippi River and tributaries		Lakes [9]		Total	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Alabama	7,964	253	1,822	33			9,786	286
Arkansas			15,733	411			15,733	411
California	1,466,758	14,683					1,466,758	14,683
Connecticut	14,916	1,217					14,916	1,217
Delaware	86,666	430					86,666	430
Florida	117,192	3,586			1,609	48	118,801	3,634
Georgia	27,141	360					27,141	360
Illinois			14,263	367	1,206	92	15,469	459
Indiana			7,717	157	702	52	8,419	209
Iowa			7,778	302			7,778	302
Kansas			455	17			455	17
Kentucky			1,622	61			1,622	61
Louisiana	76,633	2,285	19,214	995			95,847	3,280
Maine	112,219	3,309					112,219	3,309
Maryland	48,235	2,004					48,235	2,004
Massachusetts	503,417	12,148					503,417	12,148
Michigan					30,393	2,156	30,393	2,156
Minnesota			3,498	138	10,735	297	14,233	435
Mississippi	22,153	652	2,650	123			24,803	775
Missouri			928	77			928	77
Nebraska			145	16			145	16
New Hampshire	354	62					354	62
New Jersey	107,802	2,844					107,802	2,844
New York	84,939	3,135			1,432	99	86,371	3,234
North Carolina	163,462	1,672					163,462	1,672
Ohio			185	7	27,670	1,157	27,855	1,164
Oklahoma			40	4			40	4
Oregon	85,392	2,077					85,392	2,077
Pennsylvania	31	6			3,572	208	3,603	214
Rhode Island	24,524	1,248					24,524	1,248
South Carolina	5,891	225					5,891	225
South Dakota			114	11			114	11
Tennessee			3,435	104			3,435	104
Texas	25,869	912	139	6			26,008	918
Virginia	217,592	3,521					217,592	3,521
Washington	124,086	6,329					124,086	6,329
Wisconsin			2,645	68	20,701	1,064	23,346	1,132
Alaska	648,710	9,093					648,710	9,093
Total	3,971,946	72,051	82,383	2,897	98,020	5,173	4,152,349	80,121

[6] Less than 500 pounds or dollars.

[7] The weight of whales caught was not determined; therefore, the weight of the manufactured products is shown.

[8] The catch for "Marine and coastal rivers" is for 1935 except in the South Atlantic and Gulf States which is for 1934; the catch of the "Mississippi River and tributaries" is for 1931; and the catch of the "Lakes" is for 1934.

[9] Includes Lake Ontario, Lake Erie, Lake Huron, Lake Michigan, Lake Superior, Rainy Lake, Namakan Lake, Lake of the Woods, Lake Okeechobee, and several mussel-bearing streams tributary to Lakes Huron, Erie, and Michigan.

Fisheries of the United States and Alaska—Continued

SEED OYSTER FISHERY

Item	New England, 1935		Middle Atlantic, 1935	
OPERATING UNITS				
Fishermen:	*Number*		*Number*	
On vessels	137		1,151	
On boats and shore:				
Regular	29		74	
Casual	1		154	
Total	167		1,379	
Vessels:				
Steam	4			
Net tonnage	344			
Motor	9		5	
Net tonnage	236		85	
Sail	15		109	
Net tonnage	114		2,246	
Total vessels	98		114	
Total net tonnage	694		2,331	
Boats:				
Motor	1		73	
Other	15		145	
Apparatus:				
Dredges, oyster	161		230	
Yards at mouth	142		283	
Tongs	7		202	
Rakes			25	
CATCH				
Oysters:	*Bushels*	*Value*	*Bushels*	*Value*
Seed, public, spring	17,355	$6,942	913,505	$302,954
Seed, public, fall	88,888	35,658	24,465	6,502
Seed, private, spring	355,843	162,334	30,659	18,412
Seed, private, fall	20,725	13,600	11,215	10,128
Total	482,811	218,534	979,844	337,996

Item	Chesapeake, 1935		South Atlantic and Gulf, 1934		Total	
OPERATING UNITS						
Fishermen:	*Number*		*Number*		*Number*	
On vessels	212				1,500	
On boats and shore:						
Regular	1,369		12		1,484	
Casual	188				343	
Total	1,769		12		3,327	
Vessels:						
Steam					4	
Net tonnage					344	
Motor	1				15	
Net tonnage	6				327	
Sail	39				163	
Net tonnage	758				3,118	
Total vessels	40				182	
Total net tonnage	764				3,789	
Boats:						
Motor	843				917	
Other	280		6		446	
Apparatus:						
Dredges, oyster	78		12		481	
Yards at mouth	107		12		544	
Tongs	1,142				1,351	
Rakes	200				225	
CATCH						
Oysters:	*Bushels*	*Value*	*Bushels*	*Value*	*Bushels*	*Value*
Seed, public, spring	1,148,218	$182,547	17,450	$2,617	2,096,528	$495,060
Seed, public, fall	889,100	154,715			1,002,453	196,875
Seed, private, spring	20,000	4,000			406,502	184,746
Seed, private, fall					31,940	23,728
Total	2,057,318	341,262	17,450	2,617	3,537,423	900,409

NOTE.—Of the number of persons fishing for seed oysters, a total of 2,760 are duplicated among those fishing for market oysters or other species. Similarly, the following craft and gear are duplicated: 123 vessels, 731 motor boats, 255 other boats, 258 dredges, 913 tongs, and 208 rakes.

Yield of the fisheries of the United States: By gear

Gear	New England, 1935		Middle Atlantic, 1935		Chesapeake, 1935	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Purse seines	87,259,900	$1,249,300	175,514,600	$492,484	119,230,600	$407,520
Haul seines	780,400	37,580	1,739,800	76,005	3,440,600	122,179
Gill nets	29,674,200	609,943	2,867,900	183,821	1,396,500	124,039
Lines	87,788,200	2,022,257	6,848,900	327,926	32,141,300	687,683
Pound nets	22,956,200	265,206	42,022,600	994,073	59,130,600	1,016,676
Floating traps	11,952,300	233,815				
Other traps	37,000	3,135				
Weirs	21,250,500	104,281	1,392,000	2,508		
Stop nets			156,800	11,120	72,700	1,565
Fyke nets	146,900	8,258	408,600	21,491	954,600	42,187
Dip nets	2,796,800	83,188	[1] 703,700	[1] 113,066	2,500,700	247,932
Cast nets			2,600	185		
Scap nets			119,700	4,423		
Bag and pocket nets	146,600	17,080				
Drag nets			11,700	2,800		
Push nets	14,400	4,800				
Otter trawls	344,801,900	7,585,204	19,067,900	803,090	8,693,300	173,249
Pots	14,273,400	2,597,879	1,966,100	209,422	369,200	18,957
Harpoons	3,246,000	428,837	42,600	8,850		
Spears	28,300	2,556	90,200	11,229		
Scrapes, crab					1,383,800	98,246
Dredges	12,987,900	1,604,006	18,015,200	2,045,705	15,507,200	944,233
Tongs	2,467,000	279,512	2,996,800	477,449	19,209,600	1,399,451
Rakes	1,271,800	161,058	3,059,900	420,181	1,178,900	115,336
Forks	705,200	39,497	529,600	91,691		
Hoes	10,562,500	608,372	1,055,900	69,878		
Picks					303,200	75,800
Gaffs			500	25		
By hand	283,000	37,830	824,500	48,242	314,500	49,466
Total	655,430,400	17,983,594	279,438,100	6,415,664	265,827,300	5,524,519

Gear	South Atlantic and Gulf, 1934		Pacific, 1935		Lakes, 1934	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Purse seines	164,367,700	$553,133	1,014,133,700	$6,679,603		
Haul seines	36,138,600	990,725	4,353,000	236,712	4,176,000	$89,287
Gill nets	48,900,500	1,598,648	34,986,100	1,799,421	44,432,900	2,547,455
Trammel nets	5,655,000	290,441	1,408,300	97,605	218,500	4,051
Lines	32,049,700	978,492	179,425,400	8,831,430	2,394,600	278,599
Pound nets	19,218,900	304,045	1,006,600	56,268	10,902,100	494,978
Other traps	520,100	65,700			28,686,600	1,546,336
Weirs	3,000	90	575,800	6,909		
Wheels	450,000	2,500				
Stop nets	563,400	16,674				
Fyke nets	146,600	4,516	323,100	32,237	2,430,500	106,628
Dip nets	3,745,200	109,531	4,612,200	137,440		
Drag bag nets			2,245,400	33,917		
Cast nets	642,200	14,240				
Push nets	[2] 5,800	[2] 975				
Reef nets			482,300	15,758		
Lampara nets			390,481,700	2,259,727		
Paranzella nets			13,116,800	650,165		
Otter trawls	113,248,200	2,914,053	3,206,500	80,759		
Beam trawls			1,351,900	30,815		
Pots	1,426,500	61,204	9,381,900	869,206	35,600	3,200
Harpoons			6,403,400	229,154		
Spears	153,800	10,213				
Dredges	8,148,000	545,011	(4)	(4)		
Tongs	7,636,200	508,060	7,967,900	926,365		
Crowfoot bars					1,681,800	29,125
Rakes	367,100	38,772	(4)	(4)		
Forks	134,200	5,988				
Grabs	2,991,100	103,656				
Picks					251,300	4,723
Hooks	240,400	250,269				
Diving apparatus, abalone and sponge	417,400	587,456	774,200	115,319	35,200	679
By hand	744,300	39,268			1,166,100	18,674
Total	447,913,900	9,993,660	1,676,236,200	23,088,810	96,411,200	5,123,735

[1] Includes the catch by drop nets and wire baskets.
[2] This catch was made by scoop nets.
[4] The catch by shovels, rakes, and dredges is included with tongs.

Yield of the fisheries of the United States: By gear—Continued

Gear	Mississippi River and tributaries, 1931		Total	
	Pounds	*Value*	*Pounds*	*Value*
Purse seines			1,560,506,500	$9,382,040
Haul seines	13,739,657	$574,541	64,368,057	2,127,029
Gill nets	166,598	6,547	162,424,698	6,869,874
Trammel nets	1,134,206	75,615	8,416,006	467,712
Lines	10,140,037	772,245	350,788,137	13,898,632
Pound nets	224,275	9,541	155,461,275	3,140,787
Floating traps			11,952,300	233,815
Other traps			29,243,700	1,615,171
Weirs			23,221,300	113,788
Wheels			450,000	2,500
Stop nets			792,900	29,359
Fyke nets	18,507,204	797,130	22,917,504	1,012,447
Dip nets	30,045	3,307	14,388,645	604,464
Drag-bag nets			2,245,400	33,917
Cast nets			644,800	14,425
Scap nets			119,700	4,423
Bag and pocket nets			146,600	17,080
Drag nets			11,700	2,800
Push nets			20,200	5,775
Reef nets			482,300	15,758
Lampara nets			390,481,700	2,259,727
Paranzella nets			13,116,800	650,165
Otter trawls			489,017,800	11,556,355
Beam trawls			1,351,900	30,815
Pots	[1] 310,455	[1] 26,277	27,763,155	3,786,145
Harpoons			9,692,000	666,841
Spears	2,250	270	274,550	24,268
Scrapes, crab			1,383,800	98,246
Dredges	3,699,100	40,958	58,357,400	5,179,918
Tongs	1,601,876	21,091	41,879,376	3,611,928
Crowfoot bars	20,893,550	265,443	22,575,350	294,568
Rakes	370,130	4,029	6,247,830	739,376
Forks	4,812,737	76,214	6,181,737	213,390
Hoes			11,618,400	678,250
Grabs	873,099	130,621	3,864,199	234,277
Picks			554,500	80,528
Hooks			240,400	250,269
Diving apparatus, abalone and sponge			1,226,800	703,454
Gaffs			500	25
By hand	5,877,304	93,528	9,209,704	287,008
Total	82,382,523	2,897,357	3,503,639,628	71,027,339

[1] Includes the catch by baskets.

Industries related to the fisheries of the United States and Alaska

Item	New England, 1935	Middle Atlantic, 1935	Chesapeake, 1935	South Atlantic and Gulf, 1934
Transporting:				
Persons engaged:	*Number*	*Number*	*Number*	*Number*
On vessels	124	69	1,022	397
On boats	18	72		181
Total	142	141	1,022	578
Vessels:				
Steam			1	
Net tonnage			103	
Motor	50	23	481	157
Net tonnage	909	378	5,480	1,631
Sail			3	33
Net tonnage			85	301
Total vessels	50	23	485	190
Total net tonnage	909	378	5,668	1,932
Boats	15	63		168
Wholesale and manufacturing:				
Establishments	380	408	585	591
Persons engaged:				
Proprietors	265	302	740	637
Salaried employees	718	1,071	360	409
Wage earners:				
Average for season	9,578	4,770	12,113	13,308
Average for year	5,501	3,485	4,805	4,200
Salaries and wages paid	$6,456,456	$6,666,507	$3,055,029	$2,873,812
Manufactured products [4]	$22,838,942	$13,452,877	$9,411,465	[5] $10,242,039
Fishermen's manufactured products:				
Persons engaged	3,792	558	62	987
Products [4]	$680,020	$378,741	$10,089	$129,700

[4] Includes packaged, cured, and canned fishery products and byproducts.
[5] Includes data for 1935 on packaged and canned products and byproducts.

Industries related to the fisheries of the United States and Alaska—Continued

Item	Pacific, 1935	Lakes, 1934	Mississippi River and tributaries, 1931	Alaska, 1935	Total for the various years
Transporting:					
Persons engaged:	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	198	15	29	1,551	3,405
On boats				[1]	271
Total	198	15	29	1,551	3,676
Vessels:					
Steam				1	2
Net tonnage				3,474	3,577
Motor	86	8	8	355	1,168
Net tonnage	1,937	114	104	11,095	21,648
Sail					36
Net tonnage					386
Total vessels	86	8	8	356	1,206
Total net tonnage	1,937	114	104	14,569	25,611
Boats				[2] 574	820
Wholesale and manufacturing:					
Establishments	337	238	217	228	2,984
Persons engaged:					
Proprietors	361	173	204		
Salaried employees	965	521	355	11,861	78,583
Wage earners:					
Average for season	13,424	2,173	4,275		
Average for year	5,204	1,152	3,483	[3]	[3]
Salaries and wages paid	$6,531,351	$2,442,879	$3,080,430	[3]	[3]
Manufactured products [4]	$51,243,348	[5] $2,599,058	[5] $3,348,636	$30,097,424	$143,233,789
Fishermen's manufactured products:					
Persons engaged	254	535	216	[3]	[3]
Products [4]	$232,921	$67,850	$8,751	[3]	[3]

[1] Included in vessels.
[2] Includes scows, houseboats, pile drivers, etc.
[3] Statistics not available.
[4] Includes packaged, cured, and canned fishery products and byproducts.
[5] Includes data for 1935 on packaged and canned products and byproducts.

NOTE.—Of the total number of persons engaged in the preparation of fishermen's manufactured products, 5,618 have also been included as fishermen, and 1,018 of the persons shown on transporting craft have also been included as fishermen.

MANUFACTURED FISHERY PRODUCTS

The output of manufactured fishery products (canned, cured, packaged, and byproducts) in the United States and Alaska during the most recent years for which data are available were valued at $145,908,313. Of this amount, canned products accounted for 52 percent, byproducts 20 percent, fresh and frozen packaged products 17 percent, and cured products 11 percent.

Since general statistical surevys were conducted in only the New England, Middle Atlantic, Chesapeake, and Pacific States, and Alaska for 1935, the following compilation of manufactured fishery products consists of composite data, based on the most recent statistics. The years covered by the data are indicated by footnotes.

Manufactured fishery products of the United States and Alaska [1]

Item	Quantity	Value
Alewives:		
Salted:		
Corned [2] ---- pounds	7,567,658	$82,249
Tight-pack cut [2] ---- do	2,101,260	79,376
Tight-pack roe [2] ---- do	257,330	13,889
Pickled [2] ---- do	[3] 4,027,328	112,911
Spiced [4] ---- do	383,500	54,925
Miscellaneous ---- do	1,536,880	37,985
Smoked ---- do	182,038	6,075
Canned ---- standard cases	15,256	37,682
Roe, canned ---- do	30,120	206,045
Dry scrap ---- tons	528	15,311
Oil ---- gallons	6,000	1,040
Barracuda, fresh fillets ---- pounds	765,000	97,350
Buffalofish, smoked [5] ---- do	885,300	220,495
Butterfish, smoked [5] ---- do	740,876	192,737
Cabrilla, fresh fillets ---- do	45,000	5,775
Carp, smoked [5] ---- do	116,145	38,289
Cisco, chubs, tullibee, and lake herring, smoked [5] ---- do	8,705,331	2,121,639
Cod:		
Fresh fillets ---- do	8,830,019	1,059,361
Frozen fillets ---- do	8,089,241	669,361
Fresh sticks ---- do	227,880	22,717
Salted:		
Green ---- do	[3] 7,421,592	357,716
Dry ---- do	1,970,086	118,567
Boneless, including absolutely boneless ---- do	8,677,585	1,535,250
Tongues ---- do	16,926	1,162
Pickled ---- do	32,789	1,130
Smoked fillets ---- do	1,043,598	152,181
Stockfish ---- do	8,140	1,128
Codfish cakes, canned ---- standard cases	10,186	44,452
Oil:		
Cod ---- gallons	17,342	4,049
Cod liver ---- do	215,479	227,019
Croaker, fresh fillets ---- pounds	103,000	13,550
Cusk:		
Fresh fillets ---- do	625,125	82,382
Frozen fillets ---- do	1,230,778	109,408
Fresh sticks ---- do	522,039	58,631
Salted, green ---- do	[3] 74,040	2,492
Smoked fillets ---- do	82,005	10,801
Drum, red, fresh fillets and steaks ---- do	2,659	416
Eels:		
Salted ---- do	78,148	5,956
Smoked [5] ---- do	87,250	25,540
Flounders:		
Fresh fillets ---- do	5,409,315	873,375
Frozen fillets ---- do	756,807	99,411
Grayfish, fresh fillets ---- do	150,000	15,000
Groupers:		
Fresh fillets ---- do	60,082	12,538
Fresh steaks ---- do	366,561	53,859
Haddock:		
Fresh fillets ---- do	20,067,462	2,211,222
Frozen fillets ---- do	26,362,271	2,205,045
Fresh sticks ---- do	57,775	11,156
Salted, green ---- do	[3] 26,850	541
Finnan haddie ---- do	355,000	45,014
Hake:		
Fresh fillets ---- do	1,823,479	171,759
Frozen fillets ---- do	1,265,803	86,818
Fresh sticks ---- do	426,746	47,650
Salted:		
Green ---- do	[3] 1,892,855	55,769
Dry ---- do	2,087,892	97,450
Boneless, including absolutely boneless ---- do	1,259,122	94,928
Smoked fillets ---- do	78,245	9,968
Halibut:		
Fresh fillets ---- do	456,350	88,080
Frozen steaks ---- do	250,033	36,744
Herring, lake:		
Fresh fillets ---- do	131,000	11,000
Salted [4] ---- do	5,599,920	193,975

[1] Data are for 1935 unless otherwise indicated.
[2] This item represents a combination of 1935 and 1934 data.
[3] This is usually an intermediate product and although shown in the total may also be shown in its final stage of processing elsewhere in the table.
[4] Data are for 1934.
[5] This item represents a combination of 1935, 1934, and 1931 data.

Manufactured fishery products of the United States and Alaska—Continued

Item	Quantity	Value
Herring, sea:		
Roused	1,319,470 pounds	$34,793
Spiced [2]	273,100 do	35,925
Split	1,065,787 do	35,848
Scotch cure	14,942,750 do	808,064
Norwegian cure	4,000 do	360
Dry salted	396,975 do	11,661
Smoked:		
Bloaters, hard	384,180 do	26,343
Bloaters, soft	864,346 do	77,573
Bloaters, unclassified	149,365 do	9,838
Boneless	2,603,604 do	275,654
Kippered	275,120 do	34,394
Lengthwise	117,105 do	7,083
Medium scale	351,550 do	23,388
Canned "sardines"	1,655,839 standard cases	5,142,750
Pearl essence	6,000 pounds	56,000
Dry scrap	1,462 tons	34,647
Meal	16,506 do	412,612
Oil	3,856,545 gallons	1,122,202
Lake trout:		
Fresh fillets	13,172 pounds	2,820
Salted [4]	25,000 do	1,240
Smoked [5]	673,856 do	172,433
"Lingcod", fresh fillets	189,000 do	22,815
Mackerel:		
Fresh fillets	166,717 do	16,500
Frozen fillets	793,124 do	65,411
Salted:		
Fillets	1,874,480 do	182,083
Split	2,477,507 do	196,832
Smoked [2]	564,714 do	84,314
Canned	1,812,218 standard cases	4,975,677
Meal	4,391 tons	113,595
Oil	267,347 gallons	75,520
Menhaden:		
Acid scrap	29,890 tons	524,870
Dry scrap	25,364 do	749,089
Meal	5,052 do	183,596
Oil	4,066,159 gallons	1,178,337
Mullet:		
Salted [4]	880,100 pounds	41,209
Roe, salted [4]	153,980 do	9,291
Smoked [4]	4,500 do	1,175
Paddlefish or spoonbill cat:		
Roe, salted [6]	1,595 do	812
Smoked [7]	334,500 do	135,045
Pike, blue, yellow, and sauger:		
Fresh fillets	2,976,111 do	631,674
Frozen fillets	357,283 do	73,053
Pilchard:		
Canned "sardines"	2,420,055 standard cases	6,237,262
Meal	95,846 tons	2,638,382
Oil	21,735,165 gallons	6,658,965
Pollock:		
Fresh fillets	1,931,176 pounds	143,888
Frozen fillets	8,658,401 do	573,394
Salted:		
Green	[3] 118,946 do	4,253
Dry	203,497 do	12,097
Rockfishes, fresh fillets	1,023,000 do	126,735
Rosefish:		
Fresh fillets	822,844 do	87,484
Frozen fillets	3,497,635 do	352,495
Sablefish:		
Fresh fillets	410,000 do	41,000
Kippered	555,656 do	95,873
Pickled	6,161 do	318
Salted	362,459 do	23,856
Smoked [8]	60,142 do	17,720
Salmon:		
Fresh fillets and steaks	10,538 do	2,628
Frozen fillets and steaks	36,035 do	5,928
Salted:		
Pickled	896,175 do	95,158
Mild cured	10,571,141 do	2,148,333

[1] This item represents a combination of 1935 and 1934 data.
[2] This is usually an intermediate product and although shown in the total may also be shown in its final stage of processing elsewhere in the table.
[4] Data are for 1934.
[5] This item represents a combination of 1935, 1934, and 1931 data.
[6] Data are for 1931.
[7] This item represents a combination of 1935 and 1931 data.
[8] This item represents a combination of 1934 and 1931 data.

Manufactured fishery products of the United States and Alaska—Continued

Item	Quantity	Value
Salmon—Continued.		
Salted—Continued.		
Caviar—pounds	304,184	$36,229
Dry salted—do	87,300	9,711
Dried—do	1,436,000	114,960
Smoked [5]—do	8,821,963	2,673,960
Kippered [3]—do	2,320,813	479,121
Canned:		
Chinook or king—standard cases	257,692	2,885,591
Blueback, red or sockeye—do	870,411	8,367,882
Silver or coho—do	366,613	2,621,008
Humpback or pink—do	3,620,725	15,026,936
Chum or keta—do	897,819	3,441,271
Steelhead trout—do	14,630	132,578
Eggs for food—do	986	23,294
Eggs for bait—do	3,870	73,239
Meal—tons	1,109	30,789
Oil—gallons	135,488	54,388
Sea bass:		
Fresh fillets (Atlantic coast)—pounds	75,000	11,330
Black, fresh fillets (Pacific coast)—do	380,000	46,200
White, fresh fillets (Pacific coast)—do	226,600	35,288
Shad:		
Smoked and kippered [3]—do	183,892	34,876
Canned—standard cases	10,507	36,044
Roe canned—do	2,493	73,064
Sheepshead:		
Fresh fillets—pounds	63,900	9,675
Smoked [5]—do	617	77
Snapper, red, fresh steaks—do	11,000	2,200
Squeteagues, fresh fillets—do	230,340	30,733
Sturgeon:		
Roe, *salted* [7]—do	323	749
Smoked and kippered [5]—do	1,678,976	1,064,102
Caviar, canned—standard cases	2,834	389,238
Swordfish, fresh fillets and steaks—pounds	405,006	97,052
Totuava, fresh fillets—do	750,000	120,000
Tuna and tunalike fishes:		
Canned:		
Albacore—standard cases	122,222	778,393
Bluefin—do	409,534	1,965,593
Bonito—do	145,180	603,798
Striped—do	285,433	1,313,337
"Tonno"—do	160,848	1,025,954
Yellowfin—do	1,293,550	6,762,805
Yellowtail—do	94,061	373,849
Meal—tons	8,330	219,610
Oil—gallons	127,660	22,648
White bass, fresh fillets—pounds	9,398	1,410
Whitefish:		
Fresh fillets—do	15,315	3,260
Smoked [5]—do	2,496,947	705,951
Caviar, canned—standard cases	1,286	49,921
Whiting, smoked—pounds	350	35
Wolffish:		
Fresh fillets—do	40,961	5,346
Frozen fillets—do	19,945	2,078
Yellow perch:		
Fresh fillets—do	1,118,480	243,194
Frozen fillets—do	89,440	17,376
Crabs, hard:		
Meat, packaged, fresh cooked [3]—do	6,369,658	2,195,164
Canned—standard cases	7,300	117,727
Dry scrap—tons	2,198	38,954
Crabs, king, meal and dry scrap—do	622	17,507
Lobsters:		
Common, packaged, fresh cooked—pounds	56,500	21,738
Spiny, packaged, fresh cooked [4]—do	1,023,117	348,019
Shrimp:		
Fresh packaged—do	384,930	131,524
Frozen packaged [4]—do	2,299,800	379,467
Sun dried [3]—do	2,007,711	301,755
Cooked and peeled [3]—do	827,814	168,794
Canned—standard cases	1,086,345	4,721,872
Meal or bran—tons	2,611	55,389
Abalone, steaks—pounds	740,000	231,844
Clams, hard:		
Fresh shucked—gallons	44,232	61,291

[3] This item represents a combination of 1935 and 1934 data.
[4] Data are for 1934.
[5] This item represents a combination of 1935, 1934, and 1931 data.
[6] Data are for 1931.
[7] This item represents a combination of 1935 and 1931 data.

Manufactured fishery products of the United States and Alaska—Continued

Item	Quantity	Value
Clams, hard—Continued.		
Canned:		
Whole, standard cases	21,253	$107,028
Chowder, do	331,557	1,179,951
Minced, do	23,366	120,933
Broth, bouillon and cocktail, do	6,498	28,219
Juice and nectar, do	9,640	41,172
Shells, ground, poultry feed, tons	2,056	26,273
Clams, razor:		
Fresh shucked, gallons	30,915	13,132
Canned:		
Whole, standard cases	1,490	12,534
Minced, do	70,188	543,511
Juice, do	70	246
Clams, soft:		
Fresh shucked, gallons	254,856	274,951
Steamed, pounds	[3] 228,873	19,494
Canned:		
Whole, standard cases	106,084	375,561
Chowder, do	81,947	246,510
Juice, bouillon and cocktail, do	14,763	24,760
Marine-shell products:		
Buttons, gross	5,606,318	3,221,548
Novelties		641,529
Mussels, fresh water, shell products:		
Buttons, gross	13,957,529	3,932,269
Novelties		78,734
Poultry feed, tons	6,231	35,112
Lime, do	1,797	3,281
Oysters:		
Eastern:		
Freshed shucked [1], gallons	6,910,504	8,689,933
Canned, standard cases	412,823	1,660,480
Japanese:		
Fresh shucked, gallons	397,943	514,933
Canned, standard cases	88,062	384,423
Native, Pacific, fresh shucked, gallons	29,395	185,736
Soup, canned (Eastern and Japanese), standard cases	34,833	196,212
Shell products:		
Poultry feed, tons	262,916	1,242,915
Lime, do	44,734	109,554
Lime, burned, do	16,258	102,593
Scallops, bay, fresh shucked [1], gallons	160,644	454,133
Scallops, sea, fresh shucked, do	381,954	485,178
Alligator hides [6], pounds	88,356	7,363
Terrapin and turtle products, canned, standard cases	3,298	55,237
Whales:		
Meal, meat, tons	852	21,800
Meal, bone, do	487	9,740
Oil, whale, gallons	1,142,549	399,150
Oil, sperm, do	200,350	48,909
Unclassified products:		
Fillets, fresh, pounds	[9] 98,611	11,888
Fillets, frozen, do	[10] 350,268	33,305
Steaks, fresh, do	[11] 146,234	28,899
Steaks, frozen, do	[12] 58,762	16,731
Sticks, frozen, do	[13] 3,659,448	281,393
Miscellaneous, packaged, fresh, do	[14] 243,062	17,550
Salted [2], do	[15] 3,129,502	299,883
Smoked [2], do	[16] 228,120	28,622
Canned:		
Fish for cat and dog food, standard cases	475,667	1,303,757
Fish cakes, etc, do	70,775	560,326
Fish flakes, do	36,070	321,848

[1] This item represents a combination of 1935 and 1934 data.
[6] Data for 1931.
[9] Includes fresh fillets of bluefish, king whiting or "kingfish", mullet, saugér, red snapper, Spanish mackerel, suckers, and whiting.
[10] Includes frozen fillets of bluefish, groupers, halibut, mullet, red snapper, Spanish mackerel, squeteagues, and whiting.
[11] Includes fresh steaks of cabio, cero, cod, haddock, halibut, pollock, and snook.
[12] Includes frozen steaks of groupers, snook, and swordfish.
[13] Includes frozen sticks of cod, cusk, hake, and whiting.
[14] Includes pan-dressed croakers and squeteagues, and fresh-shucked sea mussels.
[15] Includes salted barracuda, cusk, haddock, pilchards, black and white sea bass, spot, yellowtail, sea herring and sea herring roe, shrimp, bits and strips and partly boned green cod, boneless cusk, and fillets of hake and sea herring; spiced chubs; and pickled sea herring.
[16] Includes smoked bluefish, cod, flounders, goosefish, haddock, smelt, Spanish mackerel, cod steaks, and miscellaneous fish; fillets of haddock, sea herring, king whiting or "kingfish," and mullet; bismarck sea herring; and spiced salmon.

Manufactured fishery products of the United States and Alaska—Continued

Item	Quantity	Value
Unclassified products—Continued.		
Cannned—Continued.		
Fish chowder ..... standard cases	9,057	$42,473
Other ..... do	[17] 39,622	366,581
Acid and dry scrap ..... tons	1,574	84,195
Meal:		
Groundfish (white fish) ..... do	11,838	484,540
Miscellaneous ..... do	[18] 4,215	137,060
Oil:		
Liver, miscellaneous ..... gallons	[19] 83,378	3,338,834
Miscellaneous ..... do	[20] 72,198	18,057
Glue ..... do	409,850	829,625
Novelties, miscellaneous		2,725
Other byproducts		[21] 377,247
Total, fresh and frozen packaged products [2] ..... pounds	191,273,299	25,378,622
Total, cured products [3] ..... do	126,516,387	15,691,380
Total, canned products ..... do	672,755,960	74,999,034
Total, byproducts [4]		29,839,277
Grand total		145,908,313

[2] This item represents a combination of 1935 and 1934 data.
[3] This item represents a combination of 1935, 1934, and 1931 data.
[17] Includes canned pickled eels, finnan haddie, smoked salmon, kippered sturgeon, spiny lobster soup and meat, shrimp soup, abalone products, coquina clam broth, conch chowder, pickled sea mussels, squid, sea cucumber, frog products, rat poison bait, cod and hake fillets, fish paste, and groundfish roe.
[18] Includes salmon egg, abalone, soft clam, oyster and miscellaneous fish meals.
[19] Includes black cod, burbot, halibut, swordfish, tuna and miscellaneous liver oils.
[20] Includes salmon egg, shark, and miscellaneous fish oils.
[21] Includes shark skins and fins; fresh-water mussel-shell stucco and chips; isinglass; kelp products; and cod-liver pressings.

NOTE.—Some of the above products have been manufactured from products imported from another country; therefore, they cannot be correlated directly with the catch within the United States and Alaska.

CANNED FISHERY PRODUCTS AND BYPRODUCTS TRADE

The output of canned fishery products and byproducts in the United States and Alaska in 1935 was valued at $104,518,774. Of this total, canned products comprised $74,999,034, and byproducts, $29,519,740—a decrease of 6 percent in the value of canned products and an increase of 30 percent in the value of byproducts when compared with the respective values of the same groups of commodities for the previous year.

Fishery products were canned at 377 establishments in the United States and Alaska during 1935. The combined output of these canneries amounted to 17,435,076 standard cases. The net weight of the products canned amounted to 672,755,960 pounds.

Canned fishery products or byproducts were prepared in 26 States and in Alaska during 1935. California ranked first in the value of the products, accounting for 34 percent of the total, and Alaska ranked second, with 27 percent.

Canned fishery products and byproducts of the United States and Alaska, 1935

SUMMARY OF PRODUCTION: BY COMMODITIES

Product	Number of plants	Standard cases	Pounds	Value
Canned products:				
Salmon:				
United States	32	894,768	42,948,864	$6,707,130
Alaska	99	5,133,122	246,389,856	25,768,136
Sardines:				
Maine	22	1,655,839	41,395,975	5,142,750
California	23	2,420,055	116,162,640	6,237,262
Tuna and tunalike fishes	14	2,510,828	60,259,872	12,823,729
Mackerel	29	1,812,218	86,986,464	4,975,677
Alewives	6	15,256	732,288	37,682
Alewife roe	26	30,120	1,445,760	206,045
Shad	7	10,507	504,336	36,044
Shad roe	8	2,493	119,664	73,064
Fish flakes	3	36,070	1,731,360	321,848
Fish cakes, balls, etc	6	80,961	3,886,128	604,778
Cat and dog food	6	475,667	22,832,016	1,303,757
Miscellaneous fish	12	15,375	740,000	184,501
Sturgeon caviar	5	2,834	136,032	389,238
Whitefish roe and caviar	4	1,286	61,728	49,921
Salmon eggs (for bait)	10	3,870	185,760	73,239
Miscellaneous roe and caviar	4	20,810	998,880	168,842
Clam products	81	[1] 666,981	16,673,715	2,680,935
Oysters	46	500,885	7,513,275	2,044,903
Shrimp	46	1,086,345	18,229,619	4,721,872
Crabs	16	7,300	350,400	117,727
Turtle products	4	3,271	157,008	52,055
Miscellaneous shellfish, etc	13	48,215	2,314,320	277,899
Total	[2] 377	17,435,076	672,755,960	74,999,034
Byproducts:			*Quantity*	*Value*
Oyster-shell products			326,564 tons	1,481,335
Fresh-water mussel-shell products				4,057,876
Marine pearl-shell products				3,863,077
Scrap, meal, etc			212,403 tons	5,711,217
Marine-animal oils			31,925,660 gallons	13,149,118
Miscellaneous byproducts				1,257,117
Total				29,519,740
Grand total				104,518,774

[1] "Cutout" or "drained" weights of can contents are included for whole and minced clams, and gross can contents for other clam products.
[2] Exclusive of duplication.

VALUE OF PRODUCTION: BY STATES

State	Canned products	Byproducts	Total
Maine	$6,077,590	$298,254	$6,375,844
Massachusetts	1,132,822	2,051,234	3,199,850
Rhode Island		15,794	
Connecticut		845,582	845,582
New York	579,028	1,818,014	2,397,042
New Jersey	1,018,338	1,549,828	2,862,909
Pennsylvania		294,743	
Delaware		638,454	638,454
Maryland	371,156	856,440	1,227,596
Virginia	88,253	1,167,705	1,255,958
North Carolina	81,231	341,206	759,185
South Carolina	336,748		
Georgia	850,991	691,346	1,876,955
Florida	334,618		
Alabama	337,108	41,071	2,533,096
Mississippi	2,154,917		
Louisiana	2,173,008	451,733	2,624,801
Texas and Wisconsin	328,916	77,996	406,912
Missouri, Illinois, and Minnesota		73,642	73,642
Iowa		3,029,461	3,029,461
Washington	4,955,117	2,378,368	7,333,485
Oregon	2,853,262	461,110	3,314,372
California	25,252,965	10,543,900	35,796,865
Alaska	26,072,966	1,893,799	27,966,765
Total	74,999,034	29,519,740	104,518,774

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PACK OF CANNED SALMON: STANDARD CASES

Product	Alaska							
	Southeast		Central		Western		Total	
	Cases	*Value*	*Cases*	*Value*	*Cases*	*Value*	*Cases*	*Value*
Chinook or king:								
1-pound tall	4,058	$28,138	11,590	$83,071	775	$5,907	16,423	$117,116
1-pound flat	2,081	21,289	4,379	41,435	60	564	6,520	63,288
½-pound flat	4,969	64,075	8,493	72,240	.....	.....	13,462	136,315
Total	11,108	113,502	24,462	196,746	835	6,471	36,405	316,719
Blueback, red or sockeye:								
1-pound tall	117,364	1,053,878	281,689	2,432,751	265,302	2,371,913	664,355	5,858,542
1-pound flat	12,505	121,515	45,188	451,610	.....	.....	57,693	573,125
½-pound flat	29,560	381,892	57,306	723,278	632	7,813	87,498	1,112,983
Total	159,429	1,557,285	384,183	3,607,639	265,934	2,379,726	809,546	7,544,650
Silver or coho:								
1-pound tall	135,591	855,526	44,708	276,555	223	1,411	180,522	1,133,492
1-pound flat	2,094	15,055	739	5,173	.....	.....	2,833	20,228
½-pound flat	4,808	46,208	2,014	17,306	.....	.....	6,822	63,514
Total	142,493	916,789	47,461	299,034	223	1,411	190,177	1,217,234
Humpback or pink:								
1-pound tall	2,164,797	9,037,864	1,034,018	4,094,392	4	15	3,198,819	13,132,271
1-pound flat	687	2,748	.....	.....	.....	.....	687	2,748
½-pound flat	34,576	222,654	9,984	62,789	.....	.....	44,560	285,443
Total	2,200,060	9,263,266	1,044,002	4,157,181	4	15	3,244,066	13,420,462
Chum or keta:								
1-pound tall	539,942	2,053,905	301,482	1,166,752	9,857	38,712	851,281	3,259,369
½-pound flat	1,006	6,036	641	3,666	.....	.....	1,647	9,702
Total	540,948	2,059,941	302,123	1,170,418	9,857	38,712	852,928	3,269,071
Grand total	3,054,038	13,910,783	1,802,231	9,431,018	276,853	2,426,335	5,133,122	25,768,136

Product	United States						Grand total, Alaska and United States	
	Washington		Oregon		Total			
	Cases	*Value*	*Cases*	*Value*	*Cases*	*Value*	*Cases*	*Value*
Chinook or king:								
1-pound tall	18,296	$122,963	20,320	$111,059	38,616	$234,022	55,039	$351,138
1-pound oval	279	5,859	774	16,254	1,053	22,113	1,053	22,113
1-pound flat	12,214	131,332	39,967	410,162	52,181	541,494	58,701	604,782
½-pound oval	8	208	3,107	80,782	3,115	80,990	3,115	80,990
½-pound flat	35,959	468,303	82,536	1,094,899	118,495	1,563,202	131,957	1,699,517
¼-pound flat	593	7,579	7,234	119,472	7,827	127,051	7,827	127,051
Total	67,349	736,244	153,938	1,832,628	221,287	2,568,872	257,692	2,885,591
Blueback, red or sockeye:								
1-pound tall	459	4,406	87	870	546	5,276	664,901	5,863,818
1-pound flat	1,998	23,177	.....	.....	1,998	23,177	59,691	596,302
½-pound oval	41	607	.....	.....	41	607	41	607
½-pound flat	57,452	781,528	530	7,420	57,982	788,948	145,480	1,901,931
¼-pound flat	103	1,792	195	3,432	298	5,224	298	5,224
Total	60,053	811,510	812	11,722	60,865	823,232	870,411	8,367,882
Silver or coho:								
1-pound tall	46,648	309,263	17,148	123,465	63,796	432,728	244,318	1,566,220
1-pound flat	21,197	159,546	31,331	250,648	52,528	410,194	55,361	430,422
½-pound oval	52	520	581	8,134	633	8,654	633	8,654
½-pound flat	19,443	167,590	26,071	229,425	45,514	397,015	52,336	460,529
¼-pound flat	1,531	15,922	12,434	139,261	13,965	155,183	13,965	155,183
Total	88,871	652,841	87,565	750,933	176,436	1,403,774	366,613	2,621,008

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Product	United States						Grand total, Alaska and United States	
	Washington		Oregon		Total			
	Cases	*Value*	*Cases*	*Value*	*Cases*	*Value*	*Cases*	*Value*
Humpback or pink:								
1-pound tall	333,419	$1,333,676	.....	.....	333,419	$1,333,676	3,532,238	$14,465,947
1-pound flat	2,188	10,065	.....	.....	2,188	10,065	2,875	12,813
½-pound flat	41,052	262,733	.....	.....	41,052	262,733	85,612	548,176
Total	376,659	1,606,474	.....	.....	376,659	1,606,474	3,620,725	15,026,936
Chum or keta:								
1-pound tall	21,933	82,194	19,336	$69,610	41,269	151,804	892,550	3,411,173
½-pound flat	3,426	19,220	196	1,176	3,622	20,396	5,269	30,098
Total	25,359	101,414	19,532	70,786	44,891	172,200	897,819	3,441,271
Steelhead:								
1-pound tall	542	2,710	3,181	15,905	3,723	18,615	3,723	18,615
1-pound flat	350	2,170	2,347	14,551	2,697	16,721	2,697	16,721
½-pound oval	.....	.....	2,175	33,060	2,175	33,060	2,175	33,060
½-pound flat	1,073	9,443	2,910	25,608	3,983	35,051	3,983	35,051
¼-pound oval	.....	.....	340	5,848	340	5,848	340	5,848
¼-pound flat	549	7,466	1,163	15,817	1,712	23,283	1,712	23,283
Total	2,514	21,789	12,116	110,789	14,630	132,578	14,630	132,578
Grand total	620,805	3,930,272	273,963	2,776,858	894,768	6,707,130	6,027,890	32,475,266

NOTE.—"Standard cases" represent the various size cases converted to the equivalent of 48 1-pound cans to the case. Salmon were canned at 24 plants in Washington, 8 in Oregon, and 99 in Alaska.

PACK OF CANNED SARDINES

Sardines (herring)	Maine		Sardines (pilchard)	California	
	Cases	*Value*		*Cases*	*Value*
Quarters, ¼-pound (100 cans):			1-pound oval (48 cans):		
In olive oil	1,774	$26,346	*In cottonseed oil*	1,427	$3,211
In cottonseed oil	[3] 1,461,051	[3] 4,582,432	In mustard	360,136	918,258
In mustard	89,459	315,208	In tomato sauce	1,339,077	3,433,240
In other sauces	3,686	15,054	In natural oil	16,068	37,438
Three-quarters, ¾-pound (48 cans):			In other sauces or oils	29,485	77,896
In mustard	67,270	203,710	½-*pound oval* (48 cans):		
			In various sauces or oils	4,456	16,533
			1-pound tall (48 cans):		
			In natural oil	356,751	722,639
			½-pound (96 cans):		
			In natural oil	69,242	195,104
			9-ounce oblong (48 cans):		
			In various sauces or oils	3,924	13,542
			6-ounce tall (50 cans):		
			In various sauces or oils	13,085	18,973
			6-ounce (100 cans):		
			In tomato sauce	11,046	27,987
			In natural oil	[4] 261,058	[4] 637,351
			Other sizes:		
			In various sauces or oils (standard cases)	25,742	135,090
Total	1,626,240	5,142,750	Total	2,491,497	6,237,262
Total (standard cases)	1,655,839	.....	Total (standard cases)	2,420,055	.....

[3] Includes a small amount packed in 6-ounce cans, 100 to the case, and 12-ounce cans, 48 to the case, which have been converted to the basis of 4-ounce cans, 100 to the case.

[4] Includes a small amount packed in salad oil.

NOTE.—"Standard cases" represent the various size cases converted to the uniform basis of 100 ¼-pound cans to the case of sardines (herring), and 48 1-pound cans to the case of sardines (pilchards). Sardines were canned at 22 plants in Maine and 23 in California.

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PACK OF CANNED TUNA AND TUNALIKE FISHES IN CALIFORNIA

Product and size	Albacore		Yellowfin		Bluefin		Striped	
	Cases	*Value*	*Cases*	*Value*	*Cases*	*Value*	*Cases*	*Value*
¼-pound (48 cans)	1,041	$3,941	119,984	$459,344	65,777	$263,278	15,936	$51,298
½-pound (48 cans)	98,087	654,277	937,664	5,046,455	297,687	1,374,048	255,584	1,173,409
1-pound (48 cans)	[5] 6,803	[5] 92,771	[5] 83,427	[5] 716,730	[5] 22,285	[5] 187,606	8,957	71,374
Total (actual cases)	105,931	740,989	1,141,075	6,222,529	385,749	1,824,932	280,377	1,296,071
Total (standard cases)	112,214		1,164,510		376,146		281,266	
Flakes:								
¼-pound (48 cans)			2,081	6,192				
½-pound (48 cans)	7,378	27,122	99,678	428,107	[6] 29,096	[6] 121,134	[7] 4,595	[7] 18,667
1-pound (48 cans)	1,315	10,282	14,161	105,977	2,646	19,527	[7] 128	[7] 992
Total (actual cases)	8,693	37,404	115,920	540,276	31,742	140,661	4,723	19,659
Total (standard cases)	10,008		129,040		34,388		4,851	
Grand total (actual cases)	114,624	778,393	1,256,995	6,762,805	417,491	1,965,593	285,100	1,315,730
Grand total (standard cases)	122,222		1,293,550		409,534		286,117	

Product and size	"Tonno"		Bonito		Yellowtail		Total	
	Cases	*Value*	*Cases*	*Value*	*Cases*	*Value*	*Cases*	*Value*
¼-pound (48 cans)			476	$1,468			203,214	$779,319
¼-pound (100 cans)	140,543	$938,709	8,555	50,985			149,098	989,694
½-pound (48 cans)	14,458	87,245	102,933	429,332	68,299	$280,120	1,774,712	9,644,886
1-pound (48 cans)			16,207	119,620	12,881	93,729	150,460	1,271,830
Total (actual cases)	155,001	1,025,954	128,171	601,405	81,180	373,849	2,277,484	12,085,729
Total (standard cases)	100,848		144,496		94,061		2,332,541	
Flakes:								
¼-pound (48 cans)							2,081	6,192
½-pound (48 cans)			(?)	(?)			140,747	595,030
1-pound (48 cans)			(?)	(?)			18,250	136,778
Total (actual cases)							161,078	738,000
Total (standard cases)							178,287	
Grand total (actual cases)	155,001	1,025,954	128,171	601,405	81,180	373,849	2,438,562	12,823,729
Grand total (standard cases)	100,848		144,496		94,061		2,510,828	

[5] Includes the pack in 4-pound cans, 12 to the case, which has been converted to the equivalent of 1-pound cans, 48 to the case.

[6] Includes the pack in ¼-pound cans, 48 to the case, which has been converted to the equivalent of ½-pound cans, 48 to the case.

[7] The pack of bonito flakes has been included with striped tuna flakes.

NOTE.—"Standard cases" represent the various size cases converted to the equivalent of 48 ½-pound cans to the case. Tuna and tunalike fishes were canned at 14 plants in California.

PACK OF CANNED MACKEREL

Size	Maine and Massachusetts		California		Total	
	Cases	*Value*	*Cases*	*Value*	*Cases*	*Value*
8-ounce (48 cans)			2,480	$8,992	2,480	$8,992
8-ounce (96 cans)			234,271	723,505	234,271	723,505
16-ounce (48 cans)			[8] 1,560,213	[8] 4,112,622	1,560,213	4,112,622
Other sizes (standard cases)	16,494	$130,558			16,494	130,558
Total (actual cases)	16,494	130,558	1,796,964	4,845,119	1,813,458	4,975,677
Total (standard cases)	16,494		1,795,724		1,812,218	

[8] Includes a small amount of mackerel stew.

NOTE.—"Standard cases" represent the various size cans converted to the equivalent of 48 1-pound cans to the case. Mackerel were canned at 1 plant in Maine, 2 in Massachusetts, and 26 in California.

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PACK OF CANNED ALEWIVES AND ALEWIFE ROE: STANDARD CASES

Product	Maryland		Virginia		North Carolina		Total	
	Cases	*Value*	*Cases*	*Value*	*Cases*	*Value*	*Cases*	*Value*
Alewives	[9] 15,256	[9] $37,682	[9]	[9]			15,256	$37,682
Alewife roe	5,910	40,681	11,961	$84,133	12,249	$81,231	30,120	206,045
Total	21,166	78,363	11,961	84,133	12,249	81,231	45,376	243,727

PACK OF CANNED ALEWIVES AND ALEWIFE ROE: ACTUAL CASES

Product and size	Cases	Value
Alewives:		
14 and 16 ounce (24 cans)	30,397	$33,622
17, 19, and 28 ounce (24 cans)	[10] 3,059	[10] 4,060
Total		37,682
Alewife roe:		
8 ounce (48 cans)	17,892	72,990
16 and 17 ounce (24 cans)	39,926	133,055
Total		206,045
Grand total		243,727

[9] The production of canned alewives in Virginia is included with that of Maryland.

[10] Includes the pack in 106-ounce cans, 6 to the case, which has been converted to the equivalent of 17-ounce cans, 24 to the case.

NOTE.—"Standard cases" represent the various size cases converted to the equivalent of 48 1-pound cans to the case. Alewives or alewife roe were canned at 7 plants in Maryland, 15 in Virginia, and 4 in North Carolina.

PACK OF CANNED OYSTERS: STANDARD CASES

State	Cases	Value
New Jersey, Maryland, Georgia, and Florida	21,501	$85,595
South Carolina	85,891	336,748
Alabama	25,717	103,700
Mississippi	241,809	982,539
Louisiana	37,905	151,898
Washington	88,062	384,423
Total	500,885	2,044,903

PACK OF CANNED OYSTERS: ACTUAL CASES

Size	Cases	Value
3½-ounce (48 cans)	14,226	$45,302
4-ounce (48 cans)	26,245	103,038
5-ounce (48 cans)	348,354	1,397,091
8-ounce (24 cans)	51,933	196,585
8-ounce (48 cans)	[11] 25,588	[11] 164,657
10-ounce (24 cans)	39,091	138,230
Total		2,044,903

[11] Includes the pack in 6-ounce cans, 48 to the case, which has been converted to the equivalent of 8-ounce cans, 48 to the case.

NOTE.—"Standard cases" represent the various size cases converted to the equivalent of forty-eight 5-ounce cans to the case. Oysters were canned at 1 plant in New Jersey, 1 in Maryland, 4 in South Carolina, 1 in Georgia, 2 in Florida, 3 in Alabama, 15 in Mississippi, 8 in Louisiana, and 11 in Washington.

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PACK OF CANNED CLAMS AND CLAM PRODUCTS: STANDARD CASES

Product and State	Whole		Minced		Chowder	
	Cases	*Value*	*Cases*	*Value*	*Cases*	*Value*
Soft clams:						
Maine and Massachusetts	[13] 106,084	[13] $375,561			81,947	$246,510
Hard clams:						
Maryland					55,776	155,515
Washington	16,605	68,280	16,026	$74,673	480	1,686
Alaska	48	384	940	3,250		
Massachusetts, Rhode Island, New York, New Jersey, Pennsylvania, and Florida	[14] 4,600	[14] 38,374	[15] 6,400	[15] 43,010	275,301	1,022,750
Total	21,253	107,038	23,366	120,933	331,557	1,179,951
Razor clams:						
Washington	1,152	10,327	40,872	344,558		
Oregon	51	408	1,012	7,105		
Alaska	287	1,799	28,304	191,848		
Total	1,490	12,534	70,188	543,511		
Grand total	128,827	495,133	93,554	664,444	413,504	1,426,461

Product and State	Juice, bouillon, broth, and cocktail [12]		Total	
	Cases	*Value*	*Cases*	*Value*
Soft clams:				
Maine and Massachusetts	14,763	$24,760	202,794	$646,831
Hard clams:				
Maryland			55,776	155,515
Washington	3,216	6,786	36,327	151,425
Alaska	60	300	1,048	3,934
Massachusetts, Rhode Island, New York, New Jersey, Pennsylvania, and Florida	[16] 12,987	[16] 62,805	299,268	1,166,939
Total	16,263	69,891	392,439	1,477,813
Razor clams:				
Washington			42,024	354,885
Oregon	70	246	1,133	7,759
Alaska			28,591	193,647
Total	70	246	71,748	556,291
Grand total	31,096	94,897	666,981	2,680,935

[12] Consists of juice, bouillon, and cocktail from soft clams in Maine; juice from hard clams in New York, Florida, Washington, and Alaska; broth from hard and coquina clams in Florida; bouillon and cocktail from hard clams in New York; and juice from razor clams in Oregon.

[13] Packed in Maine.

[14] Packed in New York, New Jersey, and Florida.

[15] Packed in New York and Florida.

[16] Includes a small amount of coquina broth packed in Florida.

Canned fishery products and byproducts of the United States and Alaska, 1935—Con.

PACK OF CANNED CLAMS AND CLAM PRODUCTS: ACTUAL CASES

Product and size	Whole		Minced		Chowder	
	Cases	*Value*	*Cases*	*Value*	*Cases*	*Value*
Soft clams:						
No. 1 (48 cans)	76,536	$275,076			17,708	$62,431
1 pound (48 cans)	6,284	30,574				
No. 2 (24 cans)	17,403	60,694			14,390	41,750
No. 3 (24 cans)					16,506	58,033
No. 10 (6 cans)					1,812	10,914
Other sizes (standard cases)	2,091	9,217			20,303	73,382
Total		375,561				246,510
Hard clams:						
½-pound (48 cans)			16,066	$59,504		
½-pound (96 cans)						
No. 1 (48 cans)	1,901	16,471	2,969	16,434	170,598	546,338
1-pound (24 cans)					6,930	19,374
1-pound (48 cans)	2,230	15,776				
No. 2 (24 cans)	3,935	23,339	1,060	6,636		
No. 3 (12 cans)					18,860	38,977
No. 10 (6 cans)	7,500	36,612	3,157	26,845	2,785	12,065
Other sizes (standard cases)	2,099	14,840	2,380	11,514	136,304	563,197
Total		107,038		120,933		1,179,951
Razor clams:						
½-pound (48 cans)			65,431	421,456		
No. 1 (48 cans)	1,234	11,005	17,006	116,209		
1-pound (48 cans)			327	3,233		
No. 2 (24 cans)			315	2,613		
Other sizes (standard cases)	256	1,529				
Total		12,534		543,511		
Grand total		495,133		664,444		1,426,461

Product and size	Juice, bouillon, broth, and cocktail		Total	
	Cases	*Value*	*Cases*	*Value*
Soft clams:				
No. 1 (48 cans)			94,244	$337,507
1 pound (48 cans)			6,284	30,574
No. 2 (24 cans)	9,939	$14,349	41,732	116,793
No. 3 (24 cans)			16,506	580,33
No. 10 (6 cans)	1,950	3,275	3,762	14,189
Other sizes (standard cases)	2,338	7,136	24,732	89,735
Total		24,760		646,831
Hard clams:				
½-pound (48 cans)			16,066	59,504
½-pound (96 cans)	79	571	79	571
No. 1 (48 cans)	1,785	6,942	177,253	586,185
1-pound (24 cans)			6,930	19,374
1-pound (48 cans)			2,230	15,776
No. 2 (24 cans)	2,672	8,503	7,667	38,478
No. 3 (12 cans)			18,860	38,977
No. 10 (6 cans)	2,861	9,913	16,243	85,435
Other sizes (standard cases)	8,105	43,962	148,888	633,513
Total		69,891		1,477,813
Razor clams:				
½-pound (48 cans)			65,431	421,456
No. 1 (48 cans)			18,240	127,214
1-pound (48 cans)			327	3,233
No. 2 (24 cans)			315	2,613
Other sizes (standard cases)	70	246	326	1,775
Total		246		556,291
Grand total		94,897		2,680,935

NOTE.—"Standard cases" represent the various size cases converted to the equivalent of 48 no. 1 cans. Soft clam products were canned at 20 plants in Maine, and 1 plant in Massachusetts; hard clam products at 1 plant in Massachusetts, 1 in Rhode Island, 2 in New York, 3 in New Jersey, 1 in Pennsylvania, 4 in Maryland, 3 in Florida, 10 in Washington, and 2 in Alaska; razor-clam products, at 8 plants in Washington, 4 in Oregon, and 15 in Alaska; and *coquina-clam products* at 1 plant in Florida.

Canned fishery products and byproducts of the United States and Alaska, 1935—Con.

PACK OF CANNED SHRIMP: STANDARD CASES

State	Dry pack (in tins)		Wet pack (in tins)		Wet pack (in glass)		Total	
	Cases	*Value*	*Cases*	*Value*	*Cases*	*Value*	*Cases*	*Value*
Georgia	33,290	$143,929	108,972	$444,250	(17)	(17)	142,262	$588,179
Florida, Alabama, and Texas	15,139	65,358	128,746	533,330	17 65,469	17 $454,044	209,354	1,052,732
Mississippi	80,449	345,597	199,603	825,626			280,052	1,171,223
Louisiana	97,714	417,235	350,930	1,492,311	(17)	(17)	454,644	1,909,546
Alaska			33	192			33	192
Total	226,592	972,119	794,284	3,295,709	65,469	454,044	1,086,345	4,721,872

PACK OF CANNED SHRIMP: ACTUAL CASES

Size	Cases	Value
In tins, dry:		
4-ounce (48 cans)	9,466	$34,736
5-ounce (48 cans)	190,118	800,383
8¼-ounce (24 cans)	35,031	137,000
In tins, wet:		
5¾-ounce (48 cans)	790,253	3,276,629
9¾-ounce (24 cans)	4,349	17,674
Other sizes (standard cases)	344	1,406
In glass, wet:		
4-ounce (24 cans)	7,264	19,483
6-ounce (24 cans)	74,839	261,936
Other sizes (standard cases)	23,899	172,625
Total		4,721,872

17 The pack of shrimp in glass for Georgia and Louisiana has been included with Florida, Alabama, and Texas.

NOTE.—"Standard cases" represent the various size cans converted to the equivalent of forty-eight 5-ounce cans to the case in the dry pack and forty-eight 5¾-ounce cans to the case in the wet pack. Shrimp were canned at 5 plants in Georgia, 2 in Florida, 3 in Alabama, 16 in Mississippi, 17 in Louisiana, 2 in Texas, and 1 in Alaska.

PACK OF MISCELLANEOUS CANNED FISHERY PRODUCTS: STANDARD CASES

Product	Atlantic and Gulf coasts 18		Pacific coast (including Alaska)		Total	
	Cases	*Value*	*Cases*	*Value*	*Cases*	*Value*
Shad			10,507	$36,044	10,507	$36,044
Shad roe			2,493	73,064	2,493	73,064
Fish flakes 19	36,070	$321,848			36,070	321,848
Fish cakes, balls, etc.	80,961	604,778			80,961	604,778
Cat and dog food	15,750	34,628	459,917	1,269,129	475,667	1,303,757
Fish chowder	9,057	42,473			9,057	42,473
Miscellaneous fish 20	6,241	140,528	77	1,500	6,318	142,028
Sturgeon caviar	21 2,834	21 389,238	(21)	(21)	2,834	389,238
Whitefish roe and caviar	1,286	49,921			1,286	49,921
Salmon eggs for bait			3,870	73,239	3,870	73,239
Miscellaneous roe and caviar 22	20,810	168,842			20,810	168,842
Crabs	(23)	(23)	23 7,300	23 117,727	7,300	117,727
Turtle products	3,271	52,055			3,271	52,055
Miscellaneous shellfish, etc. 24	32,549	189,108	15,666	88,791	48,215	277,899
Total	208,829	1,993,419	499,830	1,659,494	708,659	3,652,913

18 Includes the production of whitefish caviar by 1 firm in Wisconsin.
19 Tuna flakes are not included in this table, but are included in the table for canned tuna and tuna like fishes.
20 Includes finnan haddie, pickled eels, fillets, fish paste, smoked king salmon, kippered sturgeon, and fish prepared for poisoning rats.
21 The production of 1 firm in Washington is included with the east coast.
22 Includes salmon roe and caviar and groundfish roe.
23 The production of 1 firm in Virginia is included with the Pacific coast.
24 Includes pickled mussels, squid, oyster puree, shrimp soup, fresh-water crawfish, terrapin, conch and abalone products, sea cucumber, frogs and frogs' legs.

NOTE.—"Standard cases" represent the various size cases converted to the equivalent of 48 1-pound cans to the case. Shad were canned at 7 plants, shad roe at 8 plants, fish flakes at 3 plants, cat and dog food at 6 plants, fish cakes, balls, etc., at 6 plants, fish chowder at 6 plants, miscellaneous fish at 6 plants, sturgeon caviar at 5 plants, whitefish roe and caviar at 4 plants, salmon eggs (for bait) at 10 plants, miscellaneous roe and caviar at 4 plants, crabs at 16 plants, turtle products at 4 plants, and miscellaneous shellfish products, etc., at 13 plants.

Canned fishery products and byproducts of the United States and Alaska, 1935—Con.

PRODUCTION OF OYSTER-SHELL PRODUCTS [25]

State	Crushed oyster-shell for poultry feed		Oyster-shell lime		Total	
	Tons	*Value*	*Tons*	*Value*	*Tons*	*Value*
Rhode Island and Delaware	1,489	$11,689	461	$2,375	1,950	$14,064
New Jersey	7,395	55,230	3,012	13,868	10,407	69,098
Pennsylvania	4,236	35,212	911	3,412	5,147	38,624
Maryland	41,895	179,896	23,692	33,881	65,587	213,777
Virginia	15,202	85,805	[26] 24,610	[26] 134,000	39,812	219,805
North Carolina, South Carolina, and Florida	55,049	259,361	636	1,949	55,685	261,310
Alabama and Louisiana	94,489	422,956	1,460	2,065	95,949	425,021
Mississippi	5,220	21,675	([27])	([27])	5,220	21,675
Texas	21,398	66,872	[27] 4,311	[27] 11,199	25,709	78,071
Washington and Oregon	5,926	57,353	([28])	([28])	5,926	57,353
California	13,273	73,139	[28] 1,899	[28] 9,398	15,172	82,537
Total	265,572	1,269,188	60,992	212,147	326,564	1,481,335

[25] The production in Washington was from both clam and oyster shells.
[26] Of this amount, 16,258 tons, valued at $102,593, were reported as "burned" lime.
[27] The production of oyster-shell lime in Mississippi has been included with that of Texas.
[28] The production of oyster-shell lime in Washington and Oregon has been included with that of California.

NOTE.—The above crushed shell products were prepared at 2 plants in Rhode Island, 10 in New Jersey, 4 in Pennsylvania, 1 in Delaware, 4 in Maryland, 9 in Virginia, 3 in North Carolina, 1 in South Carolina, 3 in Florida, 2 in Alabama, 4 in Mississippi, 1 in Louisiana, 3 in Texas, 5 in Washington, 1 in Oregon, and 5 in California.

PRODUCTION OF FRESH-WATER MUSSEL-SHELL PRODUCTS

Item	Iowa		Other States		Total	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Pearl buttons.....gross	10,147,144	$2,921,583	3,810,385	$1,010,686	13,957,529	$3,932,269
Crushed shell for poultry feed.....tons	5,842	32,743	389	2,369	6,231	35,112
Lime.....do	1,689	2,921	108	360	1,797	3,281
Other products [29]	----------	[30] 87,214	----------	([30])	----------	87,214
Total	----------	3,044,461	----------	1,013,415	----------	4,057,876

[29] Includes stucco, colored shells, and "pearl novelties."
[30] The novelties produced in other States are included with the production in Iowa.

NOTE.—Mussel shells purchased by manufacturing plants during the year amounted to 16,962,000 pounds, valued at $213,606. Shells were purchased from 15 States in the Mississippi Valley, in the Great Lakes region, and from Canada. The producing States in order of their importance were: Arkansas, which contributed 22 percent of the total quantity; Tennessee and Illinois, each 17 percent; Indiana, 11 percent; Michigan, 7 percent; Kentucky, 6 percent; Iowa and Minnesota, each 5 percent; Texas, 4 percent; Wisconsin, 2 percent; Ohio and Mississippi, each 1 percent; and Alabama, Missouri, South Dakota, and Canada each less than one-half of 1 percent.

PRODUCTION OF MARINE PEARL-SHELL PRODUCT [31]

Item	Maine, Massachusetts, Rhode Island, and Connecticut		New York		New Jersey	
	Gross	*Value*	*Gross*	*Value*	*Gross*	*Value*
Pearl buttons	1,531,909	$886,368	1,054,838	$546,251	1,518,690	$1,065,039
Novelties [32]	----------	194,500	----------	61,690	----------	152,564
Total	----------	1,080,868	----------	607,941	----------	1,217,603

Item	Pennsylvania, Maryland, and Florida		Oregon and California		Total	
	Gross	*Value*	*Gross*	*Value*	*Gross*	*Value*
Pearl buttons	1,500,881	$723,890	----------	----------	5,606,318	$3,221,548
Novelties [32]	----------	160,767	----------	$72,008	----------	641,329
Total	----------	884,657	----------	72,008	----------	3,863,077

[31] Produced principally from imported shells.
[32] Includes knife handles, handles for manicure sets, dolls, lamps, mounted-fish decoys, etc.

NOTE.—Marine pearl-shell products were manufactured at 1 plant in Maine, 2 in Massachusetts, 1 in Rhode Island, 6 in Connecticut, 10 in New York, 22 in New Jersey, 2 in Pennsylvania, 1 in Maryland, 3 in Florida, 1 in Oregon, and 2 in California.

Canned fishery products and byproducts of the United States and Alaska, 1935—Con.

FISH UTILIZED AND PRODUCTS OF THE MENHADEN INDUSTRY

State	Menhaden utilized	Products						
		Dry scrap and meal		Acidulated scrap		Oil		Total
	Number	*Tons*	*Value*	*Tons*	*Value*	*Gallons*	*Value*	*Value*
New York, New Jersey, Delaware, and Georgia	272, 276, 000	5, 724	$185, 437	18, 322	$335, 938	1, 882, 631	$549, 129	$1, 070, 504
Virginia	200, 300, 000	14, 404	424, 510			1, 567, 298	459, 101	883, 611
North Carolina	99, 227, 000	3, 994	123, 724	5, 271	84, 106	356, 331	96, 771	304, 601
Florida	76, 534, 000	6, 294	199, 014	6, 297	104, 826	259, 899	73, 336	377, 176
Total	[33] 648, 337, 000	[34] 30, 416	[34] 932, 685	29, 890	524, 870	4, 066. 159	1, 178, 337	2, 635, 892

[33] 389,002,000 pounds.
[34] Of this production 25,364 tons, valued at $749,089 were reported as dry scrap and 5,052 tons, valued at $183,596, as fish meal.

NOTE.—The menhaden factories were located as follows: 1 in New York, 2 in New Jersey, 2 in Delaware, 9 in Virginia, 7 in North Carolina, 1 in Georgia, and 5 in Florida.

PRODUCTION OF MISCELLANEOUS BYPRODUCTS

Product	Atlantic and Gulf coasts [35]		Pacific coast (including Alaska)		Total	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Dried scrap:						
Alewife, tons	528	$15, 311			528	$15, 311
Herring, do	1, 462	34, 647			1, 462	34, 647
Blue crab, do	2, 198	38, 954			2, 198	38, 954
King crab, do	340	10, 134			340	10, 134
Miscellaneous [36], do	1, 574	34, 195			1, 574	34, 195
Meal:						
Groundfish "white fish", do	11, 838	484, 540			11, 838	484, 540
Herring (Alaska), do			15, 061	$357, 728	15, 061	357, 728
Herring (Maine), do	1, 445	54, 884			1, 445	54, 884
Mackerel, do			4, 391	113, 595	4, 391	113, 595
Pilchard, do			95, 846	2, 638, 382	95, 846	2, 638, 382
Salmon, do			1, 109	30, 739	1, 109	30, 739
Tuna, do			8, 330	219, 610	8, 330	219, 610
Shrimp, do	2, 131	45, 793	240	4, 800	2, 371	50, 593
Whale (*meat*), do			852	21, 800	852	21, 800
Whale (bone), do			487	9, 740	487	9, 740
Miscellaneous [37], do	1, 779	62, 859	2, 486	75, 951	4, 265	138, 810
Oil:						
Alewife, gallons	6, 000	1, 040			6, 000	1, 040
Cod, do	17, 342	4, 049			17, 342	4, 049
Cod liver, do	215, 479	227, 019			215, 479	227, 019
Herring (Alaska), do			3, 792, 409	1, 113, 724	3, 792, 409	1, 113, 724
Herring (Maine), do	64, 136	8, 478			64, 136	8, 478
Mackerel, do			267, 347	75, 520	267, 347	75, 520
Pilchard, do			21, 735. 165	6, 658, 965	21, 735, 165	6, 658, 965
Salmon [38], do			135, 488	54, 388	135, 488	54, 388
Tuna, do			127, 660	22, 648	127, 660	22, 648
Whale:						
Sperm, do			200, 350	48, 909	200, 350	48, 909
Other, do			1, 142, 549	399, 150	1, 142, 549	399, 150
Liver (other than cod) [39], do	11, 605	539, 687	71, 773	2, 799, 147	83, 378	3, 338, 834
Miscellaneous [40], do	14, 618	3, 450	57, 580	14, 607	72, 198	18, 057
Liquid glue, do	[41] 409, 850	[41] 829, 625	([41])	([41])	409, 850	829, 625
Pearl essence, pounds	6, 000	56, 000			6, 000	56, 000
Miscellaneous byproducts [42]		39, 992		331, 500		371, 492
Total		2, 490, 657		14, 990, 903		17, 481, 560

[35] Includes the production of burbot liver oil in Minnesota and Wisconsin.
[36] Includes groundfish and miscellaneous dry scrap, as well as the production of miscellaneous acid scrap by 1 firm in Virginia.
[37] Includes salmon egg, abalone, clam, king crab, oyster, and miscellaneous meal.
[38] Includes a considerable production of salmon oil especially prepared for human consumption.
[39] Partly estimated.
[40] Includes salmon egg, shark, and miscellaneous oil.
[41] A quantity of liquid glue produced by one firm in California is included with the production of liquid glue of the Atlantic and Gulf coasts.
[42] Includes isinglass, shark skins and fins, kelp products, miscellaneous novelties, and cod-liver pressings.

FROZEN-FISH TRADE[5]

FISH, FROZEN

During 1935 the freezing plants which reported their activities to the Government froze 149,642,769 pounds of fishery products. These products at the time they were held in cold storage plants, were estimated to be valued at about $15,000,000. Compared with the output in 1934 this was an increase of 12 percent in volume. Five species or groups of species accounted for 66 percent of the total amount frozen. In the order of their importance they were: Cod, haddock (including haddock fillets), hake, and pollock, which accounted for 27 percent of the total; salmon, 13 percent; whiting, 10 percent; and halibut and mackerel, 8 percent each. Other products frozen in considerable quantities during the year were shellfish, sea herring, and squid.

Production of frozen fishery products, 1935

BY SPECIES AND MONTHS

Species	Month ended the 15th of—					
	January	February	March	April	May	June
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Bluefish (all trade sizes)	16,525	24,549	10,537	7,086	63,500	21,464
Butterfish (all trade sizes)	2,298	9,458	1,680	----------	22,004	93,011
Catfish	36,866	26,679	19,367	60,639	43,110	83,925
Cisco (Lake Erie)	17,222	----------	----------	118	327	3,883
Cisco (lake herring), including bluefin, blackfin, and chub	55,713	28,965	62,865	12,080	28,293	74,275
Cisco (tullibees, Canadian lakes)	11,030	464	----------	1,986	7,138	6,800
Cod, haddock, hake, and pollock	464,147	153,401	246,712	704,527	717,636	1,388,279
Croaker	6,143	813	1,107	11,359	76,946	218,194
Flounders	48,802	83,265	51,405	34,904	75,235	106,315
Haddock fillets	1,011,346	1,826,855	1,423,983	1,936,592	2,985,725	2,925,015
Halibut (all trade sizes)	----------	----------	----------	91,087	1,867,747	2,164,607
Herring, sea (including alewives and blue-backs)	57,150	56,457	42,716	7,731	227,104	950,689
Lake trout	23,173	20,198	2,169	1,882	81,655	87,346
Mackerel (except Spanish)	16,987	35,623	30,441	32,715	350,601	3,569,675
Perch, yellow	(1)	(1)	(1)	(1)	(1)	(1)
Pike, blue and sauger	147,477	10,349	3,455	26,394	25,852	1,802
Pike, yellow or wall-eyed	4,339	4,272	390	17,167	50,427	8,574
Pike (including pickerel, jacks, and yellow jack)	9,876	47,655	2,696	15,762	13,028	21,143
Sablefish (black cod)	2,313	577	894	2,435	16,026	76,442
Salmon, king or chinook	57,219	920	2,135	5,946	41,050	391,557
Salmon, silver or coho	102,566	11,245	11,915	20,933	4,693	30,515
Salmon, fall and pink	17,106	31,111	21,854	9,388	1,885	2,186
Salmon, steelhead trout	1,755	19,095	18,400	4,630	5,566	11,601
Salmon, sockeye or red	27,600	17,973	14,313	14,409	10,113	24,014
Scup (porgies)	----------	----------	----------	----------	43,647	19,252
Shad and shad roe	2,270	3,618	1,069	2,014	67,268	79,905
Shellfish	141,119	190,512	146,619	125,736	410,545	476,582
Smelts, eulachon, etc	13,000	15,392	8,677	160,075	91,913	35,156
Squid	----------	1,196	360	2,353	386,445	2,094,385
Sturgeon and spoonbill cat	3,636	9	291	1,832	22,257	19,505
Suckers	5,140	400	1,642	2,284	19,333	17,549
Swordfish	41,311	7,329	19,606	21,985	3,541	68
Weakfish (including southern "sea trout")	4,907	596	500	193	15,163	18,612
Whitefish	50,072	41,561	24,574	69,126	55,048	30,633
Whiting	52,422	36,569	66,102	55,257	274,785	4,303,320
Miscellaneous fish	1,493,480	1,266,880	1,037,463	1,232,372	1,561,656	1,639,776
Total	3,945,010	3,973,986	3,275,937	4,783,057	9,667,262	20,996,055

[1] Prior to July 15, 1935, yellow perch were included with "Miscellaneous fish."

[5] The statistics in this section have been furnished by the Bureau of Agricultural Economics, Department of Agriculture.

Production of frozen fishery products, 1935—Continued

BY SPECIES AND MONTHS—Continued

Species	Month ended the 15th of—						
	July	August	September	October	November	December	Total
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Bluefish (all trade sizes)	3,033	37,001	136,702	329,799	94,595	7,613	752,404
Butterfish (all trade sizes)	147,734	24,747	64,678	373,594	136,631	9,319	885,154
Catfish	70,995	58,371	57,835	55,833	61,750	58,347	633,717
Cisco (Lake Erie)	20,972	26,601	3,240	1,719	930	31,451	106,463
Cisco (lake herring), including bluefin, blackfin, and chub	115,640	300,440	105,137	131,275	383,962	1,049,317	2,347,962
Cisco (tullibees, Canadian lakes)	1,752	3,550	3,001	2,368	900	322	39,311
Cod, haddock, hake, and pollock	1,662,506	1,636,807	1,325,602	1,800,072	3,424,203	1,542,537	15,156,429
Croaker	388,386	607,777	217,173	18,917	5,595	53,540	1,605,950
Flounders	88,694	16,761	28,124	191,064	61,284	38,338	824,251
Haddock fillets	2,054,240	2,179,051	1,999,751	2,560,164	1,902,715	1,630,368	24,435,805
Halibut (all trade sizes)	2,021,306	1,839,372	1,830,737	667,326	1,127,898	758,069	12,368,149
Herring, sea (including alewives and bluebacks)	156,758	770,525	986,117	450,153	499,236	607,772	4,812,408
Lake trout	112,841	71,310	52,374	104,016	416,044	72,953	1,045,961
Mackerel (except Spanish)	3,155,216	2,628,458	1,629,361	296,497	471,810	73,739	12,291,123
Perch, yellow	4,189	735	21,600	14,993	43,723	9,483	94,723
Pike, blue and sauger	41,829	12,890	3,543	52,798	267,117	212,273	805,779
Pike, yellow or wall-eyed	10,535	1,772	22,960	13,431	18,827	7,635	160,329
Pike (including pickerel, jacks, and yellow jack)	13,199	8,200	22,561	23,497	12,820	796	191,233
Sablefish (black cod)	308,162	114,080	533,572	1,090,134	681,324	157,511	2,983,470
Salmon, king or chinook	799,801	697,622	925,098	1,463,070	891,651	16,517	5,293,486
Salmon, silver or coho	166,648	876,478	1,841,909	2,311,051	2,311,836	440,519	8,130,308
Salmon, fall and pink	780	114,971	73,385	226,960	3,771,146	178,566	4,449,338
Salmon, steelhead trout	85,882	183,859	155,452	112,135	10,209	8,057	616,641
Salmon, sockeye or red	9,159	9,428	11,019	27,151	17,769	9,015	191,963
Scup (porgies)	8,471	50,983	55,572	28,344	2,550	219	209,038
Shad and shad roe	112,531	13,805	49,368	38,086	14,988	2,209	387,131
Shellfish	617,559	438,895	810,309	1,105,583	1,123,079	935,173	6,521,711
Smelts, eulachon, etc.	11,371	47,064	44,775	58,309	26,761	14,125	526,618
Squid	240,265	227,933	14,378	66,765	2,817	10,822	3,047,719
Sturgeon and spoonbill cat	19,352	45,090	8,169	41,661	6,144	885	168,831
Suckers	9,746	7,950	2,573	642	7,948	9,953	85,160
Swordfish	4,971	129,478	730,853	45,020	5,740	11,287	1,021,189
Weakfish (including southern "sea trout")	29,203	46,607	135,276	364,694	74,819	48,083	738,603
Whitefish	22,465	128,501	23,882	28,182	17,282	47,994	539,320
Whiting	5,071,951	1,792,730	1,366,701	913,083	816,995	495,528	15,245,443
Miscellaneous fish	1,555,383	2,568,003	1,441,985	2,080,807	2,478,246	2,573,596	20,929,649
Total	19,143,525	17,717,845	16,734,772	17,090,093	21,191,344	11,123,883	149,642,769

Production of frozen fishery products, 1935—Continued

BY GEOGRAPHICAL SECTIONS AND SPECIES[1]

[Expressed in thousands of pounds; that is, 000 omitted]

Species	New England	Middle Atlantic	South Atlantic	North Central, East	North Central, West	South Central	Pacific	Total
Bluefish (all trade sizes)	46	660	4	18	1	23	.....	752
Butterfish (all trade sizes)	135	746	2	1	.....	1	.....	885
Catfish	201	10	134	48	183	58	.....	634
Cisco (Lake Erie)	9	97	.....	.....	.....	.....	.....	106
Cisco (lake herring), including bluefin, blackfin, and chub	.....	452	.....	1,313	583	.....	.....	2,348
Cisco (tullibees, Canadian lakes)	23	5	1	8	2	.....	.....	39
Cod, haddock, hake, and pollock	14,424	136	4	141	9	122	321	15,157
Croaker	.....	398	1,109	73	.....	26	.....	1,606
Flounders	179	578	12	12	2	5	36	824
Haddock fillets	23,661	48	22	693	9	.....	3	24,436
Halibut (all trade sizes)	325	103	5	604	25	22	11,284	12,368
Herring, sea (including alewives and bluebacks)	3,802	115	13	624	5	28	225	4,812
Lake trout	2	166	17	733	107	11	10	1,046
Mackerel (except Spanish)	9,944	1,909	26	97	1	44	270	12,291
Perch, yellow[1]	.....	3	.....	92	.....	.....	.....	95
Pike, blue and sauger	.....	388	.....	418	.....	.....	.....	806
Pike, yellow or wall-eyed	.....	74	.....	85	1	.....	.....	160
Pike (including pickerel, jacks, and yellow jack)	.....	4	.....	101	86	.....	.....	191
Sablefish (black cod)	.....	6	.....	51	1	.....	2,926	2,984
Salmon, chinook or king	22	54	.....	18	2	.....	5,197	5,293
Salmon, silver or coho	67	95	.....	37	6	.....	7,925	8,130
Salmon, fall and pink	2	19	.....	46	4	.....	4,378	4,449
Salmon, steelhead trout	.....	20	40	2	.....	.....	555	617
Salmon, red or sockeye	.....	1	.....	.....	3	7	181	192
Scup (porgies)	52	157	.....	.....	.....	.....	.....	209
Shad and shad roe	212	88	2	33	1	2	49	387
Shellfish	850	1,981	416	1,240	720	35	1,280	6,522
Smelts, eulachon, etc	32	8	6	291	1	2	187	527
Squid	2,131	907	.....	2	.....	.....	8	3,048
Sturgeon and spoonbill cat	.....	132	1	5	16	5	10	169
Suckers	5	1	.....	77	2	.....	.....	85
Swordfish	839	4	4	1	.....	.....	173	1,021
Weakfish (including southern "sea trout")	.....	632	107	.....	.....	.....	.....	739
Whitefish	11	271	1	224	24	4	4	539
Whiting	13,846	583	36	257	5	519	.....	15,246
Miscellaneous fish	7,169	1,289	1,638	4,455	612	2,154	3,613	20,930
Total	77,989	12,140	3,600	11,800	2,411	3,068	38,635	149,643

[1] Prior to July 15, 1935, yellow perch were included with "Miscellaneous fish."

[2] New England includes the six States of that section; Middle Atlantic—New York, New Jersey, and Pennsylvania; South Atlantic—Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, and Florida; North Central, East—Ohio, Indiana, Illinois, Michigan, and Wisconsin; North Central, West—Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas; South Central—Kentucky, Tennessee, Alabama, Mississippi, Louisiana, Texas, Oklahoma, and Arkansas; and Pacific—Washington, Oregon, California, and Alaska.

BY GEOGRAPHICAL SECTIONS AND MONTHS

[Expressed in thousands of pounds; that is, 000 omitted]

Month ended the 15th of—	New England	Middle Atlantic	South Atlantic	North Central, East	North Central, West	South Central	Pacific	Total
January	1,599	484	272	644	168	165	613	3,945
February	1,926	267	123	865	109	253	431	3,974
March	1,668	193	71	628	56	322	338	3,276
April	3,164	174	40	759	89	189	368	4,783
May	4,736	1,097	113	932	134	201	2,454	9,667
June	14,179	2,468	103	859	175	181	2,971	20,996
July	12,490	1,277	401	960	173	176	3,667	19,144
August	10,284	964	1,215	823	144	297	3,991	17,718
September	8,364	1,297	316	560	116	292	5,790	16,735
October	6,728	1,971	147	992	286	369	6,597	17,090
November	8,063	1,180	115	1,848	387	341	9,257	21,191
December	4,788	768	624	1,930	574	282	2,158	11,124
Total	77,989	12,140	3,600	11,800	2,411	3,068	38,635	149,643

HOLDINGS

During 1935 monthly holdings of frozen fish and shellfish averaged 52,201,000 pounds, which is an increase of 8 percent as compared with the average monthly holdings in 1934. The holdings during November were largest, amounting to 76,503,000 pounds. However, the holdings during each of the months from October to December inclusive, exceeded 70,000,000 pounds. The holdings during May were smallest when only 21,774,000 pounds of fishery products were in storage.

Holdings of frozen fishery products, 1935

BY SPECIES AND MONTHS

Species	Month ended the 15th of—					
	January	February	March	April	May	June
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Bluefish (all trade sizes)	466,197	372,036	272,294	155,570	185,576	164,821
Butterfish (all trade sizes)	1,255,844	958,998	671,618	447,450	364,260	363,209
Catfish	184,679	193,967	153,934	173,710	175,984	240,443
Cisco (Lake Erie)	60,317	44,442	17,209	2,717	3,011	6,034
Cisco (lake herring), including bluefin, blackfin, and chub	955,205	546,594	341,438	116,869	88,143	142,271
Cisco (tullibees, Canadian lakes)	105,270	129,912	100,760	106,980	82,065	72,335
Cod, haddock, hake, and pollock	3,600,836	2,250,919	1,562,560	1,409,209	1,461,478	2,162,082
Croaker	1,425,219	1,003,195	804,243	465,529	352,314	524,687
Flounders	453,570	475,143	428,242	284,810	283,160	310,365
Haddock fillets	6,245,885	6,233,714	4,585,411	3,631,586	4,557,744	5,534,630
Halibut (all trade sizes)	6,717,335	4,541,533	2,330,938	1,068,233	2,430,966	4,457,616
Herring, sea (including alewives and blue-backs)	2,723,163	2,298,555	1,990,415	1,548,538	1,477,151	2,111,611
Lake trout	925,265	688,937	415,462	183,745	215,399	255,415
Mackerel (except Spanish)	5,992,851	4,213,538	2,340,337	538,126	549,236	4,041,658
Perch, yellow	(1)	(1)	(1)	(1)	(1)	(1)
Pike, blue and sauger	714,449	746,475	375,403	363,327	227,610	133,090
Pike, yellow or wall-eyed	221,437	279,942	235,575	175,942	145,887	119,131
Pike (including pickerel, jacks, and yellow jack)	173,331	221,754	173,548	139,921	101,872	81,472
Sablefish (black cod)	925,998	579,462	324,431	143,455	77,504	114,244
Salmon, chinook or *king*	2,303,618	1,799,439	1,200,676	691,797	559,257	745,929
Salmon, silver or coho	4,348,522	3,412,008	2,251,666	1,039,412	608,409	397,464
Salmon, fall and pink	1,780,003	1,326,758	715,495	430,240	243,929	198,829
Salmon, steelhead trout	431,799	363,445	238,151	229,869	191,988	178,371
Salmon, red or sockeye	146,066	125,768	101,473	57,469	48,961	50,551
Scup (porgies)	235,638	177,493	149,544	79,345	94,514	100,197
Shad and shad roe	359,911	325,708	217,698	148,865	193,089	245,527
Shellfish	1,845,298	1,425,174	895,117	528,199	609,477	698,107
Smelts, eulachon, etc	647,563	1,170,806	1,136,002	833,127	610,907	541,210
Squid	731,618	681,362	449,519	283,514	539,928	2,602,327
Sturgeon and *spoonbill cat*	517,831	459,311	390,910	337,172	223,951	185,681
Suckers	17,212	12,796	7,745	10,405	29,688	47,237
Swordfish	707,936	579,176	347,765	54,989	15,729	21,605
Weakfish (including southern "sea trout")	577,273	383,840	265,659	100,118	73,502	75,971
Whitefish	839,067	1,043,275	1,266,441	820,399	635,609	528,757
Whiting	6,298,132	4,648,610	3,043,826	1,617,077	642,851	4,204,303
Miscellaneous fish	9,241,969	7,824,437	5,293,584	3,835,349	3,672,807	4,280,314
Total	64,176,297	51,538,522	35,185,089	22,053,063	21,773,954	35,937,494

[1] Prior to July 15, 1935, yellow perch were included with "miscellaneous fish."

Holdings of frozen fishery products, 1935—Continued

BY SPECIES AND MONTHS—Continued

Species	Month ended the 15th of—					
	July	August	September	October	November	December
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Bluefish (all trade sizes)	100,607	116,329	215,536	528,714	526,886	400,987
Butterfish (all trade sizes)	431,164	380,655	371,085	721,461	693,400	501,874
Catfish	275,764	358,872	375,485	391,833	412,847	455,293
Cisco (Lake Erie)	22,718	35,057	37,645	32,469	21,064	50,379
Cisco (lake herring), including bluefin, blackfin, and chub	225,797	483,712	529,179	509,633	665,688	1,548,908
Cisco (tullibees, Canadian lakes)	64,412	59,981	50,613	56,943	36,872	333,835
Cod, haddock, hake and pollock	2,308,867	3,237,507	3,428,878	3,245,795	5,060,670	5,562,626
Croaker	889,810	1,404,523	1,316,046	1,040,614	680,041	536,186
Flounders	360,953	312,802	297,698	447,270	442,521	366,526
Haddock fillets	6,150,506	7,489,189	6,730,342	6,833,251	6,143,835	6,090,160
Halibut (all trade sizes)	6,307,235	8,055,857	9,589,926	8,540,209	8,534,135	7,777,632
Herring, sea (including alewives and blue-backs)	1,947,328	2,242,378	2,881,410	3,009,779	3,119,523	3,284,349
Lake trout	356,112	337,313	272,053	343,187	725,805	706,347
Mackerel (except Spanish)	6,998,555	9,245,920	10,578,508	10,005,173	9,328,256	7,664,819
Perch, yellow	22,675	7,391	36,050	62,995	134,150	122,169
Pike, blue and sauger	123,807	76,026	52,849	113,210	395,600	629,423
Pike, yellow or wall-eyed	105,506	61,534	104,162	104,338	147,194	152,086
Pike (including pickerel, jacks, and yellow jack)	87,035	88,183	97,079	138,606	221,217	214,512
Sablefish (black cod)	390,604	441,848	874,436	1,823,211	2,320,800	2,179,450
Salmon, chinook or king	1,450,740	1,933,903	2,669,713	3,984,539	4,255,226	3,607,258
Salmon, silver or coho	534,795	1,365,684	3,109,048	5,118,508	7,047,796	6,575,159
Salmon, fall and pink	150,692	202,283	256,995	447,784	3,058,980	3,672,912
Salmon, steelhead trout	253,166	389,182	510,438	606,291	496,196	374,495
Salmon, red or sockeye	47,890	49,062	44,456	50,927	67,794	57,655
Scup (porgies)	105,986	151,149	193,744	213,523	125,920	79,875
Shad and shad roe	324,033	303,987	319,125	246,380	329,418	246,190
Shellfish	1,051,778	1,012,793	1,638,462	2,433,391	3,235,388	3,909,247
Smelts, eulachon, etc	513,214	545,112	556,156	548,032	615,403	690,489
Squid	2,758,706	2,786,373	2,527,719	2,401,638	2,142,301	1,838,732
Sturgeon and spoonbill cat	183,402	205,557	160,455	170,191	121,529	93,171
Suckers	83,225	85,870	103,461	95,247	99,865	104,630
Swordfish	16,526	135,553	952,999	829,066	665,035	586,839
Weakfish (including southern "sea trout")	92,268	176,620	291,810	645,572	618,290	428,339
Whitefish	501,701	615,496	630,286	650,048	682,095	738,794
Whiting	8,244,286	8,849,307	8,298,368	7,023,050	5,603,924	4,956,307
Miscellaneous fish	4,665,508	6,110,229	6,437,643	6,643,088	7,727,096	8,428,313
Total	48,147,371	59,353,237	66,539,858	70,155,966	76,502,760	75,055,966

BY GEOGRAPHICAL SECTIONS AND MONTHS[1]

[Expressed in thousands of pounds; that is, 000 omitted]

Month ended the 15th of—	New England	Middle Atlantic	South Atlantic	North Central, East	North Central, West	South Central	Pacific[2]	Total
January	22,789	10,409	3,313	9,139	2,434	550	15,542	64,176
February	18,127	9,247	2,772	7,852	2,492	518	10,531	51,539
March	11,510	7,615	2,124	5,133	2,445	602	5,756	35,185
April	6,753	4,804	1,298	3,800	2,187	384	2,818	22,053
May	6,672	4,276	1,018	3,632	1,916	302	3,958	21,774
June	16,230	5,929	1,081	3,735	2,281	385	6,296	35,937
July	23,735	6,614	1,377	4,018	2,784	361	9,258	48,147
August	29,223	6,921	2,397	4,642	3,313	446	12,411	59,353
September	30,702	7,457	2,278	4,829	3,619	470	17,185	66,540
October	28,687	8,934	2,023	5,219	3,988	544	20,761	70,156
November	27,283	9,403	1,479	7,638	4,662	587	25,451	76,503
December	25,167	9,798	1,838	9,071	5,515	605	23,062	75,056
Average	20,573	7,617	1,917	5,726	3,136	480	12,752	52,201

[1] New England includes the six States of that section; Middle Atlantic—New York, New Jersey, and Pennsylvania; South Atlantic—Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, and Florida; North Central, East—Ohio, Indiana, Illinois, Michigan, and Wisconsin; North Central, West—Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas; South Central—Kentucky, Tennessee, Alabama, Mississippi, Louisiana, Texas, Oklahoma, and Arkansas; and Pacific—Washington, Oregon, California, and Alaska.

[2] Includes a small amount of fish held in Colorado in the Mountain section.

COLD-STORAGE HOLDINGS OF CURED FISH

During 1935 monthly cold storage holdings of cured herring and mild-cured salmon averaged 12,908,000 pounds, which is a decrease of 7 percent as compared with the average monthly holdings in 1934. The holdings during November were the largest, amounting to 18,013,327 pounds, and the smallest were in April, amounting to 9,581,547 pounds.

Holdings of cured fish, 1935, by species and months

Month ended the 15th of—	Cured herring	Mild-cured salmon	Total
	Pounds	*Pounds*	*Pounds*
January	7,338,569	5,169,306	12,507,875
February	6,758,153	3,622,609	10,380,762
March	6,491,758	3,348,698	9,840,456
April	6,494,393	3,087,154	9,581,547
May	7,133,795	2,632,528	9,766,323
June	7,225,106	3,185,054	10,410,160
July	7,605,512	3,751,945	11,257,457
August	8,748,849	4,784,312	13,533,161
September	10,510,962	5,149,166	15,660,128
October	11,773,739	5,538,342	17,312,081
November	12,242,185	5,771,142	18,013,327
December	11,729,915	4,800,959	16,530,874

FOREIGN FISHERY TRADE

The foreign trade in fishery products of the United States in 1935 amounted to $50,605,975, of which $36,231,959 represents the value of these products imported for consumption, and $14,374,016, the value of exports of domestic fishery products. Compared with the previous year, there was an increase of 13 percent in total trade, 18 percent in the value of the imports, and 4 percent in the value of exports.

Imports consisted of 324,731,532 pounds of edible products, valued at $27,535,119, and nonedible products, valued at $8,696,840. Fishery exports consisted of 119,687,266 pounds of edible products, valued at $12,875,503, and nonedible products, valued at $1,498,513.

Exports of domestic fishery products, 1935 [1]

Item	Quantity	Value
EDIBLE FISHERY PRODUCTS		
Fish, fresh, frozen, or packed in ice:		
Salmon.....pounds	3,125,180	$381,778
Other.....do	2,019,733	173,258
Total.....do	5,144,913	555,036
Fish, salted, smoked, or dry cured:		
Cod.....do	401,203	43,414
Salmon.....do	890,727	135,536
Other.....do	842,361	72,073
Total.....do	2,134,291	251,023
Fish, pickled:		
Salmon.....do	1,449,400	249,438
Other.....do	1,234,200	67,514
Total.....do	2,683,600	316,952

[1] These statistics have been furnished by the Bureau of Foreign and Domestic Commerce, Department of Commerce.

Exports of domestic fishery products, 1935—Continued

Item	Quantity	Value
Fish, canned:		
Mackerel, pounds	2,258,067	$113,439
Salmon, do	45,312,277	6,917,920
Sardines, do	45,454,334	2,724,210
Other, do	1,042,967	156,524
Total, do	94,067,645	9,912,093
Shellfish, not canned:		
Oysters, fresh, in the shell, do	3,853,687	109,730
Oysters, fresh, shucked, frozen, or in ice, do	1,649,860	211,655
Shrimp, fresh, frozen, or in ice, do	3,372,972	381,776
Shrimp, dried, do	1,812,729	307,551
Other shellfish, fresh, frozen, in ice or dried, do	209,811	25,663
Total, do	10,899,059	1,036,375
Shellfish, canned, do	4,517,937	711,882
Other fish products, do	239,821	92,142
Total edible products, do	119,687,266	12,875,503
NONEDIBLE FISHERY PRODUCTS		
Marine-animal oils, pounds	3,276,003	269,547
Sponges, do	78,465	88,706
Fish meal for feed, tons	21,858	848,392
Oyster shells, do	44,470	291,868
Total nonedible products		1,498,513
Grand total		14,374,016

Imports of fishery products entered for consumption, 1935 [1]

Item	Pounds	Value
EDIBLE FISHERY PRODUCTS		
Fish, fresh or frozen:		
Whole, beheaded, or eviscerated or both:		
Salmon	6,398,525	$573,542
Fresh-water fish, not elsewhere specified:		
Yellow pike	8,104,721	700,488
Whitefish	11,696,306	1,234,511
Tullibees	2,656,937	152,123
Jacks or grass pike	3,694,012	196,710
Lake trout	3,790,821	373,939
Yellow perch	5,417,378	323,495
Lake herring, ciscoes, and chubs	1,575,563	151,404
Fresh-water fish, not elsewhere specified	11,831,126	700,395
Eels	403,428	23,230
Cod, haddock, hake, pollock, and cusk	2,388,531	106,476
Halibut:		
Fresh	2,536,946	246,488
Frozen	164,093	13,862
Mackerel	123,367	6,643
Swordfish	4,195,126	383,849
Sturgeon	1,721,896	280,734
Fish, not specially provided for	4,058,935	132,555
Whether or not whole:		
Smelts	7,086,162	736,458
Tuna fish	6,282,680	394,902
Sea herring:		
Fresh	37,459,015	276,833
Frozen	1,979,033	58,079
Fillets, skinned, boned, sliced, or divided, not specially provided for	4,100,761	415,099
Total	127,655,362	7,481,815
Fish, salted, dried, smoked, pickled or preserved:		
Dried and unsalted:		
Cod, haddock, hake, pollock, and cusk	48,018	3,301
Other	3,265,794	393,964
In oil or in oil and other substances:		
Sardines	28,663,348	3,525,495
Anchovies	2,391,958	787,845
Antipasto	287,320	105,157
Tuna	8,185,340	1,262,676
Other	283,659	57,714

[1] These statistics have been furnished by the Bureau of Foreign and Domestic Commerce, Department of Commerce.

Imports of fishery products entered for consumption, 1935—Continued

Item	Pounds	Value
EDIBLE FISHERY PRODUCTS—continued		
Fish, salted, dried, smoked, pickled or preserved—Continued.		
Not in oil or in oil and other substances:		
In airtight containers weighing, with contents, not over 15 pounds each:		
Anchovies	2,998,423	$270,486
Salmon	3,024,720	196,298
Herring and sardines	10,353,553	728,650
Fish cakes, balls, and pudding	1,921,789	126,568
Other	1,397,807	154,312
Pickled or salted:		
Not in oil, etc., and not in airtight containers weighing, with contents, 15 pounds or less each:		
Salmon	498,068	60,653
Cod, haddock, hake, pollock, and cusk, neither skinned nor boned (except that vertebral column may be removed):		
Containing not more than 43 percent moisture by weight	4,585,011	232,063
Containing more than 43 percent moisture by weight	37,417,033	1,461,281
Cod, haddock, hake, pollock, and cusk, skinned or boned	2,512,556	285,014
Herring:		
In bulk or in containers weighing, with contents, more than 15 pounds each (net weight)	33,418,569	1,783,823
In containers (not airtight), weighing, with contents, not more than 15 pounds each	81,350	1,832
Mackerel:		
In bulk or in containers weighing, with contents, more than 15 pounds each (net weight)	3,809,866	201,100
Pickled or salted, not specially provided for:		
In bulk or in containers weighing, with contents, more than 15 pounds each (net weight)	1,082,054	79,975
In containers (not airtight), weighing, with contents, not more than 15 pounds each	4,276	469
Smoked or kippered:		
Not in oil, etc., and not in airtight containers weighing, with contents, 15 pounds or less each:		
Salmon	1,654	795
Herring:		
Whole or beheaded	2,008,798	65,236
Eviscerated, split, skinned, boned, or divided	1,128,079	100,806
Cod, haddock, hake, pollock, and cusk:		
Whole, or beheaded, or *eviscerated or both*	753,260	71,044
Filleted, skinned, boned, sliced, or divided	1,324,740	132,319
Smoked or kippered, not specially provided for	11,358	817
Fish paste and fish sauce	138,045	36,188
Prepared or preserved, not specially provided for:		
In containers weighing, with contents, not more than 15 pounds each	28,247	3,929
In bulk or in containers weighing, with contents, more than 15 pounds each (net weight)	651,284	39,630
Total	152,275,977	12,169,440
Caviar and other fish roe:		
Not boiled, etc.:		
Sturgeon	268,075	305,441
Fish roe, not specially provided for	92,536	18,003
Boiled, packed in airtight containers	80,192	8,163
Total	440,803	331,607
Shellfish:		
Crab meat, crab sauce, and crab paste	10,783,556	3,496,886
Clams, or clams in combination with other substances (except clam chowder)	1,322,620	281,432
Oysters, oyster juice, or either in combination with other substances in airtight containers	113,288	39,320
Lobsters (including spiny lobsters and crawfish):		
Not canned	10,020,039	2,100,185
Canned	897,637	410,843
Clams not in airtight containers	5,702,244	76,876
Shrimp and prawn	1,863,949	178,073
Scallops	1,455,011	209,905
Oysters, not in airtight containers	7,071,082	185,259
Shellfish, not specially provided for	4,488,886	521,883
Pastes and sauces of shellfish, not specially provided for	140,349	22,481
Crabs	2,595	479
Turtles	498,134	28,635
Total	44,359,390	7,552,257
Total edible fishery products	324,731,532	27,535,119

Imports of fishery products entered for consumption, 1935—Continued

Item	Quantity	Value
NONEDIBLE FISHERY PRODUCTS		
Marine-animal oils:		
Cod oil ..... gallons	2,678,102	$809,630
Cod-liver oil ..... do	4,607,093	2,975,298
Eulachon oil ..... do	3,168	270
Halibut-liver oil ..... do	1,662	23,587
Herring oil ..... do	4,948	537
Menhaden oil ..... do	3,186	1,056
Sod oil ..... do	106,604	28,086
Whale oil:		
Sperm, crude ..... do	311,685	73,502
Sperm, refined or otherwise processed ..... do	66,099	22,854
Whale oil, not specially provided for ..... do	2,698,638	604,872
Total	10,481,185	4,539,692
Pearls and imitation pearls:		
Pearls and parts, not strung or set		652,219
Imitation pearls, half pearls and hollow or filled		13,858
Imitation pearl beads:		
Hollow or filled		15,615
Solid irridescent, valued at not more than 10 cents per inch ..... inches	104,880	43
Other solid imitation pearl beads:		
Valued at not more than ¼ cent per inch ..... do	86,005,328	48,212
Valued at more than ¼, but not more than 1 cent per inch ..... do	254,856	1,201
Valued at more than 1, but not more than 5 cents per inch ..... do	10,805	250
Valued at more than 5 cents per inch ..... do	420	87
Total		731,485
Shells and buttons of pearl or shell:		
Shells, unmanufactured:		
Green snail shell ..... pounds	129,726	14,489
Mother-of-pearl ..... do	5,818,871	1,160,190
Shells, not specially provided for ..... do	3,114,627	56,261
Shells and mother-of-pearl, engraved, cut, ornamented, or manufactured		37,624
Shell pearl buttons:		
Ocean or trochus ..... gross	273,185	76,138
Fresh water ..... do	1,823	522
Buttons (from Philippine Islands) ..... do	728,276	260,575
Total		1,605,799
Sponges:		
Sheepswool ..... pounds	156,912	241,903
Yellow, grass, or velvet ..... do	355,137	116,840
Other ..... do	101,094	105,468
Total	613,143	464,211
Agar agar ..... do	451,399	161,998
Ambergris ..... do	41	6,029
Cod-liver oil cake and cod-liver oil cake meal ..... do	2,206,874	57,633
Cuttlefish bone ..... do	346,472	54,134
Goldfish, live ..... number	533,880	4,731
Fish for other than human consumption, not elsewhere specified		91,801
Fish sounds ..... pounds	164,049	27,068
Fish scrap and fish meal ..... tons	27,851	750,183
Isinglass ..... pounds	66,549	27,920
Kelp ..... do	65,660	1,285
Skins, fish, raw or salted ..... do	1,312,078	66,276
Skins, seal, raw (not fur skins) ..... do	913,102	87,635
Spermaceti wax ..... do	120,269	15,555
Whalebone, unmanufactured ..... do	277	181
Whalebone, manufactures of		224
Total		1,355,653
Total, nonedible fishery products		8,696,840
Grand total		36,231,959

FISHERIES OF THE NEW ENGLAND STATES

(Area XXII) [6]

The yield of the commercial fisheries of the New England States (Maine, New Hampshire, Massachusetts, Rhode Island, and Connecticut) during 1935 amounted to 655,430,400 pounds, valued at $17,983,594 to the fishermen, representing an increase of 31 percent in volume and 33 percent in value as compared with the catch in 1933, the most recent previous year for which catch statistics are available. These fisheries gave employment to 18,449 fishermen, as compared with 17,073 in 1933.

There were 380 fishery wholesale and manufacturing establishments in the 5 States in 1935 as compared with 362 in 1933 when the most recent survey of these establishments was made. In 1935 these establishments employed 10,561 persons, paid $6,456,456 in salaries and wages, and produced manufactured products (canned, cured, packaged, and byproducts), valued at $22,838,942. In 1933 the wholesale and manufacturing firms employed 9,177 persons, paid $5,410,072 in salaries and wages, and produced manufactured products valued at $14,322,274.

Fisheries of the New England States, 1935

SUMMARY OF CATCH

Product	Maine		New Hampshire		Massachusetts	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Fish	95,785,000	$1,076,277	146,400	$10,730	489,824,600	$10,807,598
Shellfish, etc	16,434,000	2,232,965	207,700	50,860	13,592,800	1,340,293
Total	112,219,000	3,309,242	354,100	61,590	503,417,400	12,147,891

Product	Rhode Island		Connecticut		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Fish	14,275,900	$301,477	9,104,400	$342,870	609,136,300	$12,538,954
Shellfish, etc	10,248,000	946,424	5,811,600	874,100	46,294,100	5,444,642
Total	24,523,900	1,247,901	14,916,000	1,216,970	655,430,400	17,983,594

[6] This is the number given this area by the North American Council on Fishery Investigations. It should be explained that there are included under this area craft whose principal fishing ports are in the area but at times fish elsewhere. Notable examples are the groundfish fishery in area XXI and the mackerel and southern trawl fisheries in area XXIII. For a clearer understanding of the statistics published in this section, the reader is referred to the section in the latter part of this document entitled "Statistical survey procedure."

Fisheries of the New England States, 1935—Continued

OPERATING UNITS: BY STATES

Item	Maine	New Hampshire	Massachusetts	Rhode Island	Connecticut	Total
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	490		3,904	280	349	5,023
On boats and shore:						
Regular	2,823	45	2,849	429	276	6,422
Casual	3,202	164	1,971	874	793	7,004
Total	6,515	209	8,724	1,583	1,418	18,449
Vessels:						
Steam			29	7	3	39
Net tonnage			4,950	200	827	5,977
Motor	91		340	70	81	582
Net tonnage	992		12,873	804	1,405	16,074
Total vessels	91		369	77	84	621
Total net tonnage	992		17,823	1,004	2,232	22,051
Boats:						
Motor	2,321	43	1,374	460	259	4,457
Other	1,737	28	1,666	666	526	4,623
Accessory boats	183		502	86	26	857
Apparatus:						
Purse seines:						
Mackerel	26		74	1		101
Length, yards	5,075		34,395	300		39,770
Menhaden				1		1
Length, yards				400		400
Other	53		2			55
Length, yards	5,005		800			5,805
Haul seines	66		14	9	51	140
Length, yards	6,425		1,472	687	5,010	13,594
Gill nets:						
Anchor	1,090		2,187	5		3,282
Square yards	322,131		792,580	14,160		1,128,871
Drift	187	3	2,620	49	48	2,907
Square yards	49,003	540	1,340,644	36,380	66,867	1,493,434
Stake	125				5	130
Square yards	13,146				840	13,986
Lines:						
Hand	5,566	677	213	145	107	6,708
Hooks and baits	5,667	677	374	179	125	7,022
Trawl	28,514	100	30,987	71	618	60,290
Hooks	1,510,100	5,000	1,661,115	30,155	21,672	3,228,042
Troll				45		45
Hooks				45		45
Trot with hooks				1	4	5
Hooks				200	700	900
Pound nets			120	43	14	177
Floating traps	25		32	39		96
Weirs	181		3			184
Fyke nets	49		16	127	111	303
Dip nets	96		90		231	417
Bag nets	126	22				148
Push nets			40			40
Otter trawls	49		292	59	79	479
Yards at mouth	1,085		8,502	1,489	2,133	13,209
Box traps	10					10
Pots:						
Crab	1,947		4,123	37		6,107
Eel	125		933	982	966	3,006
Fish					12	12
Lobster	184,592	3,287	58,419	25,255	17,884	289,437
Periwinkle and cockle			50	1,174		1,224
Harpoons	86		60	47	26	219
Spears	5		16	19	10	50
Dredges:						
Clam			44	19		63
Yards at mouth			22	14		36
Oyster			48	36	76	160
Yards at mouth			54	54	115	223
Scallop	154		2,515	918		3,587
Yards at mouth	233		2,189	731		3,153
Tongs:						
Oyster			34	57	10	101
Other			269	729	63	1,061
Rakes:						
Oyster				16	2	18
Other	9		700	70	121	900
Forks			278	7		285
Hoes	1,924	33	1,292	86	21	3,356

Fisheries of the New England States, 1935—Continued

CATCH: BY STATES

Species	Maine		New Hampshire		Massachusetts		Rhode Island		Connecticut		Total	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	3,373,900	$17,105			958,700	$7,797	55,400	$381	17,600	$184	4,405,600	$25,467
Anchovies							3,700	74			3,700	74
Bluefish					91,300	9,713	147,500	10,972	118,300	11,783	357,100	32,468
Bonito					17,800	718	15,200	783			33,000	1,501
Butterfish	25,700	1,494			1,478,700	55,156	734,800	23,861	54,500	2,992	2,293,700	83,503
Carp									51,900	3,860	51,900	3,860
Cod	8,407,200	160,690	13,900	$525	110,633,700	2,313,898	608,100	16,090	670,900	22,890	120,333,800	2,514,093
Crevalle							1,500	15			1,500	15
Croaker					2,278,100	41,307			72,400	1,478	2,350,500	42,785
Cunner	200	6					800	4			1,000	10
Cusk	2,734,100	47,588	2,200	66	4,819,900	89,057					7,556,200	136,711
Drum, red					2,200	35					2,200	35
Eels:												
Common	95,600	7,048			105,800	7,065	162,700	13,295	55,900	5,337	420,000	32,745
Conger					110,500	1,345	1,700	149	1,200	57	113,400	1,551
Flounders	1,669,000	47,678	44,300	1,813	28,377,600	997,215	2,349,800	80,449	6,293,500	194,110	38,734,200	1,321,265
Frigate mackerel					73,500	368	8,300	134			81,800	502
Goosefish					2,300	34					2,300	34
Grayfish	300	1			30,400	686	4,600	46			35,300	733
Haddock	4,245,300	153,984	33,400	1,672	189,860,200	4,106,404			466,890	14,670	194,605,700	4,276,730
Hake	16,231,700	154,695	4,100	82	10,271,500	220,452	1,800	29	32,200	1,420	26,541,300	376,078
Halibut	44,800	5,486			2,780,500	238,708			100,000	8,000	2,925,300	252,194
Herring, sea	56,942,500	260,722			3,189,800	23,222	196,300	2,167			54,328,600	286,111
Herring smelt					13,400	253					13,400	253
Hickory shad							200	2			200	2
Kingfish or "king mackerel"									100	4	100	4
King whiting or "kingfish"					4,100	158	900	25			5,000	183
Lamphrey									1,800	375	1,800	375
Launce					34,000	550	100	1			34,100	551
Mackerel	1,476,600	25,388	1,800	108	59,652,100	1,206,904	817,300	16,474	2,400	180	61,950,200	1,249,054
Menhaden					21,000	205	4,256,100	13,683	7,300	74	4,284,400	13,962
Minnows									4,500	2,409	4,500	2,409
Mummichog									6,000	1,150	6,000	1,150
Pilotfish					600	8					600	8
Pollock	5,018,400	57,466	4,500	134	28,281,100	487,661	37,500	1,113	53,000	866	33,394,500	547,240
Rosefish	47,400	379			17,109,500	183,709					17,156,900	184,088
Salmon	39,400	9,366			900	202					40,300	9,568
Scup or porgy					4,786,000	114,376	1,851,900	42,361	112,800	3,056	6,750,700	159,793
Sea bass					3,322,100	116,333	63,000	3,479	31,000	2,173	3,416,100	121,985
Sea robin					17,500	215	219,000	2,078	39,500	707	276,000	3,000
Shad	13,000	753			306,000	5,900	5,600	364	402,600	32,685	727,200	39,702
Sharks	36,400	390			42,200	567	2,200	44			80,800	1,001
Skates	2,500	31			7,700	105	167,100	1,403	49,600	795	226,900	2,334

Fisheries of the New England States, 1935—Continued

CATCH: BY STATES—Continued

Species	Maine		New Hampshire		Massachusetts		Rhode Island		Connecticut		Total	
FISH—continued	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Skipper or "billfish"					300	$3	200	$2			500	$5
Smelt	682,800	$79,648	42,200	$6,330	600	6	1,000	200	1,900	$353	728,500	86,537
Squeteagues, or "sea trout", gray					260,500	10,747	38,000	2,552	28,500	1,544	327,000	14,843
Striped bass					5,100	537	16,200	2,094	400	55	21,700	2,686
Sturgeon	900	90			2,700	303	1,400	123			5,000	516
Suckers	15,200	819							81,400	3,032	96,600	3,851
Swordfish	309,400	38,979			2,295,000	332,655	295,500	38,242	85,700	13,996	2,985,600	423,872
Tautog					38,100	1,671	165,100	5,272	55,600	3,826	258,800	10,769
Thimble-eyed mackerel							45,800	496			45,800	496
Tilefish					700	16			160,000	8,000	160,700	8,016
Tomcod	11,300	279							5,200	260	16,500	539
Tuna or "horse mackerel"	271,400	5,527			223,600	6,887	43,500	1,517			538,500	13,931
White perch	100	5			50,000	5,684	1,100	66			51,200	5,755
Whiting	12,500	76			15,418,100	160,009	1,954,500	21,387	29,900	449	17,415,000	181,921
Wolffish	75,000	848			2,849,200	58,754			10,000	100	2,934,200	59,702
Yellow perch	2,400	336					500	50			2,900	386
Total	95,785,000	1,076,277	146,400	10,730	489,824,600	10,807,598	14,275,900	301,477	9,104,400	342,870	609,136,300	12,538,952
SHELLFISH, ETC.												
Crabs:												
Hard	593,500	16,220			2,394,000	39,580	114,100	2,994	4,500	490	3,106,100	59,284
Soft and peelers									300	97	300	97
Lobsters	7,687,200	1,767,498	194,400	49,523	1,805,300	448,327	619,000	132,690	546,400	122,186	10,852,300	2,520,224
Clams:												
Hard, public [1]	1,700	152			1,241,600	140,618	2,252,100	207,883	421,400	85,666	3,916,800	434,319
Hard, private [1]					24,000	2,842	108,000	10,704	7,900	2,849	139,900	16,395
Razor					583,000	13,682					583,000	13,682
Soft, public [2]	6,960,000	286,484	13,300	1,337	2,488,100	248,155	390,200	19,742	30,700	5,045	9,801,300	560,763
Surf or skimmer					800	50					800	50
Mussels, sea	117,100	2,875									117,100	2,875
Oysters: [3]												
Market, public, spring					3,300	625	28,800	4,930	1,600	145	33,700	5,700
Market, public, fall							29,700	5,467	800	135	30,500	5,602
Market, private, spring					266,800	77,234	2,374,000	238,129	1,933,000	255,062	4,573,800	570,425
Market, private, fall							2,794,500	276,215	2,571,700	352,300	5,366,200	628,515
Periwinkles and cockles	3,000	90			2,700	345	153,200	6,722			158,900	7,157
Scallops:												
Bay					1,142,300	199,764	74,700	11,495	287,500	50,000	1,504,500	261,259
Sea	743,200	115,620			924,300	115,089	2,600	247			1,670,100	230,956
Squid					2,149,600	27,717	1,388,100	29,206	5,800	125	3,543,500	57,048

Irish moss					7,500	300					7,500	300
Bloodworms	227,800	34,653			55,500	2,665					283,300	37,318
Sandworms	65,500	9,173			504,000	23,300					569,500	32,473
Sea urchins	35,000	200									35,000	200
Total	16,434,000	2,232,965	207,700	50,860	13,592,800	1,340,293	10,248,000	946,424	5,811,600	874,100	46,294,100	5,444,642
Grand total	112,219,000	3,309,242	354,100	61,590	503,417,400	12,147,891	24,523,900	1,247,901	14,916,000	1,216,970	655,430,400	17,983,594

[1] Statistics on hard clams used in this table are based on yields of 11 pounds of meats per bushel in Maine; 11.01 pounds, in Massachusetts; 16 pounds, in Rhode Island; and 10 pounds, in Connecticut.

[2] Statistics on soft clams used in this table are based on yields of 15 pounds of meats per bushel in Maine and New Hampshire; 13.64 pounds, in Massachusetts; 20 pounds, in Rhode Island; and 14.94 pounds, in Connecticut.

[3] Statistics on oysters used in this table are based on yields of 6.57 pounds of meats in Massachusetts; 7.31 pounds, in Rhode Island; and 8 pounds in Connecticut.

NOTE.—*Included in the catch of Massachusetts are 15,098,600 pounds of fishery products, valued at $465,905 which were taken in the southern winter trawl fishery off southern* New Jersey, Maryland, Virginia, and North Carolina. These products consisted principally of croakers, flounders, scup, and sea bass.

SUPPLEMENTARY TABLE SHOWING THE PRODUCTION OF CERTAIN SHELLFISH IN NUMBER AND BUSHELS

Product	Maine		New Hampshire		Massachusetts		Rhode Island		Connecticut		Total	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Crabs:												
Hard, number	1,780,500	$16,220			7,182,000	$39,580	342,300	$2,994	13,500	$490	9,318,300	$59,284
Soft and peelers, do									1,200	97	1,200	97
Clams:												
Hard, public, bushels	155	152			112,770	140,618	140,756	207,883	42,140	85,666	295,821	434,319
Hard, private, do					2,182	2,842	6,750	10,704	790	2,849	9,722	16,395
Razor, do					18,403	13,682					18,403	13,682
Soft, public, do	464,000	286,484	887	$1,337	182,412	248,155	15,460	19,742	2,055	5,045	664,814	560,763
Surf or skimmer, do					47	50					47	50
Mussels, sea, do	9,758	2,875									9,758	2,875
Oysters:												
Market, public, spring, do					502	625	3,940	4,930	200	145	4,642	5,700
Market, public, fall, do							4,063	5,467	100	135	4,163	5,602
Market, private, spring, do					40,609	77,234	324,761	238,129	241,625	255,062	606,995	570,425
Market, private, fall, do							382,285	276,215	321,462	352,300	703,747	628,515
Periwinkles and cockles, do	200	90			150	345	8,511	6,722			8,861	7,157
Scallops:												
Bay, do					186,346	199,764	10,671	11,495	50,000	50,000	247,017	261,259
Sea, do	123,867	115,620			154,050	115,089	371	247			278,288	230,956

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Fisheries of the New England States, 1935—Continued

SEED OYSTER FISHERY

Item	Rhode Island		Connecticut		Total	
OPERATING UNITS						
Fishermen:	*Number*		*Number*		*Number*	
On vessels			137		137	
On boats and shore:						
Regular	2		27		29	
Casual			1		1	
Total	2		165		167	
Vessels:						
Steam			4		4	
Net tonnage			344		344	
Motor			9		9	
Net tonnage			236		236	
Sail			15		15	
Net tonnage			114		114	
Total vessels			28		28	
Total net tonnage			694		694	
Boats:						
Motor	1				1	
Other			15		15	
Apparatus:						
Dredges			161		161	
Yards at mouth			142		142	
Tongs	2		5		7	
CATCH						
Oysters:	*Bushels*	*Value*	*Bushels*	*Value*	*Bushels*	*Value*
Seed, public, spring			17,355	$6,942	17,355	$6,942
Seed, public, fall	1,000	$500	87,888	35,158	88,888	35,658
Seed, private, spring			355,843	162,334	355,843	162,334
Seed, private, fall			20,725	13,600	20,725	13,600
Total	1,000	500	481,811	218,034	482,811	218,534

NOTE.—Of the total number of persons fishing for seed oysters, 13 are duplicated among those fishing for market oysters or other species. Similarly the following craft and gear are duplicated: 2 vessels, 4 dredges, and 2 tongs.

Industries related to the fisheries of the New England States, 1935

OPERATING UNITS, SALARIES, AND WAGES

Item	Maine and New Hampshire	Massachusetts	Rhode Island	Connecticut	Total
Transporting:					
Persons engaged:	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	62	45	3	14	124
On boats	15		3		18
Total	77	45	6	14	142
Vessels, motor	31	11	2	6	50
Net tonnage	364	314	15	216	909
Boats	12		3		15
Wholesale and manufacturing:					
Establishments	149	170	31	30	380
Persons engaged:					
Proprietors	108	102	27	28	265
Salaried employees	195	443	36	44	718
Wage earners:					
Average for season	5,034	3,787	383	374	9,578
Average for year	2,012	2,983	276	230	5,501
Paid to salaried employees	$318,559	$948,553	$92,299	$121,401	$1,480,812
Paid to wage earners	$1,241,799	$3,344,633	$230,077	$159,135	$4,975,644
Total salaries and wages	$1,560,358	$4,293,186	$322,376	$280,536	$6,456,456
Fishermen manufacturing	1,273	2,181	337	1	3,792

Industries related to the fisheries of the New England States, 1935—Continued

PRODUCTS MANUFACTURED

Item		Maine		Massachusetts		Rhode Island		Connecticut	
		Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
By manufacturing establishments:									
Alewives, salted, tight pack	pounds	1,536,880	$37,985						
Cod:									
Fresh fillets	do	157,828	16,506	5,771,831	$644,303				
Fresh sticks	do	227,880	22,717						
Frozen fillets	do	(1)	(1)	8,643,741	665,721				
Salted:									
Green [2]	do	950,998	45,499	(1)	(1)				
Dry	do	26,465	1,064	(1)	(1)				
Boneless, including absolutely boneless	do	167,084	24,632	5,526,395	1,003,811				
Oil, cod	gallons	14,502	3,180	(1)	(1)				
Oil, cod liver	do	(1)	(1)	204,122	221,895				
Cusk:									
Fresh fillets	pounds	62,055	10,777	563,070	71,605				
Fresh sticks	do	522,039	58,631						
Frozen fillets	do	(1)	(1)	1,222,778	108,808				
Salted, green [2]	do	53,040	2,072	(1)	(1)				
Smoked fillets	do	82,005	10,801						
Flounders:									
Fresh fillets	do	62,261	8,215	1,089,981	162,874				
Frozen fillets	do	(1)	(1)	709,392	94,285				
Haddock:									
Fresh fillets	do	662,744	78,369	16,954,718	1,802,223				
Fresh sticks	do	57,775	11,156						
Frozen fillets	do	35,070	2,890	26,327,201	2,202,155				
Salted, green [2]	do	6,250	131						
Hake:									
Fresh fillets	do	414,484	30,038	1,280,968	125,617				
Fresh sticks	do	426,746	47,650						
Frozen fillets	do	(1)	(1)	1,205,655	81,010				
Salted:									
Green [2]	do	1,575,831	44,842	(1)	(1)				
Dry	do	452,926	12,544	1,634,966	84,906				
Smoked fillets	do	78,245	9,968						
Herring, sea:									
Salted, split	do	1,085,787	35,848						
Smoked:									
Bloaters:									
Hard	do	171,780	7,001	(1)	(1)				
Soft	do	113,946	6,522	(1)	(1)				

[1] This item has been included under "Unclassified products."

[2] This item is usually an intermediate product, and although included in the total, may also be shown in its final stage of processing in this or another State.

Industries related to the fisheries of the New England States, 1935—Continued

PRODUCTS MANUFACTURED—Continued

Item	Maine		Massachusetts		Rhode Island		Connecticut	
By manufacturing establishments—Continued.								
Herring, sea—Continued.								
Smoked—Continued.	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Boneless ..... do	2,603,604	$275,654						
Lengthwise ..... do	117,105	7,083						
Medium scaled ..... do	345,300	22,488	(1)	(1)				
Kippered ..... do			118,520	$14,004				
Canned "sardines" ..... standard cases	1,655,839	5,142,750						
Pearl essence ..... pounds	5,750	53,500						
Scrap, dry ..... tons	1,462	34,647						
Meal ..... do	1,445	54,884						
Oil ..... gallons	64,136	8,478						
Mackerel:								
Fresh fillets ..... pounds	(1)	(1)	140,717	12,670				
Frozen fillets ..... do			793,124	65,411				
Salted:								
Fillets ..... do			1,874,480	152,083				
Split ..... do			2,459,507	196,157				
Pollock:								
Fresh fillets ..... do	(1)	(1)	1,361,076	100,578				
Frozen fillets ..... do	(1)	(1)	8,532,401	565,204				
Salted:								
Green [2] ..... do	98,946	3,953	(1)	(1)				
Dry ..... do	16,791	797	(1)	(1)				
Rosefish:								
Fresh fillets ..... do			822,844	87,484				
Frozen fillets ..... do			3,497,635	352,495				
Wolffish:								
Fresh fillets ..... do			32,961	3,906				
Frozen fillets ..... do			19,945	2,078				
Crab meat, packaged, fresh cooked ..... do	70,067	34,328	257,576	109,166	(1)	(1)		
Lobster meat, packaged, fresh cooked ..... do	(1)	(1)	111,900	117,885	(1)	(1)		
Clams, hard, fresh shucked ..... gallons					33,560	$43,072		
Clams, soft:								
Fresh shucked ..... do	43,055	43,438	99,560	135,177	11,290	11,581		
Canned:								
Whole ..... standard cases	106,084	375,561						
Chowder ..... do	77,585	231,510	(1)	(1)				
Juice, bouillon, and cocktail ..... do	14,763	24,760						
Marine-shell buttons ..... gross	(1)	(1)	(1)	(1)			1,329,911	$760,582
Oysters, fresh shucked ..... gallons			(1)	(1)	426,012	656,792	322,825	467,605
Unclassified products:								
Fillets, fresh and frozen ..... pounds	[3] 674,723	[3] 45,527	[4] 383,251	[4] 35,532				
Sticks and steaks, fresh and frozen ..... do	[5] 6,000	[5] 605	[6] 3,882,895	[6] 332,080				

Salted	do	[7] 253,125	[7] 14,610	[8] 6,530,189	[8] 481,551			
Smoked	do	[9] 402,100	[9] 50,080	[10] 2,260,378	[10] 344,847	(11)	(11)	(11)	(11)
Canned:									
Fish cakes and flakes	standard cases	34,042	257,485	13,698	115,992				
Fish chowder	do	7,129	31,376						
Cat and dog food	do			15,750	34,628				
Other	do	[12] 2,248	[12] 14,148	[13] 118,436	[13] 904,656	(11)	(11)		
Meal, groundfish	tons	(11)	(11)	11,588	473,540				
Oil, miscellaneous liver	gallons	(11)	(11)	11,209	435,206				
Glue	do			385,058	755,249				
Miscellaneous			[14] 154,045		[15] 165,734		[16] 99,379		[17] 126,660
Total			7,410,745		13,262,526		810,824		1,354,847
By fishermen:									
Alewives, smoked	pounds	117,258	3,062	5,000	250				
Cod:									
Fresh fillets	do	360	22						
Salted, green [3]	do			406,500	10,975				
Salted, dry	do	4,300	272						
Cusk, salted, green [3]	do			1,000	20				
Haddock, salted, green [3]	do			20,600	410				
Hake:									
Fresh fillets	do	2,827	254						
Salted, green [3]	do			5,000	50				

[1] This item has been included under "Unclassified products."
[2] This item is usually an intermediate product, and although included in the total, may also be shown in its final stage of processing in this or another State.
[3] Includes fresh fillets of mackerel and pollock, and frozen fillets of cod, cusk, flounders, hake, and pollock.
[4] Includes fresh and frozen fillets of halibut, salmon, and whiting.
[5] Includes frozen sticks of cod, cusk, and hake.
[6] Includes fresh steaks of cod, haddock, halibut, pollock, salmon, and swordfish; frozen steaks of halibut, salmon, and swordfish; and frozen whiting sticks.
[7] Includes dry-salted cusk, boneless hake, salted hake, and sea herring fillets; and salted round sea herring.
[8] Includes green-salted cod, cusk, hake, and pollock; dry-salted cod, haddock, and pollock; strips and bits of cod; boneless cusk and hake; absolutely boneless hake; and round and pickled sea herring.
[9] Includes smoked fillets of cod, haddock, and sea herring, and finnan haddie.
[10] Includes smoked alewives, butterfish, carp, cod fillets, haddock (finnan haddie), lake trout, mackerel, salmon, sea herring (medium scaled, and hard and soft bloaters), shad and whitefish, and smoked and spiced salmon.
[11] This item has been included under "Miscellaneous."
[12] Includes canned finnan haddie, mackerel, and cod and hake fillets.
[13] Includes canned haddock chowder; mackerel; hard and soft clam chowder; groundfish roe; fish cakes, balls, etc.; and rat poison bait.
[14] Includes clam meal; groundfish meal and dry scrap; fresh-shucked salt-water mussels; packaged, fresh-cooked lobster meat; and marine-shell buttons.
[15] Includes cod-liver pressings; fresh-shucked oysters; groundfish dry scrap; miscellaneous meal; marine-shell buttons and novelties; fresh-water mussel-shell novelties; and isinglass.
[16] Includes finnan haddie; canned hard clam chowder; packaged fresh-cooked crab and lobster meats; oyster-shell poultry feed and lime; and marine-shell novelties.
[17] Includes smoked butterfish, carp, lake trout, mackerel, salmon, spoonbill cat, and whitefish; and marine-shell novelties.

Industries related to the fisheries of the New England States, 1935—Continued

PRODUCTS MANUFACTURED—Continued

Item	Maine		Massachusetts		Rhode Island		Connecticut	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
By fishermen—Continued.								
Herring, sea, smoked, bloaters, soft.....do....	1,000	$106						
Mackerel, salted, split.....do....			18,000	$675				
Pollock, salted, dry.....do....	5,000	400						
Crab meat, packaged, fresh cooked.....do....	1,070	412	10,900	5,230	3,000	$1,200		
Clams, hard, fresh shucked.....gallons..					25	44		
Clams, razor, fresh shucked.....do....			30,915	13,132				
Clams, soft:								
Fresh shucked.....do....	68,647	49,073	15,504	18,792	400	700		
Steamed.....pounds..	228,873	19,494						
Oysters, fresh shucked.....gallons..			4,200	7,383				
Scallops:								
Bay, fresh shucked.....do....			123,528	357,700	8,301	27,863		
Sea, fresh shucked.....do....	42,900	71,156	63,007	91,286			45	$59
Total.....		144,251		505,903		29,807		59
Grand total.....		7,554,996		13,768,429		840,631		1,354,906

NOTE.—The total value of manufactured products for the New England States was as follows: By manufacturing establishments, $22,838,942; and by fishermen, $680,020. Some of the above products may have been manufactured from products imported from another State or country; therefore they cannot be correlated directly with the catch within the State. Of the total number of persons engaged in the preparation of fishermen's manufactured products, 3,664 have also been included as fishermen and 8 of the persons shown on transporting craft have also been included as fishermen. This should be considered when computing the total number of persons in the fishery industries exclusive of duplication.

MAINE

Fisheries of Maine, 1935

OPERATING UNITS: BY GEAR

Item	Purse seines		Haul seines	Gill nets			Lines	
	Mackerel	Other		Anchor	Drift	Stake	Hand	Trawl
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	64	115	-------	70	3	-------	8	163
On boats and shore:								
Regular	48	89	35	77	23	-------	162	395
Casual	3	3	95	37	13	37	988	122
Total	115	207	130	184	39	37	1,158	680
Vessels:								
Motor	12	28	-------	12	1	-------	5	18
Net tonnage	111	247	-------	107	5	-------	31	307
Boats:								
Motor	14	25	65	43	24	-------	194	431
Other	14	25	66	17	6	32	33	10
Accessory boats	12	28	-------	-------	-------	-------	-------	126
Apparatus:								
Number	26	53	66	1,090	187	125	5,566	28,514
Length, yards	5,075	5,005	6,425	-------	-------	-------	-------	-------
Square yards	-------	-------	-------	322,131	49,003	13,146	-------	-------
Hooks	-------	-------	-------	-------	-------	-------	5,667	1,510,100

Item	Floating traps	Weirs	Fyke nets	Dip nets	Bag nets	Otter trawls	Box traps	Pots	
								Crab	Eel
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	-------	-------	-------	-------	-------	70	-------	-------	-------
On boats and shore:									
Regular	26	175	-------	-------	5	60	-------	23	-------
Casual	2	88	10	96	66	-------	14	17	7
Total	28	263	10	96	71	130	14	40	7
Vessels:									
Motor	-------	-------	-------	-------	-------	18	-------	-------	-------
Net tonnage	-------	-------	-------	-------	-------	178	-------	-------	-------
Boats:									
Motor	14	25	1	-------	-------	31	-------	24	-------
Other	9	202	8	-------	11	-------	2	16	7
Accessory boats	-------	16	-------	-------	-------	-------	-------	-------	-------
Apparatus:									
Number	25	181	49	96	126	49	10	1,947	125
Yards at mouth	-------	-------	-------	-------	-------	1,085	-------	-------	-------

Item	Pots, lobster	Harpoons	Spears	Dredges, scallop	Rakes, other than for oysters	Hoes	By hand, other than for oysters	Total, exclusive of duplication
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	7	83	-------	30	-------	-------	-------	490
On boats and shore:								
Regular	2,069	95	-------	106	-------	512	5	2,823
Casual	425	51	5	83	9	1,412	26	3,202
Total	2,501	229	5	219	9	1,924	31	6,515
Vessels:								
Motor	7	11	-------	3	-------	-------	-------	91
Net tonnage	41	189	-------	75	-------	-------	-------	992
Boats:								
Motor	1,764	75	-------	146	-------	-------	-------	2,321
Other	615	-------	5	-------	4	811	8	1,737
Accessory boats	-------	10	-------	-------	-------	-------	-------	183
Apparatus:								
Number	184,592	86	5	154	9	1,924	-------	-------
Yards at mouth	-------	-------	-------	233	-------	-------	-------	-------

Fisheries of Maine, 1935—Continued

CATCH: BY GEAR

Species	Purse seines				Haul seines		Gill nets			
	Mackerel		Other				Anchor		Drift	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	905,500	$7,422	95,000	$720			100	$2		
Butterfish	100	3								
Cod							3,357,700	73,401		
Cusk							16,900	266		
Flounders							23,400	439		
Haddock							766,800	24,353		
Hake							365,700	3,965		
Halibut							100	14		
Herring, sea	211,800	1,482	29,811,600	162,003					900	$22
Mackerel	428,600	7,545	49,700	1,007			100	1	182,100	3,514
Pollock	411,100	2,399	732,100	3,871			3,016,300	40,639		
Rosefish							1,400	13		
Salmon							100	11	900	270
Shad	4,700	272	200	1			1,500	85	900	78
Sharks			200	4			34,000	361		
Smelt					92,700	$8,765	46,100	6,572		
Sturgeon							800	82		
Tomcod					300	8				
Tuna or "horse mackerel"							100	2		
Wolffish							1,900	11		
Total	1,961,800	19,123	30,688,800	167,606	93,000	8,773	7,633,000	150,217	184,800	3,884

Species	Gill nets—Con.		Lines				Floating traps	
	Stake		Hand		Trawl			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	12,800	$340					6,900	$50
Butterfish							25,600	1,491
Cod			505,700	$7,915	3,992,100	$69,909		
Cunners			200	6				
Cusk			2,400	41	2,682,000	46,765		
Eels, common					2,200	136		
Flounders			2,100	252	14,900	265		
Grayfish					300	1		
Haddock			61,100	2,054	2,825,300	104,223		
Hake			801,200	6,818	13,794,100	131,991		
Halibut			2,000	246	40,700	4,974		
Herring, sea							393,700	2,534
Mackerel							812,400	13,211
Pollock			418,100	5,977	418,900	4,361		
Rosefish					4,300	41		
Salmon	5,200	780					14,600	3,130
Shad	1,200	155					2,200	82
Sharks					2,200	25		
Skates					2,500	31		
Smelt	21,600	2,324	354,200	42,274				
Tuna or "horse mackerel"			9,200	276				
Whiting							12,200	73
Wolffish			200	2	33,300	392		
Total	40,800	3,599	2,156,400	65,861	23,812,800	363,114	1,267,600	20,571

Fisheries of Maine, 1935—Continued

CATCH: BY GEAR—Continued

Species	Weirs		Fyke nets		Dip nets		Bag nets		Otter trawls	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	667,000	$2,867			1,686,600	$5,704				
Cod									551,700	$9,465
Cusk									32,800	516
Eels, common			25,900	$2,044						
Flounders									1,628,600	46,722
Haddock									592,100	23,354
Hake									1,270,700	11,321
Halibut									2,000	252
Herring, sea	20,524,500	94,681								
Mackerel	3,700	110								
Pollock									21,900	219
Rosefish									41,700	325
Salmon	16,400	4,625			2,200	550				
Shad	2,300	80								
Smelt	14,600	1,798			15,700	1,865	137,900	$16,050		
Sturgeon									100	8
Suckers			15,200	819						
Tomcod			4,300	129	4,200	42	2,500	100		
White perch			100	5						
Whiting									300	3
Wolffish									39,600	443
Yellow perch			2,400	336						
Total	21,228,500	104,161	47,900	3,333	1,708,700	8,161	140,400	16,150	4,181,500	92,628

Species	Box traps		Pots						Harpoons	
			Crab		Eel		Lobster			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Eels, common	37,000	$3,135			23,300	$1,229				
Swordfish									309,400	$38,979
Tuna or "horse mackerel"									262,100	5,249
Crabs, hard			359,400	$9,743			234,100	$6,477		
Lobsters							7,687,200	1,767,498		
Total	37,000	3,135	359,400	9,743	23,300	1,229	7,921,300	1,773,975	571,500	44,228

Species	Spears		Dredges, scallop		Rakes		Hoes		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Eels	7,200	$504								
Clams:										
Hard, public							1,700	$152		
Soft, public							6,960,000	286,484		
Mussels, sea					59,800	$1,660			57,300	$1,215
Periwinkles and cockles									3,000	90
Scallops, sea			743,200	$115,620						
Bloodworms							227,800	34,653		
Sandworms							65,500	9,173		
Sea urchins									35,000	200
Total	7,200	504	743,200	115,620	59,800	1,660	7,255,000	330,462	95,300	1,505

Fisheries of Maine, 1935—Continued

OPERATING UNITS: BY COUNTIES

Item	Cumberland	Hancock	Kennebec	Knox	Lincoln	Penobscot	Sagadahoc	Waldo	Washington	York
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	274	36	-------	95	56	-------	-------	-------	22	7
On boats and shore:										
Regular	512	621	-------	483	350	-------	94	19	562	182
Casual	434	961	4	339	311	18	376	98	567	94
Total	1,220	1,618	4	917	717	18	470	117	1,151	283
Vessels:										
Motor	38	11	-------	22	12	-------	-------	-------	6	2
Net tonnage	500	95	-------	231	99	-------	-------	-------	52	15
Boats:										
Motor	480	517	-------	460	260	-------	93	9	326	176
Other	290	412	4	185	194	18	71	44	472	47
Accessory boats	126	5	-------	20	9	-------	-------	-------	21	2
Apparatus:										
Purse seines:										
Mackerel	5	-------	-------	2	17	-------	-------	-------	-------	2
Length, yards	940	-------	-------	480	3,255	-------	-------	-------	-------	400
Other	13	11	-------	9	11	-------	-------	-------	9	-------
Length, yards	1,130	1,100	-------	1,220	985	-------	-------	-------	570	-------
Haul seines	65	-------	-------	-------	-------	-------	1	-------	-------	-------
Length, yards	6,325	-------	-------	-------	-------	-------	100	-------	-------	-------
Gill nets:										
Anchor	452	53	-------	-------	470	-------	-------	-------	115	-------
Square yards	170,045	16,300	-------	-------	116,860	-------	-------	-------	18,926	-------
Drift	60	-------	-------	6	12	-------	6	-------	17	86
Square yards	15,803	-------	-------	1,080	2,160	-------	1,440	-------	7,200	21,320
Stake	-------	12	-------	-------	5	61	3	13	31	-------
Square yards	-------	1,080	-------	-------	280	5,040	266	780	5,700	-------
Lines:										
Hand	28	1,805	-------	814	851	-------	1,684	276	105	3
Hooks	28	1,805	-------	814	873	-------	1,744	276	124	3
Trawl	10,950	5,070	-------	3,090	2,030	-------	3,710	60	2,233	1,371
Hooks	548,000	253,500	-------	154,500	102,500	-------	236,700	3,000	143,350	68,550
Floating traps	8	-------	-------	1	2	-------	9	5	-------	-------
Weirs	-------	66	-------	13	4	11	1	10	76	-------
Fyke nets	-------	-------	20	-------	7	-------	22	-------	-------	-------
Dip nets	-------	4	-------	29	7	-------	2	15	33	6
Bag nets	-------	8	-------	-------	-------	-------	1	33	84	-------
Otter trawls	21	15	-------	7	4	-------	-------	-------	2	-------
Yards at mouth	425	350	-------	160	90	-------	-------	-------	60	-------
Box traps	-------	4	-------	-------	-------	-------	-------	-------	6	-------
Pots:										
Crab	1,947	-------	-------	-------	-------	-------	-------	-------	-------	-------
Eel	-------	-------	-------	-------	55	-------	-------	50	20	-------
Lobster	25,881	42,942	-------	43,472	21,143	-------	4,933	260	33,061	12,900
Harpoons	45	-------	-------	-------	11	-------	22	-------	-------	8
Spears	-------	-------	-------	3	2	-------	-------	-------	-------	-------
Dredges, scallop	69	65	-------	9	-------	-------	-------	-------	11	-------
Yards at mouth	100	94	-------	26	-------	-------	-------	-------	13	-------
Rakes, other than for oysters	9	-------	-------	-------	-------	-------	-------	-------	-------	-------
Hoes	307	616	-------	145	184	-------	91	42	491	48

Fisheries of Maine, 1935—Continued

CATCH: BY COUNTIES

Species	Cumberland		Hancock		Kennebec	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	150,600	$1,221	653,100	$2,828		
Butterfish	1,500	80				
Cod	4,309,800	95,160	1,145,200	19,152		
Cunners	200	6				
Cusk	1,617,500	30,317	91,500	1,448		
Eels, common	1,000	16	8,500	850	2,500	$175
Flounders	589,000	11,404	687,800	28,165		
Haddock	1,624,500	57,041	710,400	25,507		
Hake	5,026,500	58,579	4,955,400	33,918		
Halibut	12,100	1,369	8,500	954		
Herring, sea	11,215,300	63,844	7,909,200	41,491		
Mackerel	258,300	3,900				
Pollock	3,259,700	43,124	171,700	984		
Rosefish	27,700	237	10,200	51		
Salmon	400	56	8,200	2,479		
Shad	3,800	185				
Sharks	34,000	344				
Smelt	91,600	8,663	261,900	28,368		
Sturgeon	600	59				
Suckers					12,200	610
Swordfish	309,400	38,979				
Tomcod	300	8			4,300	129
Tuna or "horse mackerel"	135,500	2,524				
Whiting	12,200	73				
Wolffish	32,800	336	6,700	76		
Yellow perch					400	36
Crabs, hard	442,700	11,905				
Lobsters	923,900	225,045	1,681,100	377,855		
Clams:						
Hard, public	1,700	152				
Soft, public	663,900	45,538	1,277,200	47,974		
Mussels, sea	116,000	2,845				
Scallops, sea	73,600	14,060	291,000	53,282		
Bloodworms	177,300	27,071				
Total	31,113,400	744,141	19,877,600	665,382	19,400	950

Species	Knox		Lincoln		Penobscot	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	455,200	$2,438	1,320,000	$7,295		
Butterfish	100	3	1,800	91		
Cod	707,000	10,832	1,114,600	14,678		
Cusk	354,600	5,910	361,000	3,183		
Eels, common	5,200	364	18,900	1,427		
Flounders	241,700	4,320	89,800	1,478		
Grayfish	300	1				
Haddock	575,700	22,739	311,700	9,508		
Hake	2,547,300	24,355	1,727,200	12,524		
Halibut	4,700	550	8,200	966		
Herring, sea	6,033,800	32,569	6,237,100	36,180		
Mackerel	30,200	881	388,600	7,268		
Pollock	506,000	2,737	606,400	3,494		
Rosefish	2,300	18	7,200	73		
Salmon			2,500	625	3,100	$896
Shad			1,500	158		
Sharks	400	8	2,000	38		
Smelt	26,900	2,886	46,900	6,392	12,200	1,260
Sturgeon			300	31		
Tuna or "horse mackerel"			16,700	420		
Whiting	300	3				
Wolffish	22,900	260	2,000	14		
Crabs, hard	11,000	300	139,800	4,015		
Lobsters	1,817,600	417,862	887,300	218,026		
Clams, soft, public	1,059,600	37,688	443,700	14,334		
Scallops, sea	366,100	46,165				
Bloodworms			50,500	7,582		
Sandworms			65,500	9,173		
Sea urchins			35,000	200		
Total	14,768,900	612,889	13,886,200	359,173	15,300	2,156

Fisheries of Maine, 1935—Continued

CATCH: BY COUNTIES—Continued

Species	Sagadahoc		Waldo		Washington		York	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	40,400	$535			644,000	$1,802	110,600	$986
Butterfish	22,300	1,320						
Cod	410,500	8,134	11,700	$350	613,500	10,180	94,900	2,204
Cusk	105,400	1,993			91,800	1,695	112,300	3,042
Eels, common	13,300	1,061	13,500	540	31,500	2,495	1,200	120
Flounders	2,200	41			58,500	2,270		
Haddock	305,900	9,647	5,200	210	331,500	13,263	380,400	16,069
Hake	558,700	6,666	36,200	250	911,100	11,761	469,300	6,042
Halibut	2,000	244			4,600	626	4,700	777
Herring, sea	778,800	4,459	432,100	2,381	18,336,200	79,798		
Mackerel	573,600	8,458			3,700	110	222,200	4,771
Pollock	70,200	731			380,900	6,007	23,500	389
Salmon	11,000	2,186	4,000	1,243	10,200	1,881		
Shad	800	30			2,900	140	4,000	240
Skates					2,500	31		
Smelt	58,500	8,377	79,400	9,058	104,400	14,494	1,000	150
Suckers	3,000	209						
Tomcod			2,500	100	4,200	42		
Tuna or "horse mackerel"	99,000	1,976					20,200	607
White perch	100	5						
Wolffish	6,200	71			500	4	3,900	87
Yellow perch	2,000	300						
Lobsters	153,500	36,945	8,200	2,105	1,480,400	305,604	735,200	184,056
Clams, soft, public	406,800	13,827	229,500	10,662	2,669,000	102,441	210,300	14,020
Mussels, sea	1,100	30						
Periwinkles and cockles					3,000	90		
Scallops, sea					12,500	2,113		
Total	3,625,300	107,245	822,300	26,899	25,696,900	556,847	2,393,700	233,560

NEW HAMPSHIRE

Fisheries of New Hampshire, 1935 [1]

OPERATING UNITS: BY GEAR

Item	Gill nets, drift	Lines		Bag nets	Pots, lobster	Hoes	Total, exclusive of duplication
		Hand	Trawl				
Fishermen, on boats and shore:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Regular	1		1		44	7	45
Casual	1	117	1	11	10	26	164
Total	2	117	2	11	54	33	209
Boats:							
Motor	1		2		41		43
Other		5			10	14	28
Apparatus:							
Number	3	677	100	22	3,287	33	
Square yards	540						
Hooks		677	5,000				

CATCH: BY GEAR

Species	Gill nets, drift		Lines			
			Hand		Trawl	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Cod			10,800	$432	3,100	$93
Cusk					2,200	66
Flounders			41,400	1,668	2,900	145
Haddock			1,200	62	32,200	1,610
Hake					4,100	82
Mackerel	1,200	$72	600	36		
Pollock					4,500	134
Smelt			36,000	5,400		
Total	1,200	72	90,000	7,598	49,000	2,130

[1] The commercial fisheries of New Hampshire are confined to Rockingham County.

Fisheries of New Hampshire, 1935—Continued

CATCH: BY GEAR—Continued

Species	Bag nets		Pots, lobster		Hoes	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Smelt	6,200	$930				
Lobsters			194,400	$49,523		
Clams, soft, public					13,300	$1,337
Total	6,200	930	194,400	49,523	13,300	1,337

MASSACHUSETTS

Fisheries of Massachusetts, 1935

OPERATING UNITS: BY GEAR

Item	Purse seines		Haul seines	Gill nets		Lines		Pound nets
	Mackerel	Other		Anchor	Drift	Hand	Trawl	
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:								
On vessels	772	14		107	163	31	940	
On boats and shore:								
Regular	41		33	54	43	112	363	165
Casual			11		1	1	6	12
Total	813	14	44	161	207	144	1,309	177
Vessels, motor	66	2		18	24	4	60	
Net tonnage	2,350	31		358	429	85	2,610	
Boats:								
Motor	8		2	26	17	75	143	46
Other	8		21	10	4	1	47	74
Accessory boats	66	2					460	
Apparatus:								
Number	74	2	14	2,187	2,620	213	30,987	120
Length, yards	34,395	800	1,472					
Square yards				792,580	1,340,644			
Hooks, baits, or snoods						374	1,661,115	

Item	Floating traps	Weirs	Fyke nets	Dip nets	Push nets	Otter trawls	Pots	
							Crab	Eel
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:								
On vessels						2,400		
On boats and shore:								
Regular	63	2	2	77		77	60	21
Casual		2	7	46	80	3	2	15
Total	63	4	9	123	80	2,480	62	36
Vessels:								
Steam						29		
Net tonnage						4,950		
Motor						237		
Net tonnage						9,255		
Total vessels						266		
Total net tonnage						14,205		
Boats:								
Motor	29			22		26	41	7
Other	34		6	58	40		1	27
Apparatus:								
Number	32	3	16	90	40	292	4,123	933
Yards at mouth						8,502		

Fisheries of Massachusetts, 1935—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Pots—Continued		Harpoons	Spears	Dredges		
	Lobster	Periwinkle and cockle			Clam	Oyster	Scallop
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	4		540		5	9	87
On boats and shore:							
Regular	712	1	3	1	59	43	709
Casual	148			15	2		552
Total	864	1	543	16	66	52	1,348
Vessels, motor	2		57		2	3	14
Net tonnage	11		2,244		14	34	244
Boats:							
Motor	583		3		33	23	519
Other	168	1					215
Accessory boats			69				
Apparatus:							
Number	58,419	50	60	16	44	48	2,515
Yards at mouth					22	54	2,189

Item	Tongs		Rakes, other than for oysters	Forks	Hoes	By hand, other than for oysters	Total, exclusive of duplication
	Oyster	Other					
Fisherman:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels							3,904
On boats and shore:							
Regular	28	119	380	138	528	2	2,849
Casual	6	150	320	140	764		1,971
Total	34	269	700	278	1,292	2	8,724
Vessels:							
Steam							29
Net tonnage							4,950
Motor							340
Net tonnage							12,873
Total vessels							369
Total net tonnage							17,823
Boats:							
Motor		20	55		20		1,374
Other	31	224	532	126	442	1	1,666
Accessory boats							562
Apparatus, number	34	269	700	278	1,292		

Fisheries of Massachusetts, 1935—Continued

CATCH: BY GEAR

Species	Purse seines				Haul seines		Gill nets	
	Mackerel		Other				Anchor	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	389,700	$4,312			300,000	$1,750	600	$9
Bluefish			2,000	$320	5,000	800	50,000	5,000
Butterfish	1,600	64						
Cod	17,700	470					5,143,400	128,583
Cusk							100	1
Flounders	5,300	183					1,400	34
Frigate mackerel	59,000	296						
Haddock							345,400	10,811
Hake	800	34					38,600	1,175
Herring, sea	45,000	325			24,000	240		
Launce					34,000	550		
Mackerel	49,014,800	1,026,170					345,900	4,693
Pollock	248,300	4,559	629,500	10,741			11,543,600	188,282
Rosefish	2,200	22						
Salmon							200	30
Shad	174,000	2,649			35,000	525		
Sharks							2,700	40
Striped bass					1,500	255		
Tuna or "horse mackerel"	15,200	215						
White perch					46,000	5,600		
Wolffish							100	1
Squid	100	6						
Total	49,973,700	1,039,305	631,500	11,061	445,500	9,720	17,472,000	338,659

Species	Gill nets—Con.		Lines				Pound nets	
	Drift		Hand		Trawl			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives							29,000	$306
Bluefish			20,800	$2,107			12,600	1,412
Bonito							15,700	705
Butterfish							945,600	26,422
Cod			672,700	15,465	27,021,700	$590,258	15,200	145
Cusk			9,000	119	4,261,800	77,841		
Eels:								
Common							15,600	920
Conger							400	17
Flounders					464,800	15,145	72,600	3,610
Grayfish							11,200	203
Haddock			20,000	351	17,126,100	465,786		
Hake			600	8	6,677,900	145,020		
Halibut			100	11	1,781,100	157,603		
Herring, sea							2,188,400	12,539
Mackerel	3,862,600	$81,453	16,000	520			5,123,600	72,712
Menhaden							21,000	205
Pilotfish							600	8
Pollock			38,300	747	747,400	13,151	191,600	1,758
Rosefish					5,100	51		
Scup or porgy			40,200	1,255			204,500	2,127
Sea bass			13,500	924			2,600	107
Sea robin							2,800	39
Shad	28,800	432					46,700	1,866
Sharks	400	14			1,400	41	28,900	264
Skates							4,800	64
Skipper or "billfish"							300	3
Squeteagues or "sea trout", gray							4,200	223
Striped bass			3,000	210			400	47
Sturgeon							1,300	160
Swordfish					1,400	219		
Tautog			27,500	1,173			10,200	482
Tuna or "horse mackerel"							201,200	6,374
Whiting					21,800	281	10,521,900	82,244
Wolffish			5,000	146	585,400	11,979		
Squid							1,914,200	23,312
Total	3,891,800	81,899	866,700	23,036	58,695,900	1,477,405	21,587,100	238,274

Fisheries of Massachusetts, 1935—Continued

CATCH: BY GEAR—Continued

Species	Floating traps		Weirs		Fyke nets		Dip nets		Push nets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	84,400	$485	22,000	$120			133,000	$815		
Bonito	2,100	13								
Butterfish	114,100	7,043								
Cod	28,600	738								
Eels, common	5,000	200			5,800	$596				
Flounders	1,500	39			4,400	133				
Grayfish	18,000	450								
Herring, sea	326,900	2,566					605,400	7,540		
Mackerel	1,269,100	20,078								
Pollock	50,800	613								
Salmon	700	172								
Scup or porgy	400	10								
Sea robin	400	6								
Shad	21,000	406								
Sharks	2,200	45								
Squeteagues or "sea trout", gray	47,100	1,285								
Striped bass	200	25								
Tautog	300	15								
Tuna or "horse mackerel"	4,300	111								
Whiting	2,435,300	33,291								
Scallops, bay							50,600	15,460	14,400	$4,800
Squid	107,500	1,631								
Total	4,519,900	69,222	22,000	120	10,200	729	789,000	23,815	14,400	4,800

Species	Otter trawls		Pots							
			Crab		Eel		Lobster		Periwinkle and cockle	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish	900	$74								
Butterfish	417,400	21,627								
Cod	77,734,400	1,578,209								
Croaker	2,275,100	41,397								
Cusk	549,000	11,096								
Drum, red	2,200	35								
Eels:										
Common					73,700	$4,830				
Conger	107,500	1,294								
Flounders	27,830,200	978,105								
Frigate mackerel	14,500	72								
Goosefish	2,300	34								
Grayfish	1,200	33								
Haddock	172,368,700	3,629,456								
Hake	3,553,600	74,215								
Halibut	999,300	81,094								
Herring, sea	100	12								
Herring smelt	13,400	253								
King whiting or "kingfish"	4,100	158								
Mackerel	20,100	1,278								
Pollock	14,831,600	267,810								
Rosefish	17,102,200	183,636								
Scup or porgy	4,540,900	110,984								
Sea bass	3,305,000	115,302								
Sea robin	14,300	170								
Shad	500	22								
Sharks	6,600	163								
Skates	2,900	41								
Spot	600	6								
Squeteagues or "sea trout", gray	209,200	9,239								
Sturgeon	1,400	143								
Swordfish	600	92								
Tautog	100	1								
Tilefish	700	16								
Tuna or "horse mackerel"	2,600	160								
White perch	4,000	84								
Whiting	2,439,100	44,193								
Wolffish	2,258,700	46,628								
Crabs, hard			2,234,100	$36,290			159,900	$3,290		
Lobsters	4,500	423					1,800,800	447,904		
Periwinkles and cockles									1,800	$270
Scallops, sea	4,500	222								
Squid	127,800	2,768								
Total	330,755,800	7,200,455	2,234,100	36,290	73,700	4,830	1,960,700	451,194	1,800	270

Fisheries of Massachusetts, 1935—Continued

CATCH: BY GEAR—Continued

Species	Harpoons		Spears		Dredges					
					Clam		Oyster		Scallop	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Eels, common			5,700	$519						
Swordfish	2,293,000	$332,344								
Tuna or "horse mackerel"	300	27								
Clams, hard public					185,000	$22,330				
Oysters, market, private, spring							112,400	$28,370		
Periwinkles and cockles									900	$75
Scallops:										
Bay							1,800	675	1,040,200	167,511
Sea									919,800	114,867
Total	2,293,300	332,371	5,700	519	185,000	22,330	114,200	29,045	1,960,900	282,453

Species	Tongs		Rakes		Forks		Hoes		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Clams:										
Hard, public	307,900	$31,400	721,800	$83,652			26,900	$3,236		
Hard, private	9,800	1,151	12,000	1,421			2,200	270		
Razor							583,000	13,682		
Soft, public					119,300	$12,435	2,368,800	235,720		
Surf or skimmer			800	50						
Oysters:										
Market, public, spring	3,300	625								
Market, private, spring	154,400	48,864								
Scallops, bay			35,300	11,318						
Irish moss									7,500	$300
Bloodworms					55,500	2,665				
Sandworms					500,000	22,500	4,000	800		
Total	475,400	82,040	769,900	96,441	674,800	37,600	2,984,900	253,798	7,500	300

OPERATING UNITS: BY COUNTIES

Item	Barnstable	Bristol	Dukes	Essex	Nantucket	Norfolk	Plymouth	Suffolk
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	142	205	53	1,516	55			1,933
On boats and shore:								
Regular	599	363	272	668	105	97	319	426
Casual	604	308	192	364	44	30	319	110
Total	1,345	876	517	2,548	204	127	638	2,469
Vessels:								
Steam				1				28
Net tonnage				184				4,766
Motor	29	28	9	125	13			136
Net tonnage	362	737	140	4,994	161			6,479
Total vessels	29	28	9	126	13			164
Total net tonnage	362	737	140	5,178	161			11,245
Boats:								
Motor	327	171	143	277	90	20	203	143
Other	457	349	87	279	41	50	286	117
Accessory boats	25	4	7	331				192
Apparatus:								
Purse seines:								
Mackerel	5	1		45				23
Length, yards	1,900	400		23,395				8,700
Other	1			1				
Length, yards	250			550				
Haul seines	2		2	3	6		1	
Length, yards	60		520	167	700		25	
Gill nets:								
Anchor	380			1,774	30		3	
Square yards	54,400			724,560	13,500		120	
Drift	102	75	210	1,631				602
Square yards	49,700	22,500	66,680	1,045,840				155,924
Lines:								
Hand	54	62	13	12	26		2	44
Hooks	56	124	26	24	52		4	88
Trawl	1,640			15,137			72	14,138
Hooks	86,200			819,075			2,880	752,960

Fisheries of Massachusetts, 1935—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Barnstable	Bristol	Dukes	Essex	Nantucket	Norfolk	Plymouth	Suffolk
Apparatus—Continued.	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Pound nets	96	13	8	1	2			
Floating traps	1			31				
Weirs							3	
Fyke nets	16							
Dip nets	72			6			4	8
Push nets			40					
Otter trawls	36	27	9	71	11			138
Yards at mouth	966	929	293	2,311	329			3,674
Pots:								
Crab				135		359	70	3,559
Eel	200	168	210	55	300			
Lobster	4,865	2,560	6,785	21,051	542	1,307	16,894	4,415
Periwinkle and cockle				50				
Harpoons	4	6	5	38				7
Spears		10	6					
Dredges:								
Clam	18	18	5		1		2	
Yards at mouth	8	7	3		1		3	
Oyster	12						36	
Yards at mouth	18						36	
Scallop	535	893	483		356		248	
Yards at mouth	495	782	409		296		207	
Tongs:								
Oyster	28	6						
Other	9	115			25		80	
Rakes, other than for oysters	368	120	103		25		84	
Forks						100		178
Hoes	435	26		579			252	

CATCH—BY COUNTIES

Species	Barnstable		Bristol		Dukes		Essex	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	9,600	$80	24,900	$263	1,500	$15	550,200	$5,311
Bluefish	13,700	2,095	3,600	232	1,300	118	900	74
Bonito	10,900	489			4,300	179	2,100	13
Butterfish	795,700	22,333	124,700	4,580	93,300	2,265	320,200	17,763
Cod	2,000,700	63,927	4,051,000	104,358	28,200	847	25,249,600	521,408
Croaker							2,154,000	39,074
Cusk	112,300	1,433					2,900,200	47,796
Drum, red							2,200	35
Eels:								
Common	39,700	3,127	30,200	1,489	19,900	1,529	13,000	680
Conger			1,600	37	100	1	89,600	1,067
Flounders	2,218,200	78,425	5,690,500	214,925	697,900	21,290	4,863,700	179,328
Frigate mackerel							56,100	281
Goosefish							2,300	34
Grayfish	5,500	52			5,700	151	19,200	483
Haddock	978,900	30,289	10,031,400	246,794	4,000	105	19,362,200	458,971
Hake	113,500	2,545	97,400	1,768	1,800	30	4,737,600	100,828
Halibut	16,200	1,711	34,200	2,831			1,697,800	150,114
Herring, sea	2,174,600	12,260	15,000	273	200	1	434,800	6,449
King whiting or "kingfish"							4,100	158
Launce							34,000	550
Mackerel	5,927,000	89,110	106,800	3,118	236,400	4,036	39,108,600	819,023
Menhaden	11,000	105	6,900	69	3,100	31		
Pilotfish			500	5	100	3		
Pollock	280,700	3,386	75,900	1,387			15,823,500	261,475
Rosefish	1,500	15	500	6			1,188,100	13,370
Salmon							900	202
Scup or porgy	3,700	67	158,700	2,356	196,200	2,166	3,448,300	66,057
Sea bass	100	1	65,500	3,063	6,400	380	2,433,400	84,218
Sea robin	1,300	22	1,900	23			9,400	119
Shad	45,800	1,840	700	20			235,000	3,645
Sharks	2,700	65	26,900	225			10,200	213
Skates			5,800	74	100	1		
Skipper or "billfish"	300	3						
Spot							600	6
Squeteagues or "sea trout", gray	800	18	1,400	96	2,000	109	235,000	9,133
Striped bass	1,700	277	200	25			200	25
Sturgeon	1,300	160	300	23			1,000	112
Swordfish	39,100	4,658	64,700	7,417	199,900	31,194	1,880,900	272,424
Tautog	5,900	235	29,200	1,263	1,300	49	300	15
Tilefish							400	8
Tuna or "horse mackerel"	201,200	6,374					7,300	311
White perch					1,000	200	4,000	84
Whiting	10,489,200	82,140	104,200	1,310	3,700	44	2,967,300	45,289

Fisheries of Massachusetts, 1935—Continued

CATCH: BY COUNTIES—Continued

Species	Barnstable		Bristol		Dukes		Essex	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Wolffish	23, 200	$551	2, 200	$46			226, 400	$4, 946
Crabs, hard	25, 200	454					192, 100	3, 208
Lobsters	114, 000	34, 660	64, 500	15, 721	169, 200	$40, 650	666, 900	163, 733
Clams:								
Hard, public	505, 900	61, 157	573, 800	61, 894	77, 900	9, 010		
Hard, private	4, 400	540						
Razor	570, 900	13, 132						
Soft, public	232, 100	24, 343	27, 600	4, 020			1, 479, 800	151, 840
Surf or skimmer					800	50		
Oysters:								
Market, public, spring			3, 300	625				
Market, private, spring	236, 200	69, 092						
Periwinkles and cockles							1, 800	270
Scallops:								
Bay	774, 300	80, 378	127, 800	38, 936	118, 500	39, 245		
Sea	21, 500	3, 469	808, 300	99, 898	90, 000	11, 500	4, 500	222
Squid	1, 885, 600	23, 580	76, 800	634	19, 600	225	149, 200	2, 779
Irish moss							7, 500	360
Sandworms							4, 000	800
Total	29, 896, 100	724, 598	22, 438, 900	819, 804	1, 984, 400	165, 424	132, 580, 400	3, 434, 244

Species	Nantucket		Norfolk		Plymouth		Suffolk	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives					348, 000	$1, 883	24, 500	$245
Bluefish	71, 800	$7, 194						
Bonito	500	37						
Butterfish	16, 300	285					128, 500	7, 930
Cod	990, 700	26, 573			20, 600	716	78, 292, 900	1, 596, 069
Croaker							124, 100	2, 233
Cusk	11, 300	161					1, 796, 100	39, 667
Eels:								
Common	3, 000	240						
Conger							19, 200	240
Flounders	2, 457, 000	99, 440					12, 450, 300	403, 807
Frigate mackerel							17, 400	87
Haddock	386, 100	9, 604			32, 200	1, 120	159, 065, 400	3, 359, 521
Hake	112, 100	1, 272					5, 209, 100	114, 009
Halibut	800	35					1, 032, 000	84, 017
Herring, sea					65, 200	489	500, 000	3, 750
Herring smelt							13, 400	253
Mackerel	32, 100	282			15, 000	300	14, 226, 200	291, 035
Pollock	600	4					12, 100, 400	221, 409
Rosefish							15, 919, 400	170, 318
Scup or porgy	6, 000	74			1, 000	80	972, 100	43, 579
Sea bass					600	48	816, 100	28, 623
Sea robin							4, 900	51
Shad	700	8					23, 800	387
Sharks							2, 400	64
Skates							1, 800	30
Squeteagues or "sea trout", gray							21, 300	1, 391
Striped bass	3, 000	210						
Sturgeon							100	8
Swordfish							110, 400	16, 962
Tautog					1, 300	108	100	1
Tilefish							300	8
Tuna or "horse mackerel"							15, 100	202
White perch	45, 000	5, 400						
Whiting							1, 853, 700	31, 226
Wolffish	400	5					2, 597, 000	53, 206
Crabs, hard			34, 500	$791	69, 200	1, 831	2, 073, 000	33, 295
Lobsters	15, 300	4, 288	55, 700	14, 346	565, 100	136, 754	154, 600	38, 175
Clams:								
Hard, public	22, 900	2, 600			61, 100	5, 957		
Hard, private					19, 600	2, 302		
Razor					12, 100	550		
Soft, public			63, 200	6, 588	629, 300	55, 517	56, 100	5, 847
Oysters, market, private, spring					30, 600	8, 142		
Periwinkles and cockles					900	75		
Scallops, bay	92, 200	25, 680			29, 500	9, 525		
Squid	600	82					17, 800	417
Bloodworms			20, 800	1, 000			34, 700	1, 665
Sandworms			187, 500	8, 438			312, 500	14, 062
Total	4, 267, 900	183, 474	361, 700	31, 163	1, 901, 300	225, 397	309, 986, 700	6, 563, 787

RHODE ISLAND

Fisheries of Rhode Island, 1935

OPERATING UNITS: BY GEAR

Item	Purse seines		Haul seines	Gill nets		Lines			
	Mackerel	Menhaden		Anchor	Drift	Hand	Trawl	Troll	Trot with hooks
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	7	28		20	7	26	6		
On boats and shore:									
Regular			6		4	67	27	21	
Casual			22		2	18	2	2	1
Total	7	28	28	20	13	111	35	23	1
Vessels:									
Steam		1							
Net tonnage		45							
Motor				1	1	12	1		
Net tonnage				13	8	96	10		
Total vessels		1		1	1	12	1		
Total net tonnage		45		13	8	96	10		
Boats:									
Motor					2	55	14	16	
Other			13		1	7			
Accessory boats	2	3			2	1	2		
Apparatus:									
Number	1	1	9	5	49	145	71	45	1
Length, yards	300	400	687						
Square yards				14,160	36,380				
Yards at mouth									
Hooks or baits						179	30,155	45	200

Item	Pound nets	Floating traps	Fyke nets	Otter trawls	Pots				Harpoons	Spears
					Crab	Eel	Lobster	Periwinkle and cockle		
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	7	87		103			22		86	
On boats and shore:										
Regular	28	39	6	42		14	169	21	34	1
Casual	12	2	3	1	2	12	56	10	4	18
Total	47	128	9	146	2	26	247	31	124	19
Vessels:										
Steam		2		1						
Net tonnage		21		8						
Motor	2	6		23			3		4	
Net tonnage	22	70		181			18		38	
Total vessels	2	8		24			3		4	
Total net tonnage	22	91		189			18		38	
Boats:										
Motor	2	1	5	26		15	152	23	19	
Other	30	24	1		2	7	8			19
Accessory boats	10	33							39	
Apparatus:										
Number	43	39	127	59	37	982	25,255	1,174	47	19
Yards at mouth				1,489						

Fisheries of Rhode Island, 1935—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Dredges			Tongs		Rakes		Forks	Hoes	Total, exclusive of duplication
	Clam	Oyster	Scallop	Oyster	Other	Oyster	Other			
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:										
On vessels	7	81	3							280
On boats and shore:										
Regular	18		121	32	172	1	26	2	19	429
Casual	13		221	25	558	15	44	6	73	874
Total	38	81	345	57	730	16	70	8	92	1,583
Vessels:										
Steam		3								7
Net tonnage		126								200
Motor	2	15								70
Net tonnage	18	339								804
Total vessels	2	18								77
Total net tonnage	18	456								1,004
Boats:										
Motor	16		184	22	171	2	18	3	4	460
Other				32	522	13	50	1	14	666
Accessory boats										86
Apparatus:										
Number	19	36	918	57	729	16	70	7	86	
Yards at mouth	14	54	731							

CATCH: BY GEAR

Species	Purse seines				Haul seines		Gill nets			
	Mackerel		Menhaden				Anchor		Drift	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish							24,800	$2,517	4,800	$380
Eels, common					58,600	$5,089				
Herring, sea					12,000	180				
Mackerel	4,100	$205							90,100	1,502
Menhaden			4,000,000	$12,000						
Squeteagues or "sea trout", gray							400	30	500	40
Tautog					500	20				
Total	4,100	205	4,000,000	12,000	71,100	5,289	25,200	2,547	95,400	1,922

Species	Lines							
	Hand		Trawl		Troll		Trot with hooks	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish					29,500	$2,078		
Cod	402,700	$10,625	166,300	$4,477				
Eels, common	11,100	1,245					1,600	$144
Mackerel					19,900	217		
Sea bass	4,600	506						
Tautog	31,400	1,101						
Tuna or "horse mackerel"					28,700	920		
Total	449,800	13,477	166,300	4,477	78,100	3,215	1,600	144

Fisheries of Rhode Island, 1935—Continued

CATCH: BY GEAR—Continued

Species	Pound nets		Floating traps		Fyke nets		Otter trawls	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	55,400	$381						
Anchovies			3,700	$74				
Bluefish	300	28	88,100	5,969				
Bonito			15,200	783				
Butterfish	124,600	3,695	610,200	20,166				
Cod			33,300	851			5,800	$137
Crevalle			1,500	15				
Cunners			800	4				
Eels:								
Common	27,900	1,753			1,300	$60		
Conger			1,700	149				
Flounders	20,900	738	230,600	11,915	13,500	657	2,084,800	67,139
Frigate mackerel			8,300	134				
Grayfish			4,600	46				
Hake			1,700	28			100	1
Herring, sea	53,700	691	52,700	565			77,900	731
Hickory shad			200	2				
King whiting or "kingfish"			900	25				
Launce			100	1				
Mackerel	67,000	1,550	636,200	13,000				
Menhaden	141,200	710	114,900	973				
Pollock			37,500	1,113				
Scup or porgy	33,300	329	1,818,600	42,032				
Sea bass			58,400	2,973				
Sea robin	6,800	68	125,000	1,213			87,200	797
Shad	600	49	5,000	315				
Sharks			2,200	44				
Skates			13,300	93			153,800	1,310
Skipper or "billfish"			200	2				
Smelt	1,000	200						
Squeteagues or "sea trout", gray	10,600	718	26,500	1,764				
Striped bass	500	55	15,700	2,039				
Sturgeon			1,400	123				
Tautog	72,900	2,207	52,200	1,701	8,100	243		
Thimble-eyed mackerel	400	4	45,400	492				
Tuna or "horse mackerel"			14,800	597				
White perch					1,100	66		
Whiting	336,000	3,094	1,176,500	15,221			442,000	3,072
Yellow perch					500	50		
Crabs, hard							8,000	63
Lobsters							100	25
Periwinkles and cockles							700	11
Scallops, sea							2,600	247
Squid	348,300	7,322	967,400	19,600			72,400	2,284
Total	1,301,400	23,592	6,164,800	144,022	24,500	1,076	2,935,400	75,817

Species	Pots								Harpoons	
	Crab		Eel		Lobster		Periwinkle and cockle			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Eels, common			51,500	$3,822						
Swordfish									295,500	$38,242
Crabs, hard	1,300	$62			104,800	$2,869				
Lobsters					618,900	132,665				
Periwinkles and cockles					2,100	117	150,300	$6,587		
Total	1,300	62	51,500	3,822	725,800	135,651	150,300	6,587	295,500	38,242

Species	Spears		Dredges					
			Clam		Oyster		Scallop	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Eels, common	10,700	$1,182						
Clams:								
Hard, public			151,700	$14,728				
Hard, private			108,000	10,704				
Oysters:								
Market, private, spring					2,374,000	$238,129		
Market, private, fall					2,794,500	276,215		
Scallops, bay							74,700	$11,495
Total	10,700	1,182	259,700	25,432	5,168,500	514,344	74,700	11,495

Fisheries of Rhode Island, 1935—Continued

CATCH: BY GEAR—Continued

Species	Tongs		Rakes		Forks		Hoes	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Clams:								
Hard, public	1,826,700	$105,916	273,700	$27,239				
Soft, public					30,400	$1,897	278,800	$17,845
Oysters:								
Market, public, spring	16,500	1,897	12,300	3,033				
Market, public, fall	16,800	2,297	12,900	3,170				
Periwinkles and cockles	100	7						
Total	1,860,100	170,117	298,900	33,442	30,400	1,789	278,800	17,845

OPERATING UNITS: BY COUNTIES

Item	Bristol	Kent	Newport	Providence	Washington
	Number	*Number*	*Number*	*Number*	*Number*
Fishermen:					
On vessels	31	4	192	27	26
On boats and shore:					
Regular	29	107	176	10	107
Casual	104	368	161	138	103
Total	164	479	529	175	236
Vessels:					
Steam			4	3	
Net tonnage			74	126	
Motor	8	1	48	3	10
Net tonnage	118	11	428	142	105
Total vessels	8	1	52	6	10
Total net tonnage	118	11	502	268	105
Boats:					
Motor	47	128	188	15	82
Other	62	308	87	114	95
Accessory boats			79		7
Apparatus:					
Purse seines:					
Mackerel			1		
Length, yards			300		
Menhaden			1		
Length, yards			400		
Haul seines	2		1	5	1
Length, yards	125		20	342	200
Gill nets:					
Anchor			5		
Square yards			14,160		
Drift			47		2
Square yards			33,880		2,500
Lines:					
Hand	4		115	8	18
Hooks or baits	8		145	8	18
Trawl			68		3
Hooks			29,255		900
Troll			33		12
Hooks			33		12
Trot with hooks				1	
Hooks				200	
Pound nets	1		29	3	10
Floating traps			28		11
Fyke nets		24	100		3
Otter trawls			43		16
Yards at mouth			1,086		402
Pots:					
Crab			37		
Eel	70	77	235	95	505
Lobster	1,560	590	16,669		6,436
Periwinkle and cockle	304		520		350
Harpoons			42		5
Spears	1	10		8	
Dredges:					
Clam	3	1	15		
Yards at mouth	4	1	9		
Oyster	14	2		12	8
Yards at mouth	21	3		18	12
Scallop	104	357	300	28	129
Yards at mouth	78	285	238	25	105
Tongs:					
Oyster	2	45			10
Other	92	385	76	113	63
Rakes:					
Oyster		4			12
Other		48		1	21
Forks					7
Hoes	21	29	2	18	16

Fisheries of Rhode Island, 1935—Continued

CATCH: BY COUNTIES

Species	Bristol		Kent		Newport		Providence		Washington	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	5,000	$50			15,300	$153			35,100	$178
Anchovies					3,600	73			100	1
Bluefish					137,500	10,285			10,000	637
Bonito					15,100	778			100	5
Butterfish					636,200	20,575			98,600	3,286
Cod	1,600	48			583,000	15,222			23,500	820
Crevalle					1,200	12			300	3
Cunners					800	4				
Eels:										
Common	2,600	220	10,400	$1,066	28,900	1,430	44,100	$4,207	76,700	6,352
Conger					1,700	149				
Flounders	100	1	1,100	33	1,757,900	61,684			580,700	18,731
Frigate mackerel					8,300	134				
Grayfish									4,600	46
Hake					1,200	17			600	12
Herring, sea					172,700	1,931			23,600	236
Hickory shad									200	2
King whiting or "kingfish"					600	16			300	9
Launce									100	1
Mackerel					738,200	14,774			79,100	1,700
Menhaden					4,014,000	12,075			242,100	1,608
Pollock					37,400	1,110			100	3
Scup or porgy					1,679,600	38,915			172,300	3,446
Sea bass					60,600	3,359			2,400	120
Sea robin					91,200	800			127,800	1,278
Shad	500	40			5,000	318			100	6
Sharks									2,200	44
Skates					133,600	1,068			33,500	335
Skipper or "billfish"					200	2				
Smelt									1,000	200
Squeteagues or "sea trout", gray					15,600	894			22,400	1,658
Striped bass					13,400	1,855			2,800	239
Sturgeon					1,400	123				
Swordfish					261,300	33,921			34,200	4,321
Tautog	6,700	208	6,600	198	116,100	3,765	3,000	120	32,700	981
Thimble-eyed mackerel					44,100	472			1,700	24
Tuna or "horse mackerel"					43,500	1,517				
White perch									1,100	66
Whiting					1,789,800	19,658			104,700	1,729
Yellow perch									500	50
Crabs, hard	72,700	2,181			25,800	358			15,600	455
Lobsters	21,700	5,419	18,500	4,294	414,700	88,717			164,100	34,260
Clams:										
Hard, public	202,500	18,986	1,492,000	136,152	200,200	19,227	172,700	16,201	184,700	17,317
Hard, private	38,700	3,624	21,300	3,330	48,000	3,750				
Soft, public	46,300	3,349	180,800	11,305	6,000	225	37,400	2,340	38,700	2,523
Oysters:										
Market, public, spring			16,100	1,774					12,700	3,156
Market, public, fall	8,000	1,000	6,000	748					15,700	3,719
Market, private, spring	893,200	79,835	86,000	9,675			1,028,500	95,609	366,300	53,010
Market, private, fall	1,155,200	99,440	86,000	9,675			1,028,600	95,610	524,700	71,490
Periwinkles and cockles	12,700	657	2,100	117	96,100	4,186			42,300	1,762
Scallops:										
Bay	4,600	672	35,600	5,106	21,500	3,119	2,700	392	10,300	2,206
Sea									2,600	247
Squid					728,600	16,751			659,500	12,455
Total	2,472,100	215,730	1,962,500	183,490	13,959,900	383,420	2,317,000	214,470	3,812,400	250,777

SEED OYSTER FISHERY: BY GEAR

Item	Tongs	
OPERATING UNITS	*Number*	
Fishermen, on boats and shore—regular	2	
Boats, motor	1	
Apparatus, number	2	
CATCH	*Bushels*	*Value*
Oysters, seed, public, fall	1,000	$500

NOTE.—Both persons fishing for seed oysters are duplicated among those fishing for market oysters or other species. The seed oyster fishery in Rhode Island was confined to Bristol County.

CONNECTICUT

Fisheries of Connecticut, 1935

OPERATING UNITS: BY GEAR

Item	Haul seines	Gill nets		Lines			Pound nets
		Drift	Stake	Hand	Trawl	Trot with hooks	
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels				27	15		
On boats and shore:							
Regular	12	12	2	59	2	5	13
Casual	120	72	6	20			5
Total	132	84	8	106	17	5	18
Vessels, motor				12	1		
Net tonnage				109	24		
Boats:							
Motor	11	36	2	56	1	1	9
Other	33	14	1	1		2	10
Accessory boats					8		
Apparatus:							
Number	51	48	5	107	618	4	14
Length, yards	5,010						
Square yards		66,867	840				
Hooks				125	21,672	700	

Item	Fyke nets	Dip nets	Otter trawls	Pots			Harpoons	Spears
				Eel	Fish	Losbter		
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels			96			7	46	
On boats and shore:								
Regular	7	30	66	11		202	8	4
Casual	26	203	7	31	1	67	9	6
Total	33	233	169	42	1	276	63	10
Vessels, motor			32			1	3	
Net tonnage			403			8	24	
Boats:								
Motor	5	1	39	14	1	173	8	1
Other	22	213		25		36	2	10
Accessory boats							18	
Apparatus:								
Number	111	231	79	966	12	17,884	26	10
Yards at mouth			2,133					

Item	Dredges, oyster	Tongs		Rakes		Hoes	By hand other than for oysters	Total, exclusive of duplication
		Oyster	Other	Oyster	Other			
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	222							349
On boats and shore:								
Regular		5	12		5	15		276
Casual		5	51	2	116	6	102	793
Total	222	10	63	2	121	21	102	1,418
Vessels:								
Steam	3							3
Net tonnage	827							827
Motor	32							81
Net tonnage	837							1,405
Total vessels	35							84
Total net tonnage	1,664							2,232
Boats:								
Motor		1	1	1				259
Other		7	60		119	6		526
Accessory boats								26
Apparatus:								
Number	76	10	63	2	121	21		
Yards at mouth	115							

Fisheries of Connecticut, 1935—Continued

CATCH: BY GEAR

Species	Haul seines		Gill nets				Lines			
			Drift		Stake		Hand		Trawl	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish							116,500	$11,622		
Carp	16,200	$1,244			25,300	$2,126				
Cod							4,500	315	505,000	$15,330
Eels, common							6,000	566		
Flounders							200	10		
Haddock									400,000	12,000
Hake									2,000	20
Halibut									100,000	8,000
Mackerel							1,800	144		
Minnows	4,400	2,349								
Mummichog	6,000	1,150								
Pollock							2,500	100	50,000	750
Scup or porgy							1,000	23		
Sea bass							3,100	310		
Shad	91,300	6,830	301,700	$25,018						
Smelt	300	150								
Suckers	47,400	1,815								
Tautog							48,800	3,478		
Tilefish									160,000	8,000
Tomcod	5,200	260								
Wolffish									10,000	100
Total	170,800	13,798	301,700	25,018	28,300	2,126	184,400	16,568	1,227,000	44,220

Species	Lines—Con.		Pound nets		Fyke nets		Dip nets		Otter trawls	
	Trot with hooks									
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			2,600	$42	15,000	$142				
Bluefish			300	21					1,500	$140
Butterfish			25,500	1,140					29,000	1,852
Carp					7,400	490				
Cod									161,400	7,225
Croaker									72,400	1,478
Eels:										
Common	10,200	$1,012			5,400	857				
Conger									1,200	57
Flounders			3,300	199	700	39			9,289,300	193,862
Haddock									66,800	2,670
Hake									30,200	1,400
Kingfish or "king mackerel"									100	4
Lamprey					1,800	375				
Mackerel			600	36						
Menhaden			7,300	74						
Minnows							100	$60		
Pollock									500	16
Scup or porgy			100	5					111,700	3,028
Sea bass									27,900	1,863
Sea robin									39,500	707
Shad			4,500	475			5,100	362		
Skates			6,400	64					43,200	731
Smelt							1,600	203		
Squeteagues or "sea trout", gray			8,300	865					20,200	679
Striped bass			400	55						
Suckers					34,000	1,217				
Tautog			6,000	317					600	24
Whiting									29,900	449
Crabs:										
Hard							4,500	490		
Soft and peelers							300	97		
Lobsters									400	41
Scallops, bay							287,500	50,000		
Squid			2,400	47					3,400	78
Total	10,200	1,012	67,700	3,340	64,300	3,120	299,100	51,212	6,929,200	216,304

Fisheries of Connecticut, 1935—Continued

CATCH: BY GEAR—Continued

Species	Pots					
	Eel		Fish		Lobster	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Eels, common	29,600	$2,551				
Tautog			200	$7		
Lobsters					546,000	$122,145
Total	29,600	2,551	200	7	546,000	122,145

Species	Harpoons		Spears		Dredges, oyster	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Eels, common			4,700	$351		
Swordfish	85,700	$13,996				
Oysters:						
Market, private, spring					1,925,800	$253,152
Market, private, fall					2,555,900	350,125
Total	85,700	13,996	4,700	351	4,481,700	603,287

Species	Tongs		Rakes		Hoes		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Clams:								
Hard, public	99,800	$20,716	141,000	$28,950			180,000	$36,000
Hard, private	7,700	2,809	200	40				
Soft, public					30,500	$5,020	200	25
Oysters:								
Market, public, spring	1,600	145						
Market, public, fall	800	135						
Market, private, spring	6,400	1,600	800	300				
Market, private, fall	15,200	1,950	600	225				
Total	131,500	27,355	143,200	29,515	30,500	5,020	180,200	36,025

OPERATING UNITS: BY COUNTIES

Item	Fairfield	Hartford	Middlesex	New Haven	New London
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	87		5	154	103
On boats and shore:					
Regular	43	6	35	40	152
Casual	280	101	109	54	249
Total	410	107	149	248	504
Vessels:					
Steam				3	
Net tonnage				827	
Motor	22		2	22	35
Net tonnage	343		22	613	427
Total vessels	22		2	25	35
Total net tonnage	343		22	1,440	427
Boats:					
Motor	27	4	68	46	114
Other	174	30	26	35	261
Accessory boats			1	1	24
Apparatus:					
Haul seines	7	25	14	3	2
Length, yards	490	2,050	2,220	50	200
Gill nets:					
Drift		1	30	1	16
Square yards		1,200	61,100	67	4,500
Stake			5		
Square yards			840		

Fisheries of Connecticut, 1935—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Fairfield	Hartford	Middlesex	New Haven	New London
Apparatus—Continued.	*Number*	*Number*	*Number*	*Number*	*Number*
Lines:					
Hand	8		36	15	48
Hooks	9		43	21	52
Trawl					618
Hooks					21,672
Trot with hooks	2			2	
Hooks	500			200	
Pound nets			3	2	9
Fyke nets	1	56	13	1	40
Dip nets	2	18			211
Otter trawls	8		5	11	55
Yards at mouth	204		97	250	1,582
Pots:					
Eel	16	65	203	110	572
Fish	12				
Lobster	2,965		1,574	4,184	9,161
Harpoons			3	1	22
Spears					10
Dredges, oyster	30			44	2
Yards at mouth	46			67	2
Tongs:					
Oyster	4		4		2
Other	61			2	
Rakes:					
Oyster	2				
Other	104			17	
Hoes	14		1		6

CATCH: BY COUNTIES

Species	Fairfield		Hartford		Middlesex		New Haven		New London	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			15,000	$142					2,600	$42
Bluefish	800	$65			50,000	$5,787	12,800	$1,411	54,700	4,520
Butterfish					300	15	4,900	279	49,300	2,698
Carp			14,000	1,166	35,000	2,540			2,900	154
Cod							1,200	54	669,700	22,836
Croaker									72,400	1,478
Eels:										
Common	17,500	1,748	1,600	154	11,600	812	6,700	544	18,500	2,079
Conger									1,200	57
Flounders	109,900	2,770			11,900	526	390,200	16,888	5,781,500	173,926
Haddock									466,800	14,670
Hake									32,200	1,420
Halibut									100,000	8,000
Kingfish or "king mackerel"									100	4
Lamprey			1,800	375						
Mackerel							1,800	144	600	36
Menhaden					4,000	40	400	5	2,900	29
Minnows	600	150	3,000	1,729	200	180	700	350		
Mummichog	5,000	800			600	150	400	200		
Pollock									53,000	866
Scup or porgy							400	11	112,400	3,045
Sea bass							1,200	48	29,800	2,125
Sea robin									39,500	707
Shad			82,700	6,272	235,500	19,244			84,400	7,169
Skates					800	15	6,000	60	42,800	720
Smelt	300	150							1,600	203
Squeteagues or "sea trout", gray							1,000	55	27,500	1,489
Striped bass									400	55
Suckers			31,200	1,093	47,600	1,811			2,600	128
Swordfish					10,700	2,188	1,500	234	73,500	11,574
Tautog	300	22			27,700	2,176	2,600	200	25,000	1,428
Tilefish									160,000	8,000
Tomcod	5,200	260								
Whiting									29,900	449
Wolffish									10,000	100
Crabs:										
Hard	2,000	295							2,500	195
Soft and peelers									300	97
Lobsters	60,600	17,583			59,900	15,054	119,800	32,076	306,100	57,473

Fisheries of Connecticut, 1935—Continued

CATCH: BY COUNTIES—Continued

Species	Fairfield		Hartford		Middlesex		New Haven		New London	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Clams:										
Hard, public	417,500	$84,516	.....	.....	.....	.....	3,900	$1,150	.....	.....
Hard, private	7,099	2,849	.....	.....	.....	.....	.....	.....	.....	.....
Soft, public	28,860	4,846	.....	.....	300	$34	.....	.....	1,600	$165
Oysters:										
Market, public, spring	800	50	.....	.....	800	95	.....	.....	.....	.....
Market, public, fall	.....	.....	.....	.....	800	135	.....	.....	.....	.....
Market, private, spring	944,000	146,450	.....	.....	.....	.....	970,600	104,512	18,400	4,100
Market, private, fall	1,009,900	152,299	.....	.....	.....	.....	1,547,400	196,901	14,400	3,100
Scallops, bay	.....	.....	.....	.....	.....	.....	.....	.....	287,500	50,000
Squid	.....	.....	.....	.....	.....	.....	.....	.....	5,800	125
Total	2,611,100	414,853	149,300	$10,931	497,700	50,802	3,073,500	355,122	8,584,400	385,262

SEED OYSTER FISHERY: BY GEAR

Item	Dredges		Tongs		Total, exclusive of duplication	
OPERATING UNITS						
Fishermen:	*Number*		*Number*		*Number*	
On vessels	137		.....		137	
On boats and shore:						
Regular	23		4		27	
Casual	.....		1		1	
Total	160		5		165	
Vessels:						
Steam	4		.....		4	
Net tonnage	344		.....		344	
Motor	9		.....		9	
Net tonnage	236		.....		236	
Sail	15		.....		15	
Net tonnage	114		.....		114	
Total vessels	28		.....		28	
Total net tonnage	694		.....		694	
Boats, other than motor	11		4		15	
Apparatus:						
Number	161		5		.....	
Yards at mouth	142		.....		.....	
CATCH						
Oysters:	*Bushels*	*Value*	*Bushels*	*Value*	*Bushels*	*Value*
Seed, public, spring	17,355	$6,942	.....	.....	17,355	$6,942
Seed, public, fall	87,888	35,158	.....	.....	87,888	35,158
Seed, private, spring	347,053	157,339	8,790	$4,995	355,843	162,334
Seed, private, fall	20,725	13,600	.....	.....	20,725	13,600
Total	473,021	213,039	8,790	4,995	481,811	218,034

Fisheries of Connecticut, 1935—Continued

SEED OYSTER FISHERY: BY COUNTIES

Item	Fairfield		New Haven	
OPERATING UNITS				
Fishermen:	*Number*		*Number*	
On vessels	104		33	
On boats and shore:				
Regular	24		3	
Casual	1			
Total	129		36	
Vessels:				
Steam	3		1	
Net tonnage	239		105	
Motor	4		5	
Net tonnage	134		102	
Sail	15			
Net tonnage	114			
Total vessels	22		6	
Total net tonnage	487		207	
Boats, other than motor	12		3	
Apparatus:				
Dredges	149		12	
Yards at mouth	123		19	
Tongs	2		3	
CATCH				
Oysters:	*Bushels*	*Value*	*Bushels*	*Value*
Seed, public, spring	17,355	$6,942		
Seed, public, fall	87,888	35,158		
Seed, private, spring	131,591	71,246	224,252	$91,088
Seed, private, fall	20,725	13,600		
Total	257,559	126,946	224,252	91,088

NOTE.—Of the total number of persons fishing for seed oysters, 11 are duplicated among those fishing for market oysters or other species. Similarly the following craft and gear are duplicated: 2 motor vessels, 4 dredges, and 2 tongs.

VESSEL FISHERIES AT PRINCIPAL NEW ENGLAND PORTS

Due to the importance of the ports of Boston and Gloucester, Mass., and Portland, Maine, as landing points for fishery products, detailed monthly statistics are collected for these landings which are published in the following sections. These landings are included in the catch by States appearing elsewhere in this document, but are presented here for their value in detailed form.

ECONOMIC ASPECT

The landings of fishery products at the three principal New England ports (Boston and Gloucester, Mass., and Portland, Maine), by vessels of 5 net tons capacity or more, during 1935, amounted to 373,118,393 pounds as landed, valued at $9,004,652. This is an increase of 24 percent in the quantity of the catch as compared with 1934, and an increase of 14 percent in the value of the catch. Of the total landings, 99 percent consisted of fresh fish and 1 percent salted fish. The landings at Boston accounted for 307,371,962 pounds, valued at $7,732,742 or 82 percent of the total volume; the landings at Gloucester amounted to 51,264,509 pounds, valued at $934,991, or 14 percent of the total; and the landings at Portland amounted to 14,481,922 pounds, valued at $336,919, or 4 percent of the total.

Among the landings of fresh fish, haddock far outranked other species in volume landed, the landings of all sizes in 1935 amounting to 156,995,731 pounds, or 42 percent of the total fresh fish.

Landings by fishing vessels at the three principal New England ports, 1935

BOSTON: BY MONTHS

Species	January		February		March		April		May		June		July	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Cod, fresh:														
Large	2,256,750	$92,008	3,026,515	$72,084	4,819,420	$110,765	4,121,155	$86,865	3,041,710	$50,673	1,814,670	$44,519	2,771,805	$51,044
Market	2,177,424	70,682	1,970,255	41,927	4,644,730	886,663	4,170,180	71,481	3,556,535	54,922	2,390,205	45,308	5,288,610	87,347
Scrod	56,410	1,343	6,000	147	2,450	59	8,110	123	29,850	503	69,550	1,339	15,300	221
Haddock, fresh:														
Large	8,051,875	268,207	11,091,195	241,464	11,960,035	309,497	14,277,770	273,800	10,353,470	212,376	7,529,295	167,706	7,101,615	160,610
Scrod	2,771,120	73,958	3,799,360	70,006	3,774,050	78,438	4,617,380	71,467	4,684,545	72,633	3,411,700	55,487	3,477,165	57,816
Hake, fresh:														
Large	302,930	13,113	306,645	10,484	580,035	16,650	505,370	11,563	652,340	10,127	631,590	10,695	793,915	12,493
Small	11,216	514	8,505	257	9,325	278	14,500	309	22,550	443	74,000	1,428	95,206	1,918
Pollock, fresh	719,245	18,162	699,835	14,323	952,580	20,107	1,045,745	18,505	668,210	11,333	346,590	7,107	280,200	5,657
Cusk, fresh	145,975	4,236	255,665	5,543	311,935	6,746	290,260	4,712	596,210	7,958	253,300	3,764	179,710	2,799
Halibut, fresh	71,043	9,322	182,238	19,598	210,021	27,721	270,967	29,861	333,214	31,121	247,426	19,791	192,103	16,934
Mackerel, fresh									2,679,633	77,678	7,681,995	92,993	7,159,360	99,403
Flounders, fresh	1,056,930	40,053	868,410	25,869	1,809,055	43,811	1,111,565	34,023	1,443,020	29,655	1,265,205	29,241	808,413	24,908
Swordfish, fresh											63,361	20,140	674,089	138,770
Wolffish, fresh	129,640	4,253	139,805	3,937	249,100	7,334	365,325	8,161	405,880	7,922	385,110	7,382	177,490	3,999
Rosefish, fresh	73,685	677	135,400	1,362	457,850	3,455	285,800	2,861	953,700	9,461	153,235	1,532	834,750	8,350
Other, fresh	12,352	683	12,558	1,047	61,255	1,508	21,585	1,230	44,615	1,204	57,065	663	73,861	1,322
Total	17,836,595	597,211	22,502,386	508,048	29,841,841	713,032	31,105,712	614,961	29,465,482	578,009	26,374,297	509,095	29,923,592	673,591
Landed in 1934:														
Fresh	14,236,593	553,040	15,496,804	662,082	25,596,117	771,289	26,498,086	499,312	23,690,399	498,960	20,506,195	521,448	22,924,069	586,979
Salted											28,100	923	20,470	616
Total	14,236,593	553,040	15,496,804	662,082	25,596,117	771,289	26,498,086	499,312	23,690,399	498,960	20,534,295	522,371	22,944,539	587,595

NOTE.—The weights of fresh and salted fish given in these statistics represent the fish as landed from the vessels, and the values are those received by the fishermen. Large cod are classified as those weighing over 10 pounds; market cod, 2¼ to 10 pounds; and scrod cod, 1 to 2¼ pounds. Large haddock are those weighing over 2½ pounds and scrod haddock, 1 to 2½ pounds. Large hake are those weighing over 6 pounds and small hake, under 6 pounds. Only landings by vessels having a capacity of 5 net tons or greater are used in this tabulation. The above statistics of the landings at Boston prior to September 1935 have been revised from those in annual or monthly bulletins or reports published prior to September 1935.

Landings by fishing vessels at the three principal New England ports, 1935—Continued

BOSTON: BY MONTHS—Continued

Species	August		September		October		November		December		Total, 1935		1934	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Cod, fresh:														
Large	1,709,040	$46,989	1,691,085	$58,983	1,992,150	$76,933	1,195,358	$59,783	2,098,485	$85,417	30,628,143	$836,063	28,517,675	$807,730
Market	3,786,065	70,519	2,997,615	65,931	2,544,750	68,397	3,368,620	101,918	2,502,785	81,060	39,397,774	846,155	40,544,632	961,060
Scrod	7,600	97	31,100	513	37,550	858	263,105	6,163	191,150	4,563	718,175	15,929	229,035	4,423
Cod, salted:														
Large			5,100	135							5,100	135	60,500	2,336
Market													22,700	395
Haddock, fresh:														
Large	6,605,425	178,039	6,833,668	206,065	6,618,755	246,750	4,465,725	189,268	5,745,730	237,122	100,634,558	2,690,924	68,276,732	2,245,644
Scrod	3,580,075	70,074	5,025,915	112,934	4,391,165	109,888	3,786,885	111,336	3,831,345	119,124	47,150,705	1,003,161	50,482,003	1,059,242
Hake, fresh:														
Large	670,680	11,440	890,305	19,275	1,000,620	24,491	472,640	15,974	597,410	22,470	7,404,480	178,775	3,438,887	95,549
Small	139,300	2,956	102,400	2,577	137,250	3,728	56,350	1,946	22,915	955	693,517	17,309	769,855	23,944
Hake, salted:														
Large													4,370	55
Pollock, fresh	440,110	9,764	381,885	8,607	1,720,820	34,547	3,147,000	62,228	3,351,927	66,598	13,754,147	276,938	8,698,871	145,637
Cusk, fresh	163,980	2,548	482,240	8,784	515,260	10,871	249,090	6,224	433,405	12,024	3,877,030	76,209	2,613,335	52,507
Halibut, fresh	235,412	19,528	170,790	17,308	68,152	7,603	22,696	2,853	32,205	3,682	2,036,267	205,412	1,646,456	193,726
Mackerel, fresh	4,536,615	92,241	2,708,555	76,396	1,514,348	66,047	533,595	21,013	200,135	14,324	27,014,236	540,095	21,002,336	422,548
Mackerel, salted													3,000	77
Flounders, fresh	719,865	32,060	1,055,465	39,282	1,506,905	47,151	764,820	35,170	1,089,990	55,008	13,499,643	436,231	10,769,825	374,270
Swordfish, fresh	807,048	123,486	476,060	76,269	3,641	804					2,024,199	359,449	1,314,095	240,254
Wolffish, fresh	49,635	1,709	32,530	999	36,050	1,217	40,575	1,276	37,430	1,397	2,048,570	49,586	3,053,151	64,042
Rosefish, fresh	2,104,960	21,479	3,083,496	32,374	3,733,652	45,713	1,550,235	14,886	777,511	8,155	14,144,274	150,305	1,288,499	13,333
Herring, fresh			4,000	25							4,000	25		
Other, fresh	445,010	8,085	861,155	16,648	627,037	13,532	90,252	2,825	30,399	1,334	2,337,144	50,081	956,631	24,592
Total, fresh	26,090,820	691,014	26,828,264	742,930	26,448,105	758,620	20,006,946	632,863	20,942,822	713,233	307,366,862	7,732,607	243,602,018	6,728,501
Total, salted			5,100	135							5,100	135	90,570	2,863
Grand total	26,090,820	691,014	26,833,364	743,065	26,448,105	758,620	20,006,946	632,863	20,942,822	713,233	307,371,962	7,732,742	243,692,588	6,731,364
Landed in 1934:														
Fresh	25,027,763	602,285	22,388,239	596,705	11,925,053	416,887	16,287,788	452,930	19,024,912	566,584			243,602,018	6,728,501
Salted			11,300	490	17,000	731	13,700	103					90,570	2,863
Total	25,027,763	602,285	22,399,539	597,195	11,942,053	417,618	16,301,488	453,033	19,024,912	566,584			243,692,588	6,731,364

GLOUCESTER: BY MONTHS

Species	January		February		March		April		May		June		July	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Cod, fresh:														
Large	144,340	$7,826	671,770	$15,176	1,642,025	$35,492	1,872,515	$38,009	1,852,545	$36,167	992,395	$23,754	506,595	$9,519
Market	18,775	744	63,035	1,394	290,765	4,503	293,100	2,988	495,856	5,019	229,675	2,298	273,529	2,736
Scrod	2,450	53	4,970	75	945	13	935	18	2,080	24				
Cod, salted:														
Large					9,565	287	17,080	512	95,620	2,867	47,855	1,436	338,697	10,158
Market					3,010	70	8,920	193	12,255	245	18,255	549	215,260	4,303
Scrod													27,636	277
Haddock, fresh:														
Large	12,510	903	39,995	828	11,935	320	469,290	11,522	639,050	11,995	513,645	7,728	529,295	7,494
Scrod	3,250	73	3,340	46	6,859	105	100,675	1,009	201,965	2,028	147,650	1,479	194,380	1,947
Haddock, salted:														
Scrod									60	4				
Hake, fresh:														
Large	41,430	1,933	11,565	436	13,560	223	595	4	16,570	129	4,770	36	30,580	232
Small							550	12	600	5	50	1	390	4
Hake, salted:														
Large									250	4			1,000	25
Pollock, fresh	416,495	12,478	59,835	1,756	13,000	130	68,755	589	129,770	1,697	32,385	334	18,165	153
Pollock, salted													505	10
Cusk, fresh	5,215	141	13,665	156	815	13	26,110	172	47,500	363	5,675	43	17,310	133
Halibut, fresh			41	8	25	4	305	39	626	69			196,390	11,783
Halibut, salted							2,000	140			100	11	285	26
Mackerel, fresh									43,225	703	3,179,757	31,959	4,645,770	41,320
Mackerel, salted											19,530	208	4,100	103
Flounders, fresh	44,560	2,064	58,545	1,841	42,095	1,043	24,145	603	36,595	804	39,960	978	19,575	391
Wolffish, fresh	2,345	75	4,065	89	11,760	252	28,955	237	18,690	195	26,800	260	3,615	38
Rosefish, fresh	14,275	123	19,650	113	12,325	70	700	4	10,700	103			250,049	2,500
Herring, salted	420,832	12,676							160,000	6,320			21,200	689
Other, fresh											34,020	292	28,600	429
Total, fresh	705,645	26,413	950,476	21,918	2,046,100	42,168	2,886,630	55,206	3,495,766	59,301	5,206,782	69,162	6,114,225	78,679
Total, salted	420,832	12,676			12,575	357	28,000	845	268,185	9,440	85,740	2,264	608,683	15,591
Grand total	1,126,477	39,089	950,476	21,918	2,058,675	42,525	2,914,630	56,051	3,763,951	68,741	5,292,522	71,366	6,722,908	94,270
Landed in 1934:														
Fresh	604,936	25,617	221,334	10,367	1,197,305	33,976	4,361,232	94,555	3,871,806	74,736	2,531,655	46,489	2,810,143	40,987
Salted					3,420	154	4,500	152	107,520	2,931	50,039	1,182	419,155	13,284
Total	604,936	25,617	221,334	10,367	1,200,725	34,130	4,365,732	94,707	3,979,326	77,667	2,581,685	47,671	3,229,298	54,271

Landings by fishing vessels at the three principal New England ports, 1935—Continued

GLOUCESTER: BY MONTHS—Continued

Species	August		September		October		November		December		Total, 1935		1934	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Cod, fresh:														
Large	159,554	$3,680	268,805	$9,604	368,460	$15,302	94,015	$4,668	96,710	$4,108	8,669,729	$203,305	7,924,179	$210,142
Market	294,978	2,955	85,265	854	88,023	2,616	60,925	1,821	42,670	1,108	2,236,581	29,036	3,266,308	57,101
Scrod	25	1			19,575	390	11,560	182	3,605	73	46,145	829	29,215	463
Cod, salted:														
Large	199,648	7,256	231,662	8,109	172,997	5,755			128,765	5,150	1,241,889	41,530	1,204,215	37,379
Market	97,706	2,475	339,068	8,745	125,640	3,142			156,050	4,681	976,184	24,403	701,021	15,450
Scrod	34,040	511	59,191	888	15,217	228			48,018	751	184,102	2,655	195,368	2,832
Haddock, fresh:														
Large	425,499	6,517	294,830	4,737	164,671	4,948	43,455	2,097	30,145	1,222	3,174,320	60,311	2,470,588	63,668
Scrod	309,870	3,102	384,435	3,849	233,220	4,655	29,525	711	3,705	93	1,618,865	19,097	2,420,692	38,387
Haddock, salted:														
Large														
Scrod					6,088	92					6,088	92	6,000	130
Hake, fresh:											60	4		
Large	23,555	175	16,560	217	22,362	357	4,265	103	29,355	905	215,167	4,750	552,175	16,624
Small	400	3	3,600	68	834	14	2,960	76			9,384	183	1,200	22
Hake, salted:														
Large					830	17					2,080	46	9,390	156
Small	855	21									855	21		
Pollock, fresh	54,279	856	1,517,790	30,344	4,061,895	80,802	4,731,090	75,766	2,178,300	41,687	13,281,759	246,592	11,140,955	160,721
Pollock, salted	200	4	100	3							805	17	790	13
Cusk, fresh	44,955	341	1,565	18	2,267	35	5,920	146	8,340	196	179,337	1,757	187,320	2,373
Cusk, salted	600	9									600	9	1,600	33
Halibut, fresh	2,555	156	2,300	207	17,854	1,916	30	4			220,126	14,186	651	95
Halibut, salted	1,905	171									4,290	348	4,120	215
Mackerel, fresh	3,598,267	42,699	1,716,890	23,664	666,420	20,495	178,445	8,545	120,725	7,717	13,549,499	177,102	7,848,295	103,051
Mackerel, salted	34,632	763	4,450	157	171,300	5,139					234,012	6,370	446,980	13,549
Flounders, fresh	24,275	586	25,855	652	22,378	610	22,940	807	24,505	1,442	335,428	11,821	366,995	12,603
Swordfish, fresh													9,279	1,620
Wolffish, fresh	85,568	856	1,630	19	955	15	130	3	590	18	185,103	2,057	129,835	2,106
Rosefish, fresh	490,840	4,909	618,512	6,186	1,236,721	15,840	74,510	869	167,585	2,090	2,895,858	32,807	539,067	5,313
Herring, salted			400	12					1,079,626	33,011	1,682,058	52,708	262,200	7,935
Other, fresh	50,715	676	137,385	1,379	8,980	68	3,035	92	1,450	19	264,185	2,955	411,751	3,718
Total, fresh	5,565,335	67,512	5,075,422	81,798	6,914,615	148,063	5,262,805	95,890	2,707,685	60,678	46,931,486	806,788	37,298,505	678,007
Total, salted	369,586	11,210	634,891	17,914	492,072	14,373			1,412,459	43,593	4,333,023	128,203	2,831,684	77,692
Grand total	5,934,921	78,722	5,710,313	99,712	7,406,687	162,436	5,262,805	95,890	4,120,144	104,271	51,264,509	934,991	40,130,189	755,699

Landed in 1934:														
Fresh	3,621,053	55,938	3,966,799	58,077	4,452,052	101,519	6,630,209	91,898	3,029,981	43,848			37,298,505	678,007
Salted	776,017	18,893	437,084	11,126	561,503	15,635	220,255	6,400	262,200	7,935			2,831,684	77,692
Total	4,387,070	74,831	4,403,883	69,203	5,013,555	117,154	6,850,464	98,298	3,292,181	51,783			40,130,189	755,699

PORTLAND: BY MONTHS

Species	January		February		March		April		May		June		July	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Cod, fresh:														
Large	29,291	$1,467	142,464	$4,055	253,466	$6,161	678,175	$12,917	343,830	$5,585	380,398	$9,699	474,166	$10,556
Market	16,378	635	65,710	1,431	160,562	3,293	327,873	5,930	88,923	1,280	22,455	307	7,834	110
Scrod	135	2	461	5	610	4	2,210	21	290	2				
Haddock, fresh:														
Large	46,906	2,765	138,748	5,167	240,836	7,118	1,991,328	37,821	940,005	17,218	44,669	1,876	52,354	2,323
Scrod	7,315	219	12,685	191	54,274	1,099	289,055	5,085	146,895	2,423	310	3	2,770	27
Hake, fresh:														
Large	45,783	2,220	50,122	1,844	46,566	1,743	82,092	2,182	152,957	1,983	314,592	3,983	396,608	5,421
Small	1,240	26	790	9	1,560	18	2,540	26	2,295	35	435	3	2,855	26
Pollock, fresh	14,358	247	20,937	362	31,957	518	80,283	886	133,822	1,201	51,771	526	76,299	765
Cusk, fresh	27,335	1,117	178,390	4,536	248,899	6,565	348,890	6,418	177,524	2,596	64,103	981	18,095	246
Halibut, fresh	2,625	326	926	141	4,432	527	26,949	3,021	6,463	689	37,535	4,451	136	17
Mackerel, fresh											7,705	111	4,660	46
Flounders, fresh	19,480	893	27,595	850	69,964	1,850	40,632	663	49,180	600	79,719	1,297	107,259	2,248
Swordfish, fresh													48,907	9,888
Wolffish, fresh	90	2	270	2	6,730	85	21,450	235	19,795	184	2,005	11	1,739	13
Rosefish, fresh	15,845	159	16,340	163	33,620	238	3,560	27	1,000	5				
Herring, fresh											135	2		
Other, fresh	172	4	1,441	66	2,422	133	10,282	981	11,268	1,037	21,075	1,806	42,444	458
Total	226,953	10,082	656,879	18,822	1,155,898	29,352	3,895,319	76,213	2,074,217	34,838	1,026,877	25,056	1,235,926	32,144
Landed in 1934:														
Fresh	498,874	20,558	322,626	15,728	879,545	25,218	3,883,239	73,297	2,032,385	37,488	1,242,096	30,342	1,306,980	39,792
Salted											1,425	28		
Total	498,874	20,558	322,626	15,728	879,545	25,218	3,883,239	73,297	2,032,385	37,488	1,243,521	30,370	1,306,980	39,792

Landings by fishing vessels at the three principal New England ports, 1935—Continued

PORTLAND: BY MONTHS—Continued

Species	August		September		October		November		December		Total, 1935		1934	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Cod, fresh:														
Large	523,461	$15,024	181,891	$8,386	93,770	$3,707	41,505	$1,493	28,980	$1,285	3,171,397	$87,335	3,332,477	$94,519
Market	8,369	121	10,493	218	26,645	568	31,533	717	8,560	262	775,335	14,872	1,517,315	30,197
Scrod	32,575	610	510	5	2,030	31	1,615	16	770	9	41,176	705	8,442	67
Cod, salted:														
Large													14,910	522
Market													2,960	89
Haddock, fresh:														
Large	75,721	3,216	56,191	3,320	118,356	5,608	134,725	6,035	34,801	1,947	3,864,640	94,414	3,221,998	98,413
Scrod	3,558	44	385	3	11,196	143	20,305	334	3,895	65	552,643	9,636	891,758	16,506
Hake, fresh:														
Large	336,816	4,935	247,657	4,963	297,915	6,209	184,879	5,331	89,400	3,077	2,245,357	43,891	2,290,139	48,412
Small	1,340	12	2,035	19	410	4	660	6	650	6	16,610	190	27,427	230
Hake, salted:														
Large													175	3
Pollock, fresh	134,457	1,345	145,506	1,497	120,000	1,202	5,550	65	33,316	472	848,256	9,086	955,693	9,934
Pollock, salted													110	2
Cusk, fresh	35,557	692	96,530	1,928	162,025	3,425	58,695	1,477	51,250	1,572	1,467,293	31,553	1,121,468	23,320
Cusk, salted													125	2
Halibut, fresh	1,480	130	294	44	1,927	262	1,447	201	463	72	84,677	9,381	130,519	11,325
Mackerel, fresh	25,909	522	8,464	288							46,738	967	1,228,276	13,178
Mackerel, salted	3,450	34									3,450	34	17,225	87
Flounders, fresh	74,038	1,714	20,386	611	2,483	62	8,670	211	16,855	535	516,261	11,534	508,194	12,496
Swordfish, fresh	55,794	7,954	14,629	2,028							119,330	19,870	140,119	23,975
Wolffish, fresh	634	2	83		180	2	65		75		53,116	536	58,443	441
Rosefish, fresh											70,365	592	13,885	140
Herring, fresh	8,800	88	55,400	263	23,800	119					88,135	472	395,400	2,871
Other, fresh	386,276	3,283	25,145	241	1,040	31	9,895	197	5,683	114	517,143	8,351	216,076	8,605
Total, fresh	1,704,785	39,692	865,599	23,814	861,777	21,373	499,544	16,083	274,698	9,416	14,478,472	336,885	16,057,539	394,629
Total, salted	3,450	34									3,450	34	35,505	705
Grand total	1,708,235	39,726	865,599	23,814	861,777	21,373	499,544	16,083	274,698	9,416	14,481,922	336,919	16,093,044	395,334
Landed in 1934:														
Fresh	1,786,887	44,786	1,620,870	35,049	1,173,947	31,027	868,247	25,593	441,843	15,751			16,057,539	394,629
Salted	34,080	677											35,505	705
Total	1,820,967	45,463	1,620,870	35,049	1,173,947	31,027	868,247	25,593	441,843	15,751			16,093,044	395,334

SUMMARY: BY PORTS

Species	Boston		Gloucester		Portland		Total, 1935		1934	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Cod, fresh:										
Large	30,628,143	$836,063	8,669,729	$203,305	3,171,397	$80,335	42,469,269	$1,119,703	39,774,331	$1,112,391
Market	39,397,774	846,155	2,236,581	29,036	775,335	14,872	42,409,690	890,063	45,328,255	1,048,358
Scrod	718,175	15,929	46,145	829	41,176	705	805,496	17,463	266,692	4,953
Cod, salted:										
Large	5,100	135	1,241,889	41,530			1,246,989	41,665	1,279,625	40,237
Market			976,184	24,403			976,184	24,403	726,681	15,934
Scrod			184,102	2,655			184,102	2,655	195,368	2,832
Haddock, fresh:										
Large	100,634,558	2,690,924	3,174,320	60,311	3,864,640	94,414	107,673,518	2,845,649	73,969,228	2,407,725
Scrod	47,150,705	1,003,161	1,618,865	19,097	552,643	9,636	49,322,213	1,031,894	53,794,453	1,114,135
Haddock, salted:										
Large			6,088	92			6,088	92	6,000	130
Scrod			60	4			60	4		
Hake, fresh:										
Large	7,404,480	178,775	215,167	4,750	2,245,357	43,891	9,865,004	227,416	6,281,201	160,585
Small	693,517	17,309	9,384	183	16,610	190	719,511	17,682	798,482	24,196
Hake, salted:										
Large			2,080	46			2,080	46	13,935	214
Small			855	21			855	21		
Pollock, fresh	13,754,147	276,938	13,281,759	246,592	848,256	9,086	27,884,162	532,616	20,795,519	316,292
Pollock, salted			805	17			805	17	900	15
Cusk, fresh	3,877,030	76,209	179,337	1,757	1,467,293	31,553	5,523,660	109,519	3,922,123	78,200
Cusk, salted			600	9			600	9	1,725	35
Halibut, fresh	2,036,267	205,412	220,126	14,186	84,677	9,881	2,341,070	229,479	1,777,626	205,146
Halibut, salted			4,290	348			4,290	348	4,120	215
Mackerel, fresh	27,014,236	540,095	13,549,499	177,102	46,738	967	40,610,473	718,164	30,078,907	538,777
Mackerel, salted			234,012	6,370	3,450	34	237,462	6,404	467,205	13,713
Flounders, fresh	13,499,643	438,231	385,428	11,821	516,261	11,584	14,401,332	459,586	11,645,014	399,369
Swordfish, fresh	2,024,199	359,409			119,330	19,870	2,143,529	379,279	1,463,493	265,849
Wolffish, fresh	2,048,570	49,586	185,103	2,057	53,116	536	2,286,789	52,179	3,241,429	66,589
Rosefish, fresh	14,144,274	150,305	2,895,858	32,807	70,365	592	17,110,497	183,704	1,841,451	18,786
Herring, fresh	4,000	25			88,135	472	92,135	497	395,400	2,871
Herring, salted			1,682,058	52,708			1,682,058	52,708	262,200	7,935
Other, fresh	2,337,144	50,081	264,185	2,955	517,143	8,351	[1] 3,118,472	61,387	1,584,458	36,915
Total, fresh	307,366,862	7,732,607	46,931,486	806,788	14,478,472	336,885	368,776,820	8,876,280	296,958,062	7,801,137
Total, salted	5,100	135	4,333,023	128,203	3,450	34	4,341,573	128,372	2,957,759	81,260
Grand total	307,371,962	7,732,742	51,264,509	934,991	14,481,922	336,919	373,118,393	9,004,652	299,915,821	7,882,397
Landed in 1934:										
Fresh	243,602,018	6,728,501	37,298,505	678,007	16,057,539	394,629			296,958,062	7,801,137
Salted	90,570	2,863	2,831,684	77,692	35,505	705			2,957,759	81,260
Total	243,692,588	6,731,364	40,130,189	755,699	16,093,044	395,334			299,915,821	7,882,397

[1] The items under "Other, fresh" include alewives, 647,780 pounds, value $5,612; butterfish, 187,458 pounds, value $11,975; eels, 615 pounds, value $27; frigate mackerel, 73,500 pounds value $368; herring smelt, 9,315 pounds, value $228; salmon, 108 pounds, value $22; scup, 6,400 pounds, value $146; sea bass, 750 pounds, value $22; sea robins, 400 pounds, value $8, shad, 65,212 pounds, value $1,098; sharks, 23,088 pounds, value $363; skates, 2,475 pounds, value $36; squeteagues, 27 pounds, value $2; sturgeon, 618 pounds, value $61; tilefish, 50 pounds; value $2; tuna or "horse mackerel", 26,413 pounds, value $633; turbot, 500 pounds, value $20; whiting, 1,892,265 pounds, value $32,273; mixed fish, 29,750 pounds, value $224; lobsters, 26 pounds, value $8; scallops, 31,698 pounds, value $3,542; squid, 775 pounds, value $24; livers, 17,712 pounds, value $474; sounds, 7 pounds; spawn, 101,530 pounds, value $4,219.

BIOLOGICAL ASPECT

In 1935 the fishing fleet landing fares at Boston and Gloucester, Mass., and Portland, Maine, and operating on the fishing banks of the North Atlantic, numbered 382 steam, motor, and sail vessels of 5-net-ton capacity or greater as measured by the United States Customs Service. These vessels made 12,372 trips to the fishing grounds, and were absent from port 53,264 days, or an average of 4.3 days per trip. The catch of edible fish landed at the three ports amounted to 376,277,640 pounds when the salted fish had been converted to the basis of fresh gutted or round fish as usually landed. This, however, does not represent the entire catch of edible fish of these vessels, for landings were also made at ports in New England other than these three, at New York City, and at more southern ports in connection with the southern winter trawl and mackerel fisheries.

Otter trawls on all sizes of vessels accounted for 254,906,714 pounds, or 68 percent of the total landings. Line trawls were next in importance, accounting for 53,541,051 pounds, or 14 percent of the total landings.

The catch taken on Sable Island Bank and landed at the three ports amounted to 102,146,279 pounds, or 27 percent of the total; that on Georges Bank, 84,473,973 pounds, or 22 percent; shore grounds, 63,786,339 pounds, or 17 percent; Browns Bank, 32,557,300 pounds, or 9 percent; South Channel, 20,055,730 pounds, or 5 percent; and Quereau Bank, 17,082,783 pounds, or 5 percent. No other bank accounted for as much as 10,000,000 pounds in the landings at the three ports.

Landings by fishing vessels at the three principal New England ports, 1935

BY GEAR AND FISHING GROUNDS

Gear and fishing grounds	Vessels fishing	Trips	Days absent	Cod			Haddock		Hake	
				Large	Market	Scrod	Large	Scrod	Large	Small
Line trawls:	*Number*	*Number*	*Number*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Grand Bank	5	8	297	57,649	28,825				1,830	
Green Bank	1	1	6	5,748	3,007				220	
St. Peters Bank	1	2	49	4,560	1,164					
Off Newfoundland (Treaty Coast)	1	1	30	127,178	194,784	82,833				
Bay of Fundy	2	3	17	3,530	4,875	565	45,820	6,220	11,810	
Gulf of St. Lawrence	8	17	470	1,748,013	1,657,300	280,302	12,541		17,600	
Quereau Bank	7	9	183	282,619	173,804		42,400	2,826	5,127	
Sable Island Bank (Western Bank)	18	30	472	489,205	275,618	990	663,750	165,325	120,240	1,693
Cape Shore	33	97	1,098	705,670	898,414	2,500	1,605,295	213,875	819,465	
La Have Bank	14	29	320	519,315	438,630		444,345	61,380	135,815	
Roseway Bank	2	2	25	22,000	42,200		33,800	3,600	3,550	
Browns Bank	33	199	2,201	3,307,366	2,456,099	636	5,052,915	681,030	764,785	730
Georges Bank	33	119	1,186	4,182,682	946,612	1,850	1,975,675	104,170	350,855	
Georges Bank (occasional)				7,700	3,100					
South Channel	20	98	738	906,805	513,580	4,250	2,290,025	132,595	228,005	
Off Highland Light	3	4	26	4,910	3,910		12,650	920	14,510	
Off Chatham	2	2	12	11,125	3,765		24,320	640		
Nantucket Shoals	1	1	4	1,300	1,150		12,100	400	345	
Cashes Bank	29	101	597	367,303	181,823	3,015	313,708	24,685	1,161,257	3,577
Cashes Bank (occasional)				36,730	8,230					
Fippenies Bank	5	11	63	32,805	16,060	100	22,725	3,530	123,250	
Platts Bank	7	12	29	12,880	6,850	330	17,205	790	25,350	
Jeffreys Ledge	10	16	61	30,310	11,860	260	25,950	765	75,760	
Middle Bank (Stellwagen)	5	20	103	26,875	15,590		87,870	4,475	41,355	
South	1	1	8	500					27,300	
Shore, general	86	1,112	2,976	1,007,139	548,260	38,826	885,143	61,958	3,447,470	209,448
Total	[1] 117	1,895	10,971	13,901,917	8,435,510	416,457	13,598,247	1,469,184	7,375,899	215,448
Hand lines:										
Cape Shore	3	5	55	41,900	51,150		1,250		59,560	
Browns Bank	1	1	11	19,200	7,500		85			
Georges Bank	3	17	183	241,285	167,055		900			
Georges Bank (occasional)				1,000	5,700		10,000			
Nantucket Shoals	2	2	13	4,950	6,180					
Shore, general	2	2	25	4,300	2,420		1,370		14,300	
Total	[1] 6	27	287	312,635	240,005		13,605		73,800	

[1] Exclusive of duplication.

Landings by fishing vessels at the three principal New England ports, 1935—Continued

BY GEAR AND FISHING GROUNDS—Continued

Gear and fishing grounds	Vessels fishing	Trips	Days absent	Cod			Haddock		Hake	
				Large	Market	Scrod	Large	Scrod	Large	Small
Harpoons:	*Number*	*Number*	*Number*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
The Gully	3	4	75							
Cape Shore	28	31	713							
Browns Bank	44	87	1,633							
Georges Bank	34	44	827							
Nantucket Shoals	7	8	99							
South	1	1	29							
Shore, general	5	20	82							
Total	[1] 51	195	3,458							
Otter trawls, large:										
Quereau Bank	43	118	1,514	1,913,515	6,416,860	196,950	2,581,900	3,737,050	38,490	
Sable Island Bank (Western Bank)	57	618	7,858	11,464,492	15,385,223	85,410	40,964,913	17,636,480	947,790	1,500
Cape Shore	2	3	29	5,875	20,000	7,500	71,000	51,600	9,800	
Emerald Bank	1	1	11	108,000	28,000		48,000	11,000		
La Have Bank	5	5	61	47,855	47,960	4,200	674,570	229,960	1,675	
Browns Bank	42	92	1,001	1,696,910	1,180,630	12,000	7,243,770	2,261,140	64,850	1,250
Georges Bank	56	556	5,937	4,839,050	7,863,640	279,155	23,214,075	16,291,095	446,360	740
South Channel	24	73	649	397,465	517,960	4,500	2,631,675	1,118,385	69,100	
Off Highland Light	5	10	73	5,985	3,470		25,300	27,060	3,825	
Off Chatham	2	2	15	11,800	61,400		76,070	18,800	100	
Middle Bank (Stellwagen)	2	2	22	140,600	101,000		104,250	39,000		
South	1	1	12	22,000	77,000		53,800	51,700		
Shore, general	4	7	43	43,500	62,875		86,040	85,690	3,340	
Total	[1] 58	1,488	17,225	20,697,047	31,766,018	589,715	77,775,363	41,558,960	1,585,330	3,490
Otter trawls, medium:										
Quereau Bank	5	9	107	63,100	180,525		87,175	157,650	1,925	
Sable Island Bank (Western Bank)	10	46	535	536,680	590,200	10,200	2,308,100	629,350	65,210	
Emerald Bank	2	2	21	85,400	45,000		73,630	32,600	500	
La Have Bank	4	5	51	21,660	39,200		136,700	35,800	3,500	
Browns Bank	16	44	455	310,015	298,450		2,110,450	662,500	24,050	
Georges Bank	39	286	2,657	1,490,235	1,394,745	15,775	7,016,190	3,548,895	82,305	
South Channel	24	93	800	219,300	418,420	4,000	2,354,230	872,365	77,675	
Off Highland Light	15	101	611	23,002	24,083		169,040	35,800	23,452	700
Off Chatham	6	13	108	18,150	143,450		176,175	42,800	5,135	
Nantucket Shoals	3	3	24	465	3,910		62,800	13,700	1,675	

Cashes Bank	2	2	16	5,000	800		43,500	2,200		
Middle Bank (Stellwagen)	1	1	6		200		500		450	
South	8	10	53	1,909	3,100		71,900	24,500	1,975	
Shore, general	66	547	1,893	288,083	210,845	33,765	313,752	95,695	168,475	194,784
Total	[1] 87	1,162	7,337	3,062,990	3,352,928	63,740	14,924,142	6,153,855	456,327	195,484
Otter trawls, small:										
Georges Bank	3	6	51	93,700	36,900		115,100	59,850	1,300	
South Channel	1	1	8	4,800	2,500		21,200	15,500		
Off Highland Light	2	2	15	1,100	900		9,200	5,850	800	
Nantucket Shoals	3	3	13	620	7,500		22,200	5,200	2,000	
South	2	5	17							
Shore, general	87	1,394	3,972	616,395	374,140	100,095	679,652	53,785	216,410	306,687
Total	[1] 91	1,411	4,076	716,675	421,940	100,095	845,352	140,285	220,510	306,687
Sink gill nets:										
Georges Bank (occasional)				23,940	4,410					
Shore, general	35	4,564	4,572	6,123,145	82,467	10	529,300	55	157,090	95
Total	35	4,564	4,572	6,147,085	86,877	10	529,300	55	157,090	95
Drift gill nets:										
Bay of Islands	5	6	308							
Off Highland Light	6	7	15							
South	9	19	53							
Shore, general	28	85	179							
Total	[1] 34	117	555							
Purse seines:										
Cape Shore	2	2	6							
Georges Bank	8	8	25							
South Channel	40	67	203							
Off Highland Light	2	2	5							
Off Chatham	61	260	788							
Nantucket Shoals	13	14	42							
Middle Bank (Stellwagen)	18	19	56							
South	61	516	1,630	200	210		50			
Shore, general	77	621	2,001							
Total	[1] 82	1,509	4,756	[2] 200	[2] 210		[2] 50			
Scallop drags:										
Georges Bank	1	4	27							
Grand total	[1] 382	12,372	53,264	44,838,549	44,303,488	1,170,017	107,686,059	49,322,339	9,858,956	721,204

[1] Exclusive of duplication.

[2] Incidental catch.

Landings by fishing vessels at the three principal New England ports, 1935—Continued

BY GEAR AND FISHING GROUNDS—Continued

Gear and fishing grounds	Pollock	Cusk	Halibut	Mackerel	Flounders	Swordfish	Wolffish	Rosefish	Herring	Other	Total
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Line trawls:											
Grand Bank		4,700	197,616								290,620
Green Bank			10,714								19,689
St. Peters Bank			86,401								92,125
Off Newfoundland (Treaty Coast)											404,795
Bay of Fundy	420	2,100	451								75,801
Gulf of St. Lawrence			519,965						32,400		4,268,121
Quereau Bank	1,700	23,940	103,312		3,000		290				639,018
Sable Island Bank (Western Bank)	13,880	138,150	253,603		5,660		7,020			225	2,135,359
Cape Shore	72,570	586,505	15,352		500		35,570				4,955,716
La Have Bank	41,605	278,770	16,682				9,035				1,945,577
Roseway Bank	4,200	8,100	832				600				118,882
Browns Bank	232,684	858,455	157,816		5,605	5,585	85,695			5,285	13,644,686
Georges Bank	106,885	270,040	193,777		900	818	14,425			880	8,149,569
Georges Bank (occasional)	200										11,000
South Channel	133,895	133,300	21,099		480		23,160			2,800	4,389,994
Off Highland Light	835	4,000	105				50			50	41,940
Off Chatham	1,000		2,492				370			500	44,212
Nantucket Shoals			67								15,362
Cashes Bank	36,088	1,023,422	5,543		765		3,745			1,386	3,126,317
Cashes Bank (occasional)	175										45,135
Fippenies Bank	3,020	60,920	1,062								264,172
Platts Bank	1,245	45,410	299				320	335		45	110,439
Jeffreys Ledge	3,215	52,935	2,268							80	203,523
Middle Bank (Stellwagen)	4,235	78,320	437				145			55	260,857
South		750					195			1,505	28,550
Shore, general	119,531	1,647,871	12,805		63,413		64,685	114,420		38,623	8,259,592
Total	777,383	5,217,688	1,602,698		80,323	[2] 6,403	245,305	114,755	[2] 32,400	51,434	53,541,051
Hand lines:											
Cape Shore	3,800	8,500	45				585				166,730
Browns Bank	555	350					500				28,190
Georges Bank	15,385	2,115	6,102				4,780				437,622
Georges Bank (occasional)	700		71								17,471
Nantucket Shoals	600										11,730
Shore, general	710	15,000	105								38,205
Total	21,750	25,965	6,323				5,865				699,948
Harpoons:											
Green Bank (occasional)						300					300
The Gully						38,354				311	38,665

Sable Island Bank (Western Bank) (occasional)						210					210
Cape Shore						396, 357					396, 357
Browns Bank						1, 105, 507				446	1, 105, 953
Browns Bank (occasional)						19, 002					19, 002
Georges Bank						407, 779				410	408, 189
Georges Bank (occasional)						5, 992					5, 992
South Channel (occasional)						315					315
Off Chatham (occasional)						484					484
Nantucket Shoals						96, 451					96, 451
Nantucket Shoals (occasional)						83					83
South						11, 450					11, 450
Shore, general						41, 723				7, 676	49, 399
Shore, general (occasional)						670					670
Total						2, 124, 677				8, 843	2, 133, 520
Otter trawls, large:											
Quereau Bank	255, 255	2, 775	36, 281		550, 235		61, 850	22, 550		3, 565	15, 817, 276
Sable Island Bank (Western Bank)	3, 713, 035	85, 320	463, 361	1, 300	3, 407, 950	8, 676	1, 029, 345	231, 499		64, 613	95, 490, 907
Cape Shore	2, 500		229		14, 075		6, 100				188, 679
Emerald Bank	1, 200		445		100		900				197, 645
La Have Bank	31, 615	4, 300	6, 604		6, 065		8, 350				1, 063, 154
Browns Bank	769, 970	42, 475	61, 286	400	401, 250		138, 155	134, 555		20, 402	14, 029, 043
Georges Bank	3, 591, 362	81, 380	95, 603	10, 120	1, 601, 265		218, 815	505, 559		93, 839	59, 132, 058
South Channel	184, 090	8, 465	8, 524	300	191, 985		19, 460	2, 780, 062	4, 000	16, 870	7, 953, 441
Off Highland Light	31, 585	40	313		2, 995			706, 334		190	807, 097
Off Chatham	1, 100		155		6, 610		450	105, 300			281, 785
Middle Bank (Stellwagen)	13, 400		2, 193		2, 500		1, 500				404, 443
South	1, 100		525				400				206, 525
Shore, general	186, 650	200	377		3, 635		600	44, 100		260	511, 267
Total	8, 776, 862	224, 955	675, 896	[1] 12, 120	6, 188, 665	[1] 8, 676	1, 485, 925	4, 530, 559	[1] 4, 000	199, 739	196, 083, 320
Otter trawls, medium:											
Quereau Bank	4, 550		1, 051		27, 940	2, 528	7, 395	92, 650			626, 489
Sable Island Bank (Western Bank)	56, 675	2, 475	14, 253		198, 905		28, 555	76, 000		3, 200	4, 519, 803
Emerald Bank	7, 100		1, 388		550		200				246, 468
La Have Bank	6, 300	1, 450	1, 247		12, 435		1, 350	12, 450		1, 625	273, 717
Browns Bank	163, 640	6, 400	14, 141		77, 955		53, 700			9, 125	3, 730, 426
Georges Bank	315, 485	12, 915	24, 847	1, 480	1, 341, 253	464	55, 520	350, 230		37, 925	15, 688, 264
South Channel	57, 640	3, 140	4, 275	500	434, 455		13, 990	1, 112, 825		22, 435	5, 595, 250
Off Highland Light	199, 219	1, 942	150		34, 778		87, 153	7, 906, 501		765	8, 506, 585
Off Chatham	2, 125	240	60		21, 950		1, 675	606, 000			1, 107, 760
Nantucket Shoals	960				14, 785		30				98, 325
Cashes Bank	37, 700		132		3, 600						92, 932
Middle Bank (Stellwagen)								94, 000			95, 150
South			20		180, 735					26, 097	310, 227
Shore, general	3, 351, 920	17, 910	305		1, 636, 674		49, 765	1, 676, 832		430, 405	8, 469, 210
Total	4, 203, 314	46, 472	61, 869	[1] 1, 980	3, 986, 015	[1] 2, 992	299, 433	12, 017, 488		531, 577	49, 360, 606

[1] Incidental catch.

Landings by fishing vessels at the three principal New England ports, 1935—Continued

BY GEAR AND FISHING GROUNDS—Continued

Gear and fishing grounds	Pollock	Cusk	Halibut	Mackerel	Flounders	Swordfish	Wolffish	Rosefish	Herring	Other	Total
Otter trawls, small:	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Georges Bank	1,350		350		15,805			2,400		1,425	326,240
South Channel	500		50		2,000		300				46,850
Off Highland Light	450		85		3,525		300	67,020			89,230
Nantucket Shoals	50				4,550			4,500		18,250	64,970
South					120,050					935	120,985
Shore, general	485,545	4,208	2,171	41	3,919,879	740	248,605	372,305		1,433,855	8,814,513
Total	487,895	4,208	2,656	[2] 41	4,065,809	[2] 740	249,205	446,225		1,454,465	9,462,788
Sink gill nets:											
Georges Bank (occasional)											28,350
Shore general	13,608,857	5,512	208	5,208	11,360		1,056	1,470	55,430	26,079	20,607,342
Total	13,608,857	5,512	208	[2] 5,208	11,360		1,056	1,470	[2] 55,430	26,079	20,635,692
Drift gill nets:											
Bay of Islands									2,490,687		2,490,687
Off Highland Light				52,825						542	53,367
South				169,935						455	170,390
Shore, general				210,267						765	211,032
Total				433,027					2,490,687	1,762	2,925,476
Purse seines:											
Cape Shore				86,900							86,900
Georges Bank				237,700							237,700
South Channel				2,069,880							2,069,880
Off Highland Light				47,350							47,350
Off Chatham				7,732,116						47,590	7,779,706
Nantucket Shoals				419,785						115	419,900
Middle Bank (Stellwagen)				658,525							658,525
South				13,120,436	69,160					88,595	13,278,651
Shore, general	9,630			16,105,978		41			32,705	676,755	16,825,109
Total	[2] 9,630			40,478,670	[2] 69,160	[2] 41			32,705	813,055	41,403,721
Scallop drags:											
Georges Bank										31,518	31,518
Grand total	27,885,691	5,524,800	2,349,650	40,931,046	14,401,332	2,143,529	2,286,789	17,110,497	2,615,222	3,118,472	376,277,640

NOTE.—The three principal New England ports are Boston and Gloucester, Mass., and Portland, Maine. *Otter trawls* (including V-D trawls) are classified according to the *size of the vessel*. The weight of salted fish landed has been converted to the equivalent of fresh fish as landed. Only landings by vessels having a capacity of 5 net tons or greater are used in this tabulation. "Occasional" after the name of a bank or ground indicates that the vessel or vessels contributing to the catch as shown fished chiefly with another type of gear. In such cases the number of vessels fishing, number of trips, and number of days absent, are shown under the principal type of gear used.

SUMMARY: BY FISHING GROUNDS

Fishing grounds	Vessels fishing	Trips	Days absent	Cod			Haddock		Hake	
				Large	Market	Scrod	Large	Scrod	Large	Small
Off Newfoundland:	*Number*	*Number*	*Number*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Area XIX:										
Bay of Islands	5	6	308							
Off Newfoundland (Treaty Coast)	1	1	30	127,178	194,784	82,883				
Area XX:										
Grand Bank	5	8	297	57,649	28,825				1,830	
Green Bank	1	1	6	5,748	3,007				220	
St. Peters Bank	1	2	49	4,560	1,164					
Total	[1] 11	18	690	195,135	227,780	82,833			2,050	
Off Canada:										
Area XIX:										
Gulf of St. Lawrence	8	17	470	1,748,013	1,657,300	280,302	12,541		17,600	
Area XXI:										
Quereau Bank	55	136	1,804	2,259,234	6,771,189	196,950	2,711,475	3,897,526	45,542	
The Gully	3	4	75							
Sable Island Bank (Western Bank)	83	694	8,865	12,490,377	16,251,041	96,600	43,936,763	18,431,155	1,133,240	3,193
Cape Shore	65	138	1,901	753,445	969,564	10,000	1,677,545	265,475	888,765	
Emerald Bank	3	3	32	193,400	73,000		121,630	43,600	500	
La Have Bank	23	39	432	588,830	525,790	4,200	1,255,615	327,140	140,990	
Roseway Bank	2	2	25	22,000	42,200		33,800	3,600	3,550	
Browns Bank	130	423	5,301	5,333,491	3,942,679	12,636	14,437,220	3,604,670	853,685	1,980
Area XXII:										
Bay of Fundy	2	3	17	3,530	4,875	565	45,830	6,220	11,810	
Total	[1] 157	1,459	18,922	23,392,320	30,237,638	601,253	64,232,419	26,579,386	3,095,682	5,173
Off United States:										
Area XXII:										
Georges Bank	165	1,040	10,893	10,879,652	10,422,162	296,780	32,329,940	20,004,010	880,820	740
South Channel	109	332	2,348	1,528,370	1,452,460	12,750	7,297,130	2,138,845	374,780	
Off Highland Light	32	126	745	34,997	32,363		216,190	69,630	42,587	700
Off Chatham	71	277	923	41,075	208,615		276,565	62,240	5,235	
Nantucket Shoals	29	31	195	7,335	18,740		97,100	19,400	4,020	
Cashes Bank	31	103	613	409,033	190,853	3,015	357,208	26,885	1,161,257	3,577
Fippennies Bank	5	11	63	32,865	16,060	100	22,725	3,330	123,250	
Platts Bank	7	12	29	12,880	6,850	330	17,205	790	25,350	
Jeffreys Ledge	10	16	61	30,310	11,860	260	25,950	765	75,760	
Middle Bank (Stellwagen)	26	42	187	167,475	116,790		192,620	43,475	41,805	
Shore, general	266	8,352	15,743	8,082,562	1,281,007	172,696	2,495,257	297,183	4,007,085	711,01
Area XXIII:										
South	76	553	1,802	24,600	80,310		125,750	76,200	29,275	
Total	[1] 369	10,895	33,652	21,251,094	13,838,070	485,931	43,453,640	22,742,953	6,771,224	716,031
Grand total	[1] 382	12,372	53,264	44,838,549	44,303,488	1,170,017	107,686,059	49,322,339	9,868,956	721,204

[1] Exclusive of duplication.

[2] Incidental catch.

Landings by fishing vessels at the three principal New England ports, 1935—Continued

SUMMARY: BY FISHING GROUNDS—Continued

Fishing grounds	Pollock	Cusk	Halibut	Mackerel	Flounders	Swordfish	Wolffish	Rosefish	Herring	Other	Total
Off Newfoundland:											
Area XIX:	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Bay of Islands									2,490,687		2,490,687
Off Newfoundland (Treaty Coast)											404,795
Area XX:											
Grand Bank		4,700	197,616								290,620
Green Bank			10,714			300					19,989
St. Peters Bank			86,401								92,125
Total		4,700	294,731			300			2,490,687		3,298,216
Off Canada:											
Area XIX:											
Gulf of St. Lawrence			519,965						32,400		4,268,121
Area XXI:											
Quereau Bank	261,505	26,715	140,644		581,175	2,528	69,535	115,200		3,565	17,082,783
The Gully						38,354				311	38,665
Sable Island Bank (Western Bank)	3,783,590	225,945	731,217	1,300	3,612,516	8,886	1,064,920	307,499		68,038	102,146,279
Cape Shore	78,870	595,005	15,626	86,900	14,575	396,357	42,255				5,794,382
Emerald Bank	8,300		1,853		650		1,200				444,113
La Have Bank	79,520	284,520	24,533		18,500		18,735	12,450		1,625	3,282,448
Roseway Bank	4,200	8,100	832				600				118,882
Browns Bank	1,166,849	907,680	233,243	400	484,810	1,130,094	278,050	134,555		35,258	32,557,300
Area XXII:											
Bay of Fundy	420	2,100	451								75,801
Total	5,383,254	2,050,065	1,668,344	88,600	4,712,225	1,576,219	1,475,295	569,704	32,400	108,797	165,808,774
Off United Statse:											
Area XXII:											
Georges Bank	4,031,367	366,450	320,750	249,300	2,959,223	415,053	293,540	858,189		165,997	84,473,973
South Channel	376,125	144,905	33,942	2,070,680	628,920	315	56,910	3,893,487	4,000	42,105	20,055,730
Off Highland Light	232,089	5,982	653	100,175	41,298		87,503	8,679,855		1,547	9,545,569
Off Chatham	4,225	240	2,707	7,732,116	28,560	484	2,495	801,300		48,090	9,213,947
Nantucket Shoals	1,610		67	419,785	19,335	96,534	30	4,500		18,365	706,821
Cashes Bank	73,963	1,023,422	5,675		4,365		3,745			1,386	3,264,384
Fippenies Bank	3,020	60,920	1,062				320	335		45	264,172
Platts Bank	1,245	45,410	299							80	110,439
Jeffreys Ledge	3,215	52,935	2,268				145			55	203,523
Middle Bank (Stellwagen)	17,635	78,320	2,630	658,525	2,500		1,695	94,000		1,505	1,418,975
Shore, general	17,756,843	1,690,701	15,971	16,321,494	5,634,961	43,174	364,711	2,209,127	88,135	2,614,418	63,786,339
Area XXIII:											
South	1,100	750	545	13,230,371	369,945	11,450	400			116,082	14,126,778
Total	22,502,437	3,470,035	386,575	40,842,446	9,689,107	567,010	811,494	16,540,793	92,135	3,009,675	207,170,650
Grand total	27,885,691	5,524,800	2,349,650	40,931,046	14,401,332	2,143,529	2,286,789	17,110,497	2,615,222	3,118,472	376,277,640

NOTE.—The weight of salted fish landed has been converted to the equivalent of fresh fish as landed. The roman numerals appearing in the stub of the above table refer to the numbers given these regions by the North American Council on Fishery Investigations.

Days' absence from port of fishing vessels landing fish at Boston and Gloucester, Mass., and Portland, Maine, 1935

Fishing grounds	January	February	March	April	May	June	July	August	September	October	November	December	Total
Off Newfoundland:													
Area XIX:													
Bay of Islands	174				38							96	308
Off Newfoundland (Treaty Coast)												30	30
Area XX:													
Grand Bank			69	186		20		22					297
Green Bank									6				6
St. Peters Bank		22	27										49
Total	174	22	96	186	38	20		22	6			126	690
Off Canada:													
Area XIX:													
Gulf of St. Lawrence						72	189	59	100	24		26	470
Area XXI:													
Quereau Bank	117				206	140	352	206	230	106	337	110	1,804
The Gully								75					75
Sable Island Bank (Western Bank)	1,511	1,308	1,474	1,110	996	475	235	431	353	360	148	464	8,865
Cape Shore	174	37		8	38	91	43	34	740	94	304	338	1,901
Emerald Bank				22								10	32
La Have Bank	5	52	49	111	54		12	10	50	84	5		432
Roseway Bank	15									10			25
Browns Bank	403	333	407	1,125	376	144	670	1,069	391	149	74	160	5,301
Area XXII:													
Bay of Fundy										17			17
Total	2,225	1,730	1,930	2,376	1,670	922	1,501	1,884	1,864	844	868	1,108	18,922
Off United States:													
Area XXII:													
Georges Bank	313	536	501	173	683	1,077	1,695	858	1,096	1,422	1,108	1,441	10,893
South Channel	64	30	108	38	176	307	386	436	319	351	167	16	2,398
Off Highland Light	19	24	7		32	4	68	103	113	251	109	15	745
Off Chatham			4	7	49	8	475	266	114				923
Nantucket Shoals						3	19	101	55	12	5		195
Cashes Bank	28	33	27	70	146	36	11	15	19	92	52	84	613
Fippenies Bank		18	4	5	21	5	10						63
Platts Bank	10	14	5										29
Jeffreys Ledge	10	16	4	21								10	61
Middle Bank (Stellwagen)	8	26	40	19	7	41	6	15		6	11	8	187
Shore, general	675	725	1,205	1,218	1,408	1,851	1,442	1,543	1,463	1,593	1,291	1,329	15,743
Area XXIII:													
South					289	401	3	269	500	234	72	34	1,802
Total	1,127	1,422	1,905	1,551	2,811	3,733	4,115	3,606	3,669	3,961	2,815	2,937	33,652
Grand total	3,526	3,174	3,931	4,113	4,519	4,675	5,616	5,512	5,539	4,805	3,683	4,171	53,264

NOTE.—The roman numerals appearing in the stub of the above table refer to the numbers given these areas by the North American Council on Fishery Investigations.

MACKEREL FISHERY OF THE ATLANTIC COAST [7]

Unlike the previous 2 years, in 1935 the mackerel fleet operated without quota restrictions of any kind and landed 53,142,300 pounds of mackerel, an increase of 32 percent as compared with the corresponding statistics of the preceding year, and the largest catch to be recorded since 1885. An unusual feature of this year's activity was the catching of important quantities of mackerel in the waters off southern New England in the autumn.

Of the total landings, about 11,000,000 pounds consisted of tinker size (under one pound each) and 42,000,000 pounds were of larger sizes. Practically all of the tinker mackerel were taken after the first of August. There were also landed 4,050 pounds of bull's-eye mackerel and 97,052 pounds of frigate mackerel.

Mackerel fishery of the Atlantic coast, 1935

CATCH: BY AREAS IN 5-DAY PERIODS

Date	Southern (area XXIII,)		Block Island (area XXII, west of Nantucket Shoals)		Gulf of Maine (area XXII, north of Nantucket Shoals)		Total
	Seiners	Netters	Seiners	Netters	Seiners	Netters	
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Apr. 6–10	32,000						32,000
Apr. 16–20	90,800	100					90,900
Apr. 21–25	475,600	113,700					589,300
Apr. 26–30	718,400	66,600					785,000
May 1–5	1,170,100						1,170,100
May 6–10	1,560,000	15,800					1,575,800
May 11–15	723,900	166,900					890,800
May 16–20	52,500	211,200	76,000	5,100			344,800
May 21–25		93,200	415,100	21,400			529,700
May 26–31	79,600	53,000	1,326,200	39,700			1,498,500
June 1–5		4,400	3,217,900	19,700	900		3,242,900
June 6–10			2,606,000	3,300		3,100	2,612,400
June 11–15			1,856,100	10,100	3,300	13,900	1,883,400
June 16–20			2,005,000	1,200	3,500		2,009,700
June 21–25			650,800		1,093,700		1,744,500
June 26–30					1,971,800		1,971,800
July 1–5					919,300	100	919,400
July 6–10					1,152,700	1,500	1,154,200
July 11–15					2,908,600	200	2,908,800
July 16–20					2,180,200		2,180,200
July 21–25					2,261,100		2,261,100
July 26–31					2,947,900		2,947,900
Aug. 1–5					1,353,900	100	1,354,000
Aug. 6–10					988,300		988,300
Aug. 11–15					1,865,300		1,865,300
Aug. 16–20					1,644,800		1,644,800
Aug. 21–25					550,900		550,900
Aug. 26–31			319,500		1,842,700	400	2,162,600
Sept. 1–5			402,600		1,561,000		1,963,600
Sept. 6–10			82,900		602,900		685,800
Sept. 11–15			4,000		586,300		590,300
Sept. 16–20			148,100		466,400		614,500
Sept. 21–25			393,700		333,400		727,100
Sept. 26–30			817,900		16,000		833,900
Oct. 1–5			568,100		193,000		761,100
Oct. 6–10			327,600		27,500		355,100
Oct. 11–15			56,500		7,000		63,500
Oct. 16–20			281,000		33,600	800	315,400
Oct. 21–25			759,200		5,600		764,800
Oct. 26–31			1,734,200		21,900		1,756,100
Nov. 1–5			282,700			2,500	285,200
Nov. 6–10			562,300			6,700	569,000
Nov. 11–15						5,100	5,100
Nov. 16–20			13,900			13,000	26,900
Nov. 21–25			121,700			74,700	196,400
Nov. 26–30			74,900			79,100	154,000

[7] This section, prepared by O. E. Sette of the Division of Scientific Inquiry, includes the landings at Cape May and Wildwood, N. J.; New York, N. Y.; Newport, R. I.; New Bedford, Woods Hole, Provincetown, Boston, and Gloucester, Mass.; and Portland and Boothbay Harbor, Maine, by purse-seine vessels, "seiners", and drift-gill-net vessels, "netters"; and such boats as fish by the same methods and on the same grounds as the vessels. It does not include the catch of the smaller boats or the catch by other forms of gear.

Mackerel fishery of the Atlantic coast, 1936—Continued

CATCH: BY AREAS IN 5-DAY PERIODS—Continued

Date	Southern (area XXIII)		Block Island (area XXII, west of Nantucket Shoals)		Gulf of Maine (area XXII, north of Nantucket Shoals)		Total
	Seiners	Netters	Seiners	Netters	Seiners	Netters	
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Dec. 1-5			86,200			201,800	288,000
Dec. 6-10						10,700	10,700
Dec. 11-15						99,400	99,400
Dec. 16-20						143,800	143,800
Dec. 21-25						23,500	23,500
Total	4,902,900	724,900	19,190,100	100,500	27,543,500	680,400	53,142,300

NOTE.—The roman numerals appearing in the boxhead of the above table refer to the numbers given these areas by the North American Council on Fishery Investigations.

OPERATING UNITS AND CATCH: BY FLEET CLASSIFICATION AND GROUNDS

Designation	Vessels and boats	Tonnage	Crew	Trips	Total catch
SOUTHERN—AREA XXIII					
Seiners:	*Number*	*Net tons*	*Number*	*Number*	*Pounds*
Regular vessels	34	1,411	436	242	4,589,600
Miscellaneous vessels	8	351	101	11	313,300
Netters:					
Regular vessels	12	248	83	76	632,900
Miscellaneous boats	16			26	92,000
Total	[1] 54	2,010	620	355	5,627,800
BLOCK ISLAND—AREA XXII (West of Nantucket Shoals only)					
Seiners:					
Spring:					
Regular vessels	53	2,043	658	356	11,834,300
Miscellaneous vessels	5	110	46	10	165,900
Miscellaneous boats	2			10	152,900
Fall:					
Regular vessels	33	1,354	423	345	6,566,300
Miscellaneous vessels	12	483	154	29	470,700
Netters:					
Spring:					
Miscellaneous vessels	10	160	60	22	91,500
Miscellaneous boats	2			4	9,000
Total	[1] 70	4,150	1,341	776	19,290,600
GULF OF MAINE—AREA XXII (North of Nantucket Shoals only)					
Seiners:					
Regular vessels	47	1,873	600	937	24,486,200
Miscellaneous vessels	35	582	271	263	2,709,300
Miscellaneous boats	12			37	288,000
Netters:					
Summer:					
Miscellaneous vessels	5	58	24	8	300
Miscellaneous boats	10			12	19,000
Fall:					
Regular vessels	21	487	153	175	620,700
Miscellaneous vessels	6	97	42	11	15,100
Miscellaneous boats	6			23	25,300
Total	[1] 99	3,097	1,090	1,466	28,223,900
Total seiners	[1] 82			2,240	51,636,500
Total netters	[1] 41			357	1,505,800
Grand total	[1] 108			2,597	53,142,300

[1] Exclusive of duplication and of boats.

NOTE.—The roman numerals appearing in the stub of the above table refer to the numbers given these areas by the North American Council on Fishery Investigations.

FISHERIES OF THE MIDDLE ATLANTIC STATES

(Area XXIII)[1]

The yield of the commercial fisheries of the Middle Atlantic States (New York, New Jersey, Pennsylvania, and Delaware), during 1935 amounted to 279,438,100 pounds, valued at $6,415,664 to the fishermen, representing an increase of 65 percent in volume and 33 percent in value as compared with the catch in 1933, the most recent previous year for which catch statistics are available. These fisheries gave employment to 9,620 fishermen, as compared with 8,574 in 1933.

There were 408 fishery wholesale and manufacturing establishments in the 4 States in 1935 as compared with 398 in 1933 when the most recent previous survey was made. In 1935 these establishments employed 6,143 persons, paid $6,666,507 in salaries and wages, and produced manufactured products (canned, cured, packaged, and byproducts), valued at $13,441,812. In 1933 the wholesale and manufacturing firms employed 5,631 persons, paid $6,085,981 in salaries and wages, and produced manufactured products valued at $11,219,966.

Fisheries of the Middle Atlantic States, 1935

SUMMARY OF CATCH

Product	New York		New Jersey		Pennsylvania	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Fish	71,294,600	$1,213,121	89,363,300	$1,345,298	31,000	$5,660
Shellfish, etc.	13,644,700	1,922,239	18,438,900	1,498,979	----------	----------
Total	84,939,300	3,135,360	107,802,200	2,844,277	31,000	5,660

Product	Delaware		Total	
	Pounds	*Value*	*Pounds*	*Value*
Fish	85,038,700	$339,993	245,727,600	$2,904,072
Shellfish, etc.	1,626,900	90,374	33,710,500	3,511,592
Total	86,665,600	430,367	279,438,100	6,415,664

OPERATING UNITS: BY STATES

Item	New York	New Jersey	Pennsylvania	Delaware	Total
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	930	1,039	----------	530	2,499
On boats and shore:					
Regular	1,219	1,391	----------	32	2,642
Casual	2,213	1,870	41	355	4,479
Total	4,362	4,300	41	917	9,620
Vessels:					
Steam	4	3	----------	12	19
Net tonnage	485	150	----------	1,455	2,090
Motor	170	185	----------	13	368
Net tonnage	2,579	3,026	----------	229	5,834
Sail	2	2	----------	----------	4
Net tonnage	12	17	----------	----------	29
Total vessels	176	190	----------	25	391
Total net tonnage	3,076	3,193	----------	1,684	7,953

[1] This is the number given to this area by the North American Council on Fishery Investigations. It should be explained that there are included in this area craft whose principal fishing ports are in the area but at times fish elsewhere. A notable example is the southern trawl fishery which extends into area XXIV. It should be observed that the persons engaged, gear and craft employed, and catch of the seed oyster fishery are not included among the statistics of the fishery for market oysters and other species but are shown in separate tables in this section. For a clearer understanding of the statistics published in this section, the reader is referred to the section in the latter part of this document entitled "Statistical survey procedure."

Fisheries of the Middle Atlantic States, 1935—Continued

OPERATING UNITS: BY STATES—Continued

Item	New York	New Jersey	Pennsylvania	Delaware	Total
Boats:	*Number*	*Number*	*Number*	*Number*	*Number*
Motor	750	1,036		44	1,830
Other	1,498	1,605	10	138	3,251
Accessory boats	85	56		36	177
Apparatus:					
Purse seines:					
Mackerel	2				2
Length, yards	1,000				1,000
Menhaden	11	5		12	28
Length, yards	3,840	1,816		6,699	12,355
Other	3	5			8
Length, yards	910	1,820			2,730
Haul seines	81	108	10	61	260
Length, yards	11,901	9,203	1,955	17,955	41,014
Gill nets:					
Anchor	101	3			104
Square yards	39,670	2,500			42,170
Drift	151	891		40	1,082
Square yards	354,750	480,662		117,875	953,287
Runaround	35	60		13	108
Square yards	79,179	181,550		3,960	264,709
Stake	135	160		30	325
Square yards	36,920	38,038		13,020	87,978
Lines:					
Hand	159	600		28	787
Hooks and baits	159	894		44	1,097
Trawl	2,646	373			3,019
Hooks	185,900	233,400			419,300
Troll		451			451
Hooks		451			451
Trot with baits or snoods	58	16			74
Baits or snoods	37,400	13,215			50,615
Trot with hooks	14				14
Hooks	2,550				2,550
Pound nets	295	156		22	473
Weirs		104			104
Stop nets	1	56		11	68
Square yards	121	54,600		1,330	56,051
Fyke nets	526	872		257	1,655
Dip nets	140	45		64	249
Cast nets		3		1	4
Scap nets	198				198
Drag nets	1	22			23
Yards at mouth	2	44			46
Drop nets		15			15
Otter trawls:					
Fish	106	66		1	173
Yards at mouth	2,447	1,526		23	3,996
Shrimp	1	1			2
Yards at mouth	23	32			55
Wire baskets		25			25
Pots:					
Crab		10			10
Eel	3,287	1,717		345	5,349
Fish	300	8,191			8,491
Lobster	5,179	12,155		115	17,449
Harpoons	25				25
Spears	146	42			188
Dredges:					
Clam	12	38		18	68
Yards at mouth	10	40		19	69
Crab	2	47		12	61
Yards at mouth	4	51		14	69
Mussel	9				9
Yards at mouth	9				9
Oyster	112	220		14	346
Yards at mouth	167	265		17	449
Scallop	473	17			490
Yards at mouth	540	57			597
Tongs:					
Oyster	361	100			461
Other	1,198	842		2	2,042
Rakes:					
Oyster		23			23
Other	376	1,286			1,662
Forks	534	14			548
Hoes		201			201
Gaffs		1			1

Fisheries of the Middle Atlantic States, 1935

CATCH: BY STATES

Species	New York		New Jersey		Pennsylvania		Delaware		Total	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	358,600	$4,383	41,300	$233			154,900	$2,050	554,800	$6,666
Bluefish	1,002,700	74,296	1,959,900	117,649			13,800	1,113	2,976,400	193,058
Bonito	207,300	6,155	93,600	3,254			100	2	301,000	9,411
Butterfish	2,817,800	120,150	3,619,200	146,132			600	24	6,437,600	266,306
Carp	185,100	14,006	233,700	16,385	5,100	$408	70,200	5,095	494,100	35,894
Catfish and bullheads	26,900	3,401	45,300	2,710			48,400	1,735	120,600	7,846
Cod	1,037,500	54,756	818,500	29,387					1,856,000	84,143
Crevalle			900	9					900	9
Croaker	84,200	1,336	7,367,000	118,730			590,800	7,538	8,042,000	127,604
Cunners			3,400	34					3,400	34
Drum:										
Black			9,300	101					9,300	101
Red or redfish			39,100	896			100	2	39,200	897
Eels:										
Common	313,200	41,685	250,500	20,914			54,900	6,081	618,600	68,680
Conger	4,000	99	16,400	405			300	4	20,700	508
Flounders	5,978,800	309,731	3,248,500	203,155			24,200	1,104	9,251,500	513,990
Frigate mackerel	49,200	862	108,500	1,272					157,700	2,134
Gizzard shad							1,600	45	1,600	45
Goosefish	58,100	1,126	13,100	65					71,200	1,191
Grayfish	68,900	1,002	44,600	891			2,000	160	115,500	2,053
Groupers			2,500	99					2,500	99
Haddock	1,323,000	60,749							1,323,000	60,749
Hake	170,400	4,389	33,700	637			5,000	28	209,100	5,054
Herring, sea	75,200	1,457	258,600	1,745					333,800	3,202
Hickory shad	1,000	24	2,500	25					3,500	49
Kingfish or "king mackerel"			13,000	533					13,000	533
King whiting or "kingfish"	23,800	2,338	46,200	2,451			700	23	70,700	4,812
Launce			1,900	254					1,900	254
Mackerel	1,510,900	40,868	1,570,800	50,376					3,081,700	91,244
Menhaden	46,390,700	89,387	49,757,700	92,623			83,454,600	292,091	179,603,000	474,101
Mullet			21,000	1,634			78,500	2,276	99,500	3,910
Mummichog	4,200	370	9,000	746					13,200	1,116
Pigfish			100	2					100	2
Pike or pickerel	100	6							100	6
Pollock	17,300	569	4,300	106					21,600	675
Pompano			4,100	1,230					4,100	1,230
Scup or porgy	1,898,300	47,288	5,185,000	87,293			12,200	205	7,095,500	134,786
Sea bass	411,700	29,243	1,655,500	76,313			21,900	548	2,089,100	106,104
Sea robin	46,500	1,298	45,100	460					91,600	1,758
Shad	476,000	39,563	818,000	83,687	10,200	3,996	24,700	4,544	1,328,900	131,790
Sharks	2,300	59	42,400	738					44,700	797

Silversides	68,400	2,675	1,200	600					69,600	3,275
Skates	47,700	836	84,200	646					131,900	1,482
Snapper, red			15,300	1,144					15,300	1,144
Spanish mackerel			23,600	1,723					23,600	1,723
Spot			17,700	538			1,500	75	19,200	613
Squeteagues or "sea trout":										
Gray	1,639,700	80,749	8,072,200	228,713			428,100	11,299	10,140,000	320,761
Spotted			2,700	120					2,700	120
Squirrel hake			25,100	253					25,100	253
Striped bass	37,100	4,781	7,700	1,247			16,700	2,207	61,500	8,235
Sturgeon	7,800	1,550	11,500	1,690			500	187	19,800	3,427
Suckers	18,800	1,325	54,000	3,324	15,700	1,256	600	18	89,100	5,923
Sunfish	1,000	59							1,000	59
Swellfish	5,000	250							5,000	250
Swordfish	42,600	8,850							42,600	8,850
Tautog	17,700	770	24,400	647			1,000	20	43,100	1,437
Thimble-eyed mackerel	600	6	244,600	3,526					245,200	3,532
Tilefish	2,494,200	94,100	100	6					2,494,300	94,106
Tomcod	7,300	131							7,300	131
Tuna or "horse mackerel"	6,100	350	18,000	793					24,100	1,143
Whitebait	9,100	1,035							9,100	1,035
White perch	55,900	2,798	35,200	3,038			22,000	1,203	113,100	7,039
Whiting	2,284,000	61,794	3,340,100	33,937			5,000	32	5,629,100	95,763
Yellow perch	7,900	466	1,500	180			3,800	284	13,200	930
Total	71,294,600	1,213,121	89,363,300	1,345,298	31,000	5,660	85,038,700	339,993	245,727,600	2,904,072
SHELLFISH, ETC.										
Crabs:										
Hard	464,300	13,767	481,000	20,617			351,900	5,886	1,297,200	40,270
King			2,633,300	8,521			502,000	753	3,135,300	9,274
Soft and peelers	125,200	25,720	205,500	67,686			59,300	13,237	390,000	106,643
Lobsters	420,500	87,167	218,800	50,754			4,100	1,025	643,400	138,946
Shrimp	84,700	3,827	109,300	9,367					194,000	13,194
Clams:										
Hard, public [1]	1,524,700	258,665	3,326,600	479,122			38,900	4,910	4,890,200	742,697
Hard, private [1]	120,000	22,155	136,900	21,162			69,500	8,110	326,400	51,427
Soft, public [2]	770,600	71,691	1,055,900	69,878					1,826,500	141,569
Soft, private [2]	8,000	1,000							8,000	1,000
Surf or skimmer	523,300	22,825	313,900	13,829					837,200	36,654
Conchs	8,600	955							8,600	955
Mussels, sea	82,500	4,629	2,900	90			13,000	1,000	98,400	5,719
Oysters: [3]										
Market, public, spring	119,700	17,165	10,400	1,860					130,100	19,025
Market, public, fall	209,200	30,387	6,400	1,110					215,600	31,497
Market, private, spring	2,039,500	342,130	4,110,400	340,015					6,149,900	682,145
Market, private, fall	3,398,700	579,605	4,335,000	360,744			581,400	54,989	8,315,100	995,338

[1] Statistics on hard clams are based on yields of 8 pounds of meats to the bushel in New York, 9.76 pounds in New Jersey, and 10 pounds in Delaware.
[2] Statistics on soft clams are based on yields of 16 pounds of meats to the bushel in New York, and 20 pounds in New Jersey.
[3] Statistics on oysters are based on yields of 7 pounds of meats to the bushel in New York, 8.91 pounds in New Jersey, and 7 pounds in Delaware.

Fisheries of the Middle Atlantic States, 1935—Continued

CATCH: BY STATES—Continued

Species	New York		New Jersey		Pennsylvania		Delaware		Total	
SHELLFISH, ETC.—continued	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Scallops:										
Bay	106,700	$35,593							106,700	$35,593
Sea	2,213,500	318,768	426,600	$25,316					2,640,100	344,084
Squid	1,371,200	39,265	1,050,400	28,081			1,400	$21	2,423,000	67,367
Turtles:										
Green			3,900	47					3,900	47
Hawksbill			200	2					200	2
Loggerhead			3,900	69					3,900	69
Snapper			7,200	374			5,400	443	12,600	817
Bloodworms	24,300	20,125	100	94					24,400	20,219
Sandworms	29,500	26,800	300	241			*		29,800	27,041
Total	13,644,700	1,922,239	18,438,900	1,498,979			1,626,900	90,374	33,710,500	3,511,592
Grand total	84,939,300	3,135,360	107,802,200	2,844,277	31,000	$5,660	86,665,600	430,367	279,438,100	6,415,664

NOTE.—Of the total catch in New York, 7,200 pounds of shrimp, valued at $727, were taken off Florida, and 131,200 pounds of fishery products, valued at $5,932, were taken in the southern trawl fishery off southern New Jersey, Maryland, Virginia, and North Carolina. Of the total catch in New Jersey, 46,800 pounds of bluefish, valued at $3,144; 4,100 pounds of pompano, valued at $1,230; 15,000 pounds of Spanish mackerel, valued at $1,200; 2,700 pounds of spotted squeteagues, valued at $120; and 95,000 pounds of shrimp, valued at $6,780, were taken off Florida while 2,520,800 pounds of fishery products, valued at $90,727, were taken in the southern trawl fishery. Of the total catch in Delaware 220,500 pounds of fishery products, valued at $5,007, were taken in the southern trawl fishery. The products of the southern trawl fishery consist principally of butterfish, croaker, flounders, scup, sea bass, gray squeteagues, and whiting.

SUPPLEMENTARY TABLE SHOWING THE PRODUCTION OF CERTAIN SHELLFISH IN NUMBER AND BUSHELS

Product	New York		New Jersey		Delaware		Total	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Crabs:								
Hard.....number	1,392,900	$13,767	1,443,000	$20,617	1,055,700	$5,886	3,891,600	$40,270
King.....do	.....	.....	658,325	8,521	125,500	753	783,825	9,274
Soft and peelers.....do	500,800	25,720	822,000	67,686	237,200	13,237	1,560,000	106,643
Clams:								
Hard, public.....bushels	190,588	358,665	340,840	479,122	3,890	4,910	535,318	742,697
Hard, private.....do	15,000	22,155	14,027	21,162	6,950	8,110	35,977	51,427
Soft, public.....do	48,162	71,691	52,795	69,878	.....	.....	100,957	141,569
Soft, private.....do	500	1,000	.....	.....	.....	.....	500	1,000
Surf or skimmer.....do	43,608	22,825	25,112	13,829	.....	.....	68,720	36,654
Conchs.....do	478	955	.....	.....	.....	.....	478	955
Mussels, sea.....do	8,250	4,629	223	90	1,000	1,000	9,473	5,719
Oysters:								
Market, public, spring.....do	17,100	17,165	1,167	1,860	.....	.....	18,267	19,025
Market, public, fall.....do	29,886	30,387	718	1,110	.....	.....	30,604	31,497
Market, private, spring.....do	291,357	342,130	461,324	340,015	.....	.....	752,681	682,145
Market, private, fall.....do	485,529	579,605	486,532	360,744	83,057	54,989	1,055,118	995,338
Scallops:								
Bay.....do	21,340	35,593	.....	.....	.....	.....	21,340	35,593
Sea.....do	368,917	318,768	72,551	25,316	.....	.....	441,468	344,084

SEED OYSTER FISHERY

Item	New York	New Jersey	Delaware	Total
OPERATING UNITS				
Fishermen:	*Number*	*Number*	*Number*	*Number*
On vessels	22	1,108	21	1,151
On boats and shore:				
Regular	7	67	.....	74
Casual	.....	98	56	154
Total	29	1,273	77	1,379
Vessels:				
Motor	5	.....	.....	5
Net tonnage	85	.....	.....	85
Sail	.....	106	3	109
Net tonnage	.....	2,207	39	2,246
Total vessels	5	106	3	114
Total net tonnage	85	2,207	39	2,331
Boats:				
Motor	4	68	1	73
Other	1	90	54	145
Apparatus:				
Dredges	10	214	6	230
Yards at mouth	14	262	7	283
Tongs	.....	146	56	202
Rakes	7	18	.....	25
CATCH				
Oysters:	*Bushels* / *Value*	*Bushels* / *Value*	*Bushels* / *Value*	*Bushels* / *Value*
Seed, public, spring	1,240 / $496	827,065 / $284,446	85,200 / $18,012	913,505 / $302,954
Seed, public, fall	..... /	24,465 / 6,502	..... /	24,465 / 6,502
Seed, private, spring	29,984 / 18,292	675 / 120	..... /	30,659 / 18,412
Seed, private, fall	10,540 / 10,005	675 / 123	..... /	11,215 / 10,128
Total	41,764 / 28,793	852,880 / 291,191	85,200 / 18,012	979,844 / 337,996

NOTE.—Of the total number of persons fishing for seed oysters, 1,260 are duplicated among those fishing for market oysters or other species. Similarly the following craft and gear are duplicated: 81 vessels, 33 motor boats, 19 other boats, 164 dredges, 34 tongs, and 8 rakes.

Industries related to the fisheries of the Middle Atlantic States, 1935

OPERATING UNITS, SALARIES, AND WAGES

Item	New York	New Jersey	Pennsylvania	Delaware	Total
Transporting:					
Persons engaged:	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	60	9			69
On boats	2	70			72
Total	62	79			141
Vessels, motor	19	4			23
Net tonnage	307	71			378
Boats	2	61			63
Wholesale and manufacturing:					
Establishments	221	123	47	17	408
Persons engaged:					
Proprietors	131	113	44	14	302
Salaried employees	787	146	110	28	1,071
Wage earners:					
Average for season	2,487	1,422	371	490	4,770
Average for year	2,097	892	319	177	3,485
Paid to salaried employees	$2,057,758	$305,516	$217,826	$23,946	$2,605,046
Paid to wage earners	$2,869,058	$786,618	$314,788	$90,997	$4,061,461
Total salaries and wages	$4,926,816	$1,092,134	$532,614	$114,943	$6,666,507
Fishermen manufacturing	485	73			558

PRODUCTS MANUFACTURED

Item	New York		New Jersey		Pennsylvania		Delaware	
By manufacturing establishments:	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Buffalofish, smoked, pounds	854,600	$215,950						
Butterfish, smoked, do	581,900	150,129	73,176	$22,363	(1)	(1)		
Carp, smoked, do			54,678	21,097				
Cisco, chubs, and tullibee, smoked, pounds	3,405,700	1,013,710	198,247	75,389	(1)	(1)		
Cod, fresh fillets, do	2,845,000	390,830	(1)	(1)				
Flounders, fresh fillets, pounds	1,287,000	224,980	(1)	(1)				
Haddock, fresh fillets, do	2,373,000	319,610	(1)	(1)				
Hake, fresh fillets, do	105,200	13,450	(1)	(1)				
Herring, sea, kippered, pounds	146,600	19,140			(1)	(1)		
Lake trout, smoked, do	205,400	64,601	(1)	(1)	(1)	(1)		
Mackerel, smoked, do	446,900	66,427	10,644	2,301	(1)	(1)		
Pollock, fresh fillets, do	145,100	17,010						
Paddlefish or spoonbill cat, smoked, pounds	312,000	128,945						
Salmon:								
Smoked, do	6,319,600	1,863,699	382,909	130,273	(1)	(1)		
Kippered, do	349,250	104,900	55,885	220,15	(1)	(1)		
Roe, canned, standard cases	986	23,294						
Shad, smoked, pounds	78,200	16,038	(1)	(1)	(1)	(1)		
Sturgeon:								
Smoked, do	1,252,900	846,700	(1)	(1)	(1)	(1)		
Caviar, canned, standard cases	2,832	389,063						
Whitefish:								
Smoked, pounds	1,505,100	450,246	166,927	54,267	(1)	(1)		
Caviar, canned, standard cases	367	11,264						

[1] The production of this item is included under "Unclassified products."

Industries related to the fisheries of the Middle Atlantic States, 1936—Continued

PRODUCTS MANUFACTURED—Continued

Item	New York		New Jersey		Pennsylvania		Delaware	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
By manufacturing establishments—Continued.								
Crab, king, scrap and meal tons			187	$4,744			(1)	(1)
Clams:								
Hard, fresh shucked gallons			(1)	(1)	3,750	$7,500		
Soft, fresh shucked gallons			16,400	16,190				
Marine-shell products:								
Buttons gross	1,054,838	$546,251	1,518,690	1,065,039	512,741	255,069		
Novelties		61,690		152,564				
Oysters, fresh shucked gallons	473,588	744,472	424,796	729,309	72,825	144,214	20,600	$26,100
Oyster-shell products:								
Poultry feed tons			7,395	55,230	4,236	35,212	(1)	(1)
Lime do			3,012	13,868	911	3,412	(1)	(1)
Unclassified products:								
Fillets, fresh and frozen pounds	[2] 88,000	[2] 19,890	(3)	(3)				
Smoked do	(3)	(3)	[4] 263,114	[4] 151,209	(3)	(3)		
Canned standard cases	[5] 14,660	[5] 155,407	(3)	(3)				
Miscellaneous		[6] 566,923		[7] 1,032,726		[8] 369,713		[9] 638,454
Total		8,424,619		3,548,584		815,120		664,554
By fishermen:								
Eels, smoked pounds	17,600	5,640	2,700	820				
Herring, sea, smoked do			4,000	160				
Mackerel, smoked do			400	40				
Whiting, smoked do			350	35				
Scallops:								
Bay, fresh shucked gallons	14,506	43,433						
Sea, fresh shucked gallons	229,203	271,328	46,799	51,349				
Crab meat, packaged, fresh cooked pounds			417	313				
King crab scrap tons			232	5,623				
Total		320,401		58,340				
Grand total		8,745,020		3,606,924		815,120		664,554

[1] The production of this item is included under "Unclassified producers."
[2] Includes fresh fillets of bluefish, halibut, mackerel, salmon, and wolffish.
[3] This has been included under "Miscellaneous."
[4] Includes smoked bluefish, cod, cod fillets and steaks, eels, flounders, goosefish, haddock, lake trout, shad, sturgeon, and sea herring (bloaters).
[5] Includes canned pickled eels, fish paste, clam products, pickled sea mussels, and terrapin, and turtle products.
[6] Includes smoked eels; halibut and swordfish liver oil; menhaden products; miscellaneous fish meal; and mussel-shell products.
[7] Includes fresh fillets of cod, flounders, haddock, and hake; canned oysters and clam products; salted boneless cod; fresh-shucked hard clams; menhaden products; and mussel-shell buttons.
[8] Includes smoked butterfish, chubs, haddock fillets, finnan haddie, sea herring (bloaters and kippers), lake trout, mackerel, salmon, shad, sturgeon, and whitefish; kippered salmon and shad; and miscellaneous fish scrap.
[9] Includes oyster-shell products, king crab scrap and meal, and menhaden products.

NOTE.—The total value of the manufactured products for the Middle Atlantic States was as follows: By manufacturing establishments, $13,452,877; and by fishermen, $378,741. Some of the above products may have been manufactured from fishery products imported from another State or a foreign country: therefore, they cannot be correlated directly with the catch within the State. Of the total number of persons engaged on transporting craft, 125 have been included as fishermen, and among the total number of persons engaged in the preparation of fishermen's prepared products, 552 have been included as fishermen.

NEW YORK

Fisheries of New York, 1935

OPERATING UNITS: BY GEAR

Item	Purse seines			Haul seines	Gill nets				Lines
	Mackerel	Menhaden	Other		Anchor	Drift	Run-around	Stake	Hand
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	16	237	16	-------	-------	-------	19	-------	123
On boats and shore:									
Regular	-------	-------	-------	58	41	66	55	11	37
Casual	-------	-------	3	96	62	207	4	71	3
Total	16	237	19	154	103	273	78	82	163
Vessels:									
Steam	-------	4	-------	-------	-------	-------	-------	-------	-------
Net tonnage	-------	485	-------	-------	-------	-------	-------	-------	-------
Motor	2	7	2	-------	-------	-------	4	-------	16
Net tonnage	65	159	41	-------	-------	-------	45	-------	249
Total vessels	2	11	2	-------	-------	-------	4	-------	16
Total net tonnage	65	644	41	-------	-------	-------	45	-------	249
Boats:									
Motor	-------	-------	-------	13	13	7	30	-------	19
Other	-------	-------	1	80	65	133	2	45	7
Accessory boats	2	22	2	-------	-------	-------	-------	-------	34
Apparatus:									
Number	2	11	3	81	101	151	35	135	159
Length, yards	1,000	3,840	910	11,901	-------	-------	-------	-------	-------
Square yards	-------	-------	-------	-------	39,670	354,750	79,179	36,920	-------
Hooks, baits, or snoods	-------	-------	-------	-------	-------	-------	-------	-------	159

Item	Lines—Continued			Pound nets	Stop nets	Fyke nets	Dip nets	Scap nets	Drag nets
	Trawl	Trot with baits or snoods	Trot with hooks						
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	90	-------	-------	-------	-------	-------	-------	-------	-------
On boats and shore:									
Regular	57	16	3	140	2	34	80	4	1
Casual	4	43	11	14	-------	58	60	194	-------
Total	151	59	14	154	2	92	140	198	1
Vessels, motor	9	-------	-------	-------	-------	-------	-------	-------	-------
Net tonnage	175	-------	-------	-------	-------	-------	-------	-------	-------
Boats:									
Motor	31	5	-------	32	-------	6	35	-------	1
Other	1	54	14	121	1	70	90	198	-------
Accessory boats	55	-------	-------	-------	-------	-------	-------	-------	-------
Apparatus:									
Number	2,646	58	14	295	1	526	140	198	1
Square yards	-------	-------	-------	-------	121	-------	-------	-------	-------
Yards at mouth	-------	-------	-------	-------	-------	-------	-------	-------	2
Hooks, baits, or snoods	185,900	37,400	2,550	-------	-------	-------	-------	-------	-------

Fisheries of New York, 1936—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Otter trawls		Pots			Harpoons	Spears	Dredges	
	Fish	Shrimp	Eel	Fish	Lobster			Clam	Crab
	Number	Number	Number	Number	Number	Number	Number	Number	Number
Fishermen:									
On vessels	226		2		3	29		12	3
On boats and shore:									
Regular	82	2	62	24	126	27	66	11	
Casual	2		37		22	2	80		
Total	310	2	101	24	151	58	146	23	3
Vessels, motor	62				1	1		6	1
Net tonnage	877				8	10		63	13
Boats:									
Motor	44	1	25	12	85	14	2	6	
Other			63		17	1	15		
Accessory boats						3			
Apparatus:									
Number	106	1	3,287	300	5,179	25	146	12	2
Yards at mouth	2,447	23						10	4

Item	Dredges—Continued			Tongs		Rakes, other than for oysters	Forks	By hand, other than for oysters	Total, exclusive of duplication
	Mussel	Oyster	Scallop	Oyster	Other				
	Number	Number	Number	Number	Number	Number	Number	Number	Number
Fishermen:									
On vessels	3	175	206	37	64				930
On boats and shore:									
Regular	10	37	82	192	409	149	240	27	1,219
Casual			360	132	744	289	294	18	2,213
Total	13	212	648	361	1,217	438	534	45	4,362
Vessels:									
Steam									4
Net tonnage									485
Motor	1	36	32	11	9				170
Net tonnage	13	647	610	61	69				2,579
Sail			2						2
Net tonnage			12						12
Total vessels	1	36	34	11	9				176
Total net tonnage	13	647	622	61	69				3,076
Boats:									
Motor	6	17	1	131	383	154			750
Other			235	84	419	143	1		1,498
Accessory boats									85
Apparatus:									
Number	9	112	473	361	1,198	376	534		
Yards at mouth	9	167	540						

Fisheries of New York, 1935—Continued

CATCH: BY GEAR

Species	Purse seines						Haul seines		Gill nets	
	Mackerel		Menhaden		Other				Anchor	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives							154,700	$1,420	2,600	$44
Bluefish							200	18	28,500	2,701
Butterfish					200	$10			300	21
Carp							54,100	3,919	1,800	102
Catfish and bullheads							4,400	595		
Croaker					1,500	14			300	10
Eels, common							17,700	1,452		
Flounders							15,000	300		
King whiting or "kingfish"							1,700	234	200	36
Mackerel	73,000	$1,820			5,000	150			1,500	150
Menhaden			45,992,800	$88,217						
Mummichog							1,000	115		
Scup or porgy					100,600	772	31,500	1,083	1,200	36
Sea bass					800	21				
Shad							10,200	874	9,300	773
Sharks									500	18
Silversides							68,400	2,675		
Squeteagues or "sea trout", gray					315,800	3,830	119,800	7,870	28,300	1,893
Striped bass							8,300	1,064	5,300	973
Sturgeon							100	20	4,600	1,079
Suckers							2,600	171	200	15
Thimble-eyed mackerel					600	6				
Whitebait							9,100	1,035		
White perch							200	15	21,400	1,100
Yellow perch							300	21	4,500	237
Crabs, hard							4,000	150		
Total	73,000	1,820	45,992,800	88,217	424,500	4,803	503,300	23,031	110,000	9,188

Species	Gill nets—Continued						Lines			
	Drift		Runaround		Stake		Hand		Trawl	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	39,300	$624			600	$8				
Bluefish			148,200	$10,669			665,600	$50,131		
Butterfish			17,900	1,152						
Carp	27,000	2,171			60,200	4,231				
Catfish and bullheads	600	28			600	60				
Cod							2,000	154	340,400	$19,647
Flounders							1,000	40		
Haddock									300	15
Herring, sea			200	6						
King whiting or "kingfish"							100	10		
Mackerel	59,500	1,835	27,000	700			4,500	175		
Pollock							10,900	425	5,000	100
Scup or porgy							7,600	246		
Sea bass							19,400	2,014		
Shad	424,000	35,658			2,000	184				
Squeteagues or "sea trout", gray			129,700	7,588			13,300	1,272	11,000	870
Striped bass	5,400	720	300	30	4,600	673				
Sturgeon	400	64			2,000	255				
Suckers	100	6			1,600	128				
Tautog							300	12		
Tilefish									2,494,200	94,100
White perch	2,200	61			23,900	1,095				
Yellow perch	2,300	129			200	20				
Crabs, hard							3,000	187		
Total	560,800	41,296	323,300	20,145	95,700	6,622	727,700	54,666	2,850,900	114,732

Fisheries of New York, 1935—Continued

CATCH: BY GEAR—Continued

Species	Lines—Continued				Pound nets		Stop nets		Fyke nets	
	Trot with baits or snoods		Trot with hooks							
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives					600	$15			77,200	$665
Bluefish					159,800	10,737				
Bonito					207,300	6,155				
Butterfish					2,605,400	106,345				
Carp			200	$12			4,800	$384	11,000	975
Catfish and bullheads			200	23					20,300	2,599
Cod					1,800	104				
Croaker					200	7				
Eels:										
Common			1,200	148	69,000	12,276			9,700	1,189
Conger					2,500	75				
Flounders					192,300	10,175			80,000	2,460
Frigate mackerel					49,200	862				
Grayfish					3,800	95				
Herring, sea					22,800	567				
Hickory shad					1,000	24				
King whiting or "king-fish"					17,300	1,823				
Mackerel					1,340,100	36,017				
Menhaden					397,900	1,170				
Pike or pickerel									100	6
Pollock					1,400	44				
Scup or porgy					874,900	21,363				
Sea bass					59,900	6,381				
Sea robin					16,500	613				
Shad					21,900	1,412	800	60	5,500	475
Sharks					1,300	36				
Skates					5,600	70				
Squeteagues or "sea trout", gray					1,000,900	56,250				
Striped bass					12,900	1,267			300	54
Sturgeon					400	96				
Suckers									8,800	688
Sunfish									1,000	59
Swellfish					5,000	250				
Tautog					17,200	720			200	38
Tomcod									7,300	131
Tuna or "horse mackerel"					6,100	350				
White perch									7,300	508
Whiting					263,500	7,711				
Yellow perch									500	50
Crabs, hard	377,600	$10,870			24,600	622			900	23
Squid					941,800	23,100				
Total	377,600	10,870	1,600	183	8,324,900	306,732	5,600	444	230,100	9,916

Fisheries of New York, 1935—Continued

CATCH: BY GEAR—Continued

Species	Dip nets		Scap nets		Drag nets		Otter trawls			
							Fish		Shrimp	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			83,600	$1,607						
Bluefish							400	$40		
Butterfish							194,000	12,622		
Carp			26,500	2,211						
Catfish and bullheads			800	96						
Cod							693,300	34,851		
Croaker							82,200	1,305		
Eels, conger							1,500	24		
Flounders							5,690,500	296,756		
Goosefish							58,100	1,126		
Grayfish							65,100	907		
Haddock							1,322,700	60,734		
Hake							170,400	4,389		
Herring, sea							52,200	884		
King whiting or "king-fish"							4,500	235		
Mackerel							300	21		
Scup or porgy							882,500	23,788		
Sea bass							209,100	14,749		
Sea robin							30,000	685		
Shad			2,300	127						
Sharks							500	5		
Skates							42,100	766		
Squeteagues or "sea trout", gray							20,900	1,176		
Sturgeon							300	36		
Suckers			5,500	324						
White perch			900	49						
Whiting							2,020,500	54,083		
Yellow perch			100	9						
Crabs:										
Hard	51,000	$1,815								
Soft and peelers	125,200	25,720								
Lobsters							2,300	343		
Shrimp					2,500	$500	7,200	727	75,000	$2,600
Conchs							5,000	555		
Scallops, sea							1,000	200		
Squid							429,400	16,165		
Total	176,200	27,535	119,700	4,423	2,500	500	11,986,000	527,172	75,000	2,600

Species	Pots						Harpoons		Spears	
	Eel		Fish		Lobster					
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Eels, common	133,700	$12,447							49,900	$7,133
Mummichog	3,200	255								
Sea bass			88,800	$4,525	33,700	$1,553				
Swordfish							42,600	$8,850		
Lobsters			8,300	2,075	409,900	84,749				
Total	136,900	12,702	97,100	6,600	443,600	86,302	42,600	8,850	49,900	7,133

Fisheries of New York, 1935—Continued

CATCH: BY GEAR—Continued

Species	Dredges									
	Clam		Crab		Mussel		Oyster		Scallop	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crabs, hard			8,200	$100						
Clams, surf or skimmer	499,200	$20,800								
Conchs	3,600	400								
Mussels, sea					49,800	$3,000				
Oysters:										
Market, private, spring							1,990,500	$334,930		
Market, private, fall							3,298,000	564,750		
Scallops:										
Bay									106,700	$35,593
Sea									2,212,500	318,568
Total	502,800	21,200	8,200	100	49,800	3,000	5,288,500	899,680	2,319,200	354,161

Species	Tongs		Rakes		Forks		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Eels, common			32,000	$7,040				
Clams:								
Hard, public	1,287,500	$217,335	237,200	41,330				
Hard, private	120,000	22,155						
Soft, public			303,200	28,260	467,400	$43,431		
Soft, private					8,000	1,000		
Surf or skimmer	24,100	2,025						
Mussels, sea							32,700	$1,629
Oysters:								
Market, public, spring	119,700	17,165						
Market, public, fall	209,200	30,387						
Market, private, spring	49,000	7,200						
Market, private, fall	100,700	14,855						
Bloodworms					24,300	20,125		
Sandworms					29,500	26,800		
Total	1,910,200	311,122	572,400	76,630	529,200	91,356	32,700	1,629

Fisheries of New York, 1935—Continued

OPERATING UNITS: BY COUNTIES

Item	Albany	Columbia	Dutchess	Greene	Kings	Nassau	New York	Orange	Putnam	Rensselaer	Richmond	Rockland	Suffolk	Ulster	Westchester
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels					255	57	85				11		522		
On boats and shore:															
Regular		6	9	6	111	236		2				10	801	20	18
Casual	10	64	109	47	29	410		31	3	19		72	1,167	178	74
Total	10	70	118	53	395	703	85	33	3	19	11	82	2,490	198	92
Vessels:															
Steam													4		
Net tonnage													485		
Motor					51	14	10				3		92		
Net tonnage					790	217	319				34		1,219		
Sail													2		
Net tonnage													12		
Total vessels					51	14	10				3		98		
Total net tonnage					790	217	319				34		1,716		
Boats:															
Motor					52	173							525		
Other	8	56	91	37	18	261		24	2	13		48	749	131	60
Accessory boats					28	1	34					22			
Apparatus:															
Purse seines:															
Mackerel					1		1								
Length, yards					500		500								
Menhaden													11		
Length, yards													3,840		
Other					1	1							1		
Length, yards					400	300							210		
Haul seines	2	5	9	6	2	6		5		5		3	26	10	2
Length, yards	96	590	962	1,175	19	200		700		542		292	5,404	1,622	299
Gill nets:															
Anchor			6									32	48	1	14
Square yards			2,075									4,215	32,130	50	1,200
Drift		8	23	2		6		7	1	1		17	4	61	21
Square yards		12,000	52,000	2,400		44,500		15,200	2,200	2,000		42,200	1,600	122,150	58,500
Runaround					1	21							13		
Square yards					8,000	53,200							17,979		
Stake		4		10								2		12	107
Square yards		9,550		16,930								970		6,600	3,050

Lines:															
Hand					80	3	40				3		33		
Hooks and baits					80	3	• 40				3		33		
Trawl					870	588	1,120						68		
Hooks					54,800	45,200	56,000						29,900		
Trot with baits or snoods													58		
Baits or snoods													37,400		
Trot with hooks			1					3	1			1		6	2
Hooks			100					700	100			250		900	500
Pound nets						4							291		
Stop nets				1											
Square yards				121											
Fyke nets	24	97	39	17				4	2	6		1	207	96	33
Dip nets						115							25		
Scap nets	5	36	58	17				8	1	5		2		62	4
Drag nets													1		
Yards at mouth													2		
Otter trawls:															
Fish					42	9	4				1		50		
Yards at mouth					973	213	113				22		1,126		
Shrimp						1									
Yards at mouth						23									
Pots:															
Eel		2			216	420						85	2,498	6	60
Fish						300									
Lobster					200	1,310							3,669		
Harpoons					2		1						22		
Spears					8	91							47		
Dredges:															
Clam					10	2									
Yards at mouth					8	2									
Crab					2										
Yards at mouth					4										
Mussel						2							7		
Yards at mouth						2							7		
Oyster						16	2						94		
Yards at mouth						20	3						144		
Scallop					40	4	8				2		419		
Yards at mouth					135	13	24				7		361		
Tongs:															
Oyster						93							268		
Other						361							836		1
Rakes, other than for oysters					16	69							291		
Forks						204							329		1

Fisheries of New York, 1935—Continued

CATCH: BY COUNTIES

Species	Albany		Columbia		Dutchess		Greene	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	7,800	$157	43,700	$782	42,900	$760	5,200	$102
Carp	4,100	234	14,900	967	14,200	1,217	40,400	2,906
Catfish and bullheads	1,300	157	7,400	1,040	4,900	573	2,100	229
Eels, common			400	41	100	9	400	33
Shad			23,200	1,324	105,500	7,556	5,200	360
Striped bass					100	11	800	80
Sturgeon			100	28	1,800	450		
Suckers	2,600	147	5,100	359	2,400	174	800	54
Sunfish					800	44		
White perch			1,600	151	3,700	253		
Yellow perch					100	9		
Total	15,800	695	96,400	4,692	176,500	11,056	54,900	3,764

Species	Kings		Nassau		New York	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish	426,200	$31,070	111,100	$7,369	174,600	$13,800
Bonito			20,400	770		
Butterfish	74,800	4,657	267,000	12,632	35,100	2,208
Cod	373,000	19,324	272,500	14,276	25,000	1,250
Croaker	2,300	23				
Eels:						
Common	39,000	7,810	48,500	5,585		
Conger	1,400	22			100	2
Flounders	2,874,300	148,263	712,800	40,038	267,000	12,944
Frigate mackerel			17,600	308		
Goosefish	58,000	1,121				
Grayfish	60,000	825	3,900	48		
Haddock	366,700	16,838	300,000	13,700	25,000	1,150
Hake	168,200	4,326				
Herring, sea	50,000	840				
Mackerel	49,300	1,271	165,800	4,450	51,000	1,270
Mummichog	1,000	115	3,200	255		
Scup or porgy	222,600	4,344	34,700	990	13,400	413
Sea bass	27,800	2,258	127,700	6,427	16,900	1,620
Sea robin	13,000	340				
Shad			1,000	70		
Silversides			5,000	400		
Skates	30,200	564	11,400	160		
Squeteagues or "sea trout", gray	308,000	3,378	165,000	8,368		
Striped bass			500	40		
Sturgeon	300	36				
Swordfish	700	140			500	110
Tautog	100	2				
Thimble-eyed mackerel	600	6				
Tilefish	682,000	32,600			1,812,200	61,500
Whiting	1,959,400	52,174	108,200	3,420	14,100	423
Crabs:						
Hard	6,200	287	1,000	65		
Soft and peelers			125,200	25,720		
Lobsters	241,200	43,403	37,000	10,008		
Shrimp			75,000	2,600		
Clams:						
Hard, public			267,800	48,900		
Hard, private			56,400	11,150		
Soft, public			203,800	19,348		
Surf or skimmer	433,200	18,050	66,000	2,750		
Conchs	8,600	955				
Mussels, sea			33,300	1,667		
Oysters:						
Market, public, spring			11,000	1,565		
Market, public, fall			20,300	2,985		
Market, private, spring			563,500	84,200	4,900	700
Market, private, fall			808,900	120,055	47,000	6,700
Scallops, sea	1,400,700	201,318	122,800	17,700	157,900	22,700
Squid	283,300	11,395	54,000	1,230	100	5
Bloodworms			8,600	9,000		
Sandworms			12,200	12,120		
Total	10,162,100	607,753	4,843,100	490,869	2,644,800	126,795

Fisheries of New York, 1936—Continued

CATCH: BY COUNTIES—Continued

Species	Orange		Putnam		Rensselaer		Richmond	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	2,400	$42			9,700	$172		
Bluefish							14,200	$994
Carp	4,600	310	700	$42	8,100	720		
Catfish and bullheads	100	15	100	4	1,700	329		
Eels, common	400	54	200	20				
Flounders							45,000	2,325
Shad	22,800	2,300	5,000	300	3,800	213		
Striped bass	500	95						
Suckers	400	22			400	23		
Tomcod			300	6				
White perch					600	24		
Whiting							25,000	750
Yellow perch	200	15						
Scallops, sea							105,000	15,500
Total	31,400	2,853	6,300	372	24,300	1,481	189,200	19,569

Species	Rockland		Suffolk		Ulster		Westchester	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	12,200	$223	201,600	$1,455	30,300	$648	2,800	$42
Bluefish			276,600	21,063				
Bonito			186,900	5,385				
Butterfish			2,440,900	100,653				
Carp	4,200	367			88,100	6,762	5,800	481
Catfish and bullheads	400	8			7,000	840	1,900	206
Cod			367,000	19,906				
Croaker			81,900	1,313				
Eels:								
Common	11,400	1,036	203,000	26,297	1,200	134	8,600	666
Conger			2,500	75				
Flounders			2,079,700	106,161				
Frigate mackerel			31,600	554				
Goosefish			100	5				
Grayfish			5,000	129				
Haddock			631,300	29,061				
Hake			2,200	63				
Herring, sea			25,200	617				
Hickory shad			1,000	24				
King whiting or "kingfish"			23,800	2,338				
Mackerel			1,244,800	33,877				
Menhaden			46,390,700	89,387				
Pike or pickerel							100	6
Pollock			17,300	569				
Scup or porgy			1,627,600	41,541				
Sea bass			239,300	18,940				
Sea robin			33,500	958				
Shad	35,400	3,531	20,900	1,342	176,000	14,564	77,200	8,003
Sharks			2,300	59				
Silversides			63,400	2,275				
Skates			6,100	112				
Squeteagues or "sea trout", gray			1,166,700	69,003				
Striped bass	9,900	1,568	16,300	1,672	400	35	8,600	1,280
Sturgeon	100	20	2,600	625	100	6	2,800	385
Suckers	1,400	108			3,200	232	2,500	206
Sunfish	100	5			100	10		
Swellfish			5,000	250				
Swordfish			41,400	8,600				
Tautog			17,600	768				
Tomcod							7,000	125
Tuna or "horse mackerel"			6,100	350				
Whitebait			9,100	1,035				
White perch	5,100	305	600	72	3,200	131	41,100	1,862
Whiting			177,300	5,027				
Yellow perch	6,700	363			900	79		
Crabs, hard			457,100	13,415				
Lobsters			142,300	33,756				
Shrimp			9,700	1,227				
Clams:								
Hard, public			1,256,500	209,665			400	100
Hard, private			63,600	11,005				
Soft, public			506,000	52,243			800	100
Soft, private			8,000	1,000				
Surf or skimmer			24,100	2,025				
Mussels, sea			49,200	2,962				

Fisheries of New York, 1935—Continued

CATCH: BY COUNTIES—Continued

Species	Rockland		Suffolk		Ulster		Westchester	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Oysters:								
Market, public, spring			108,700	$15,600				
Market, public, fall			188,900	27,402				
Market, private, spring			1,471,100	257,230				
Market, private, fall			2,542,800	452,850				
Scallops:								
Bay			106,700	35,593				
Sea			427,100	61,550				
Squid			1,033,800	26,635				
Bloodworms			15,700	11,125				
Sandworms			17,300	14,680				
Total	86,900	$7,534	66,137,500	1,821,524	310,500	$23,441	159,600	$13,462

SEED OYSTER FISHERY: BY GEAR

Item	Dredges		Rakes		Total, exclusive of duplication	
OPERATING UNITS						
Fishermen:	*Number*		*Number*		*Number*	
On vessels	22				22	
On boats and shore, regular			7		7	
Total	22		7		29	
Vessels, motor	5				5	
Net tonnage	85				85	
Boats:						
Motor			4		4	
Other			1		1	
Apparatus:						
Number	10		7			
Yards at mouth	14					
CATCH						
Oysters:	*Bushels*	*Value*	*Bushels*	*Value*	*Bushels*	*Value*
Seed, public, spring			1,240	$496	1,240	$496
Seed, private, spring	29,984	$18,292			29,984	18,292
Seed, private, fall	10,540	10,005			10,540	10,005
Total	40,524	28,297	1,240	496	41,764	28,793

SEED OYSTER FISHERY: BY COUNTIES

Item	Nassau		Suffolk	
OPERATING UNITS				
Fishermen:	*Number*		*Number*	
On vessels	5		17	
On boats and shore, regular			7	
Total	5		24	
Vessels, motor	1		4	
Net tonnage	28		57	
Boats:				
Motor			4	
Other			1	
Apparatus:				
Dredges	2		8	
Yards at mouth	3		11	
Rakes			7	
CATCH				
Oysters:	*Bushels*	*Value*	*Bushels*	*Value*
Seed, public, spring			1,240	$496
Seed, private, spring	1,000	$500	28,984	17,792
Seed, private, fall	750	375	9,790	9,630
Total	1,750	875	40,014	27,918

NOTE.—With the exception of 1 motor boat, all of the persons, craft, and gear engaged in the seed oyster fishery are duplicated among those fishing for market oysters or other species.

NEW JERSEY

Fisheries of New Jersey, 1935

OPERATING UNITS: BY GEAR

Item	Purse seines		Haul seines	Gill nets				Lines	
	Menhaden	Other		Anchor	Drift	Run-around	Stake	Hand	Trawl
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	105	45	-------	-------	8	-------	-------	57	20
On boats and shore:									
Regular	-------	-------	56	2	99	90	71	243	132
Casual	-------	-------	204	-------	156	10	17	47	18
Total	105	45	260	2	263	100	88	347	170
Vessels:									
Steam	3	-------	-------	-------	-------	-------	-------	-------	-------
Net tonnage	150	-------	-------	-------	-------	-------	-------	-------	-------
Motor	2	5	-------	-------	2	-------	-------	10	6
Net tonnage	155	83	-------	-------	18	-------	-------	126	59
Total vessels	5	5	-------	-------	2	-------	-------	10	6
Total net tonnage	305	83	-------	-------	18	-------	-------	126	59
Boats:									
Motor	-------	-------	7	1	77	46	12	131	69
Other	-------	-------	104	-------	65	-------	24	19	-------
Accessory boats	15	7	-------	-------	5	-------	-------	22	14
Apparatus:									
Number	5	5	108	3	891	60	160	600	373
Length, yards	1,816	1,820	9,203	-------	-------	-------	-------	-------	-------
Square yards	-------	-------	-------	2,500	480,662	181,550	38,038	-------	-------
Hooks, baits, or snoods	-------	-------	-------	-------	-------	-------	-------	894	233,400

Item	Lines—Contd.		Pound nets	Weirs	Stop nets	Fyke nets	Dip nets	Cast nets	Drag nets
	Troll	Trot with baits or snoods							
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	13	-------	211	-------	-------	-------	-------	-------	-------
On boats and shore:									
Regular	77	6	105	-------	14	33	41	-------	15
Casual	-------	12	21	19	72	45	4	3	4
Total	90	18	337	19	86	78	45	3	19
Vessels, motor	2	-------	31	-------	-------	-------	-------	-------	-------
Net tonnage	36	-------	194	-------	-------	-------	-------	-------	-------
Boats:									
Motor	106	7	18	6	13	23	5	-------	11
Other	-------	4	13	3	36	27	39	-------	-------
Accessory boats	9	-------	1	-------	-------	-------	-------	-------	-------
Apparatus:									
Number	451	16	156	104	56	872	45	3	22
Square yards	-------	-------	-------	-------	54,600	-------	-------	-------	-------
Yards at mouth	-------	-------	-------	-------	-------	-------	-------	-------	44
Hooks, baits, or snoods	451	13,215	-------	-------	-------	-------	-------	-------	-------

Item	Drop nets	Otter trawls		Wire baskets	Pots			
		Fish	Shrimp		Crab	Eel	Fish	Lobster
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	-------	130	4	-------	-------	-------	-------	-------
On boats and shore:								
Regular	-------	59	-------	-------	3	39	54	93
Casual	2	2	-------	1	-------	15	7	22
Total	2	191	4	1	3	54	61	115
Vessels, motor	-------	36	1	-------	-------	-------	-------	-------
Net tonnage	-------	676	20	-------	-------	-------	-------	-------
Boats:								
Motor	-------	30	-------	1	1	23	34	60
Other	1	-------	-------	-------	-------	22	-------	-------
Apparatus:								
Number	15	66	1	25	10	1,717	8,191	12,155
Yards at mouth	-------	1,526	32	-------	-------	-------	-------	-------

Fisheries of New Jersey, 1935—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Spears	Dredges				Tongs	
		Clam	Crab	Oyster	Scallop	Oyster	Other
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels		44	13	501	52		
On boats and shore:							
Regular	35	10	4	28		76	404
Casual	7	2		4		24	438
Total	42	56	17	533	52	100	842
Vessels:							
Motor		13	4	91	9		
Net tonnage		149	44	1,677	213		
Sail		2	2				
Net tonnage		17	17				
Total vessels		15	6	91	9		
Total net tonnage		166	61	1,677	213		
Boats:							
Motor	6	6	2	18		72	377
Other	36					23	397
Apparatus:							
Number	42	38	47	220	17	100	842
Yards at mouth		40	51	265	57		

Item	Rakes		Forks	Hoes	Gaffs	By hand		Total, exclusive of duplication
	Oyster	Other				Oyster	Other	
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels								1,039
On boats and shore:								
Regular	19	436	9	107			89	1,391
Casual	4	850	5	94	1	4	248	1,870
Total	23	1,286	14	201	1	4	337	4,300
Vessels:								
Steam								3
Net tonnage								150
Motor								185
Net tonnage								3,026
Sail								2
Net tonnage								17
Total vessels								190
Total net tonnage								3,193
Boats:								
Motor	12	336		26			47	1,036
Other	9	889		139	1	4	212	1,605
Accessory boats								56
Apparatus:								
Number	23	1,286	14	201	1			

Fisheries of New Jersey, 1935—Continued

CATCH: BY GEAR

Species	Purse seines				Haul seines		Gill nets	
	Menhaden		Other				Anchor	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives					400	$4		
Bluefish			62,000	$4,350	1,200	72		
Bonito			1,100	44				
Butterfish			4,100	161				
Carp					93,400	6,567		
Catfish and bullheads					12,100	614		
Croaker	1,400	$14	112,100	1,539	7,700	158		
Eels, common					51,500	3,172		
Flounders			1,300	98	11,800	766		
Frigate mackerel	3,500	35	300	3				
Herring, sea			100	1				
King whiting or "kingfish"					1,000	50		
Launce					1,900	254		
Mackerel			400	16				
Menhaden	43,441,800	76,744	789,000	1,936				
Mullet					20,900	1,632		
Mummichog					700	66		
Scup or porgy			186,900	2,443				
Sea bass			22,000	1,054				
Shad					29,100	6,225	400	$117
Silversides					1,200	600		
Squeteagues or "sea trout", gray	13,000	250	926,200	16,806	28,800	1,756		
Striped bass					500	110		
Suckers					54,000	3,324		
Tautog			100	2				
Tuna or "horse mackerel"			1,300	26				
White perch					20,200	1,640		
Whiting			3,100	31				
Yellow perch					1,500	180		
Crabs:								
Hard					8,300	1,375		
Soft and peelers					9,500	2,670		
Total	43,459,700	77,043	2,110,000	28,510	355,700	31,235	400	117

Species	Gill nets—Continued						Lines	
	Drift		Runaround		Stake		Hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives					900	$18		
Bluefish	30,800	$1,371	223,700	$11,879	8,400	320	836,200	$44,683
Bonito	500	18	4,600	232			100	2
Butterfish	25,300	1,149	7,500	205				
Carp					5,000	350		
Cod							6,600	208
Croaker	52,700	1,108	36,600	564			15,400	325
Eels:								
Common							19,300	1,605
Conger							100	1
Flounders							11,500	600
Groupers							2,500	99
Mackerel	214,500	8,114	41,300	1,599				
Pompano							4,100	1,230
Scup or porgy	700	10	1,500	30			28,000	370
Sea bass							351,600	18,959
Shad	174,400	25,382			362,900	28,273		
Snapper, red			15,000	1,200			15,300	1,144
Spanish mackerel								
Spot	5,000	150			1,000	50		
Squeteagues or "sea trout":								
Gray	103,200	2,764	85,500	3,231	9,100	386	43,200	1,363
Spotted							2,700	120
Striped bass	2,000	235			600	125		
Sturgeon	3,500	764						
Tautog							9,500	368
White perch					11,200	1,048		
Turtles, snapper							4,500	225
Total	612,600	41,065	415,700	18,940	394,100	30,570	1,345,600	71,302

Fisheries of New Jersey, 1935—Continued

CATCH: BY GEAR—Continued

Species	Lines—Continued						Pound nets	
	Trawl		Troll		Trot with baits or snoods			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives							37,800	$189
Bluefish			594,100	$41,681			207,400	13,193
Bonito			9,600	491			77,700	2,467
Butterfish							3,395,600	137,046
Cod	762,700	$27,844					42,500	1,033
Crevalle							900	9
Croaker							5,349,100	82,799
Drum:								
Black							8,900	96
Red or redfish							34,400	443
Eels:								
Common							9,300	1,381
Conger	100	1					3,100	226
Flounders							287,800	17,487
Frigate mackerel			4,800	56			99,900	1,178
Goosefish							13,100	65
Grayfish							44,500	890
Hake							7,600	112
Herring, sea							258,500	1,744
Hickory shad							2,500	25
Kingfish or "king mackerel"			12,800	524				
King whiting or "kingfish"							40,500	2,218
Mackerel			2,000	80			1,312,300	40,556
Menhaden							5,526,900	13,943
Mullet							100	2
Pollock							4,200	106
Scup or porgy							4,296,100	73,839
Sea bass							170,000	8,486
Sea robin							44,300	443
Shad							251,200	23,690
Sharks							42,300	737
Skates	2,600	13					81,600	633
Spanish mackerel							8,600	523
Spot							11,100	323
Squeteagues or "sea trout", gray							6,384,700	193,519
Squirrel hake							23,600	236
Striped bass							2,000	187
Sturgeon							5,100	687
Tautog							8,500	181
Thimble-eyed mackerel							244,600	3,526
Tuna or "horse mackerel"			9,200	505			7,500	262
White perch							500	20
Whiting							3,051,300	29,229
Crabs:								
Hard					105,000	$3,313	85,400	1,394
King							1,233,300	5,983
Soft and peelers					900	225		
Squid							967,200	25,808
Turtles:								
Green							3,900	47
Hawksbill							200	2
Loggerhead							3,900	69
Total	765,400	27,858	632,500	43,337	105,900	3,538	33,691,600	687,042

Species	Weirs		Stop nets		Fyke nets		Dip nets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives					2,200	$22		
Carp			133,000	$9,307				
Catfish and bullheads			5,600	336	27,600	1,760		
Drum, red or redfish					4,500	450		
Eels, common					19,100	2,183		
Flounders					39,600	1,351		
Striped bass					2,600	590		
White perch					3,300	330		
Crabs:								
Hard							54,800	$4,691
King	1,392,000	$2,508			8,000	30		
Soft and peelers							191,300	63,841
Turtles, snapper					2,200	124		
Total	1,392,000	2,508	138,600	9,643	109,100	6,840	246,100	68,532

Fisheries of New Jersey, 1935—Continued

CATCH: BY GEAR—Continued

Species	Cast nets		Drag nets		Drop nets		Otter trawls	
							Fish	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish							1,100	$100
Butterfish							186,700	7,561
Carp	2,300	$161						
Cod							6,700	302
Croaker							1,791,800	32,219
Cunners							3,400	34
Drum:								
Black							400	5
Red or redfish							200	2
Eels:								
Common							3,800	43
Conger							12,600	172
Flounders							2,896,500	182,853
Grayfish							100	1
Hake							26,100	525
Kingfish or "king mackeral"							200	9
King whiting or "kingfish"							4,700	183
Mackerel							300	11
Pigfish							100	2
Scup or porgy							676,800	10,601
Sea bass							213,300	10,293
Sea robin							800	17
Sharks							100	1
Spot							600	15
Squeteagues or "sea trout", gray							478,500	8,638
Squirrel hake							1,100	13
Sturgeon							2,900	239
Tautog							4,600	51
Tilefish							100	6
Whiting							285,700	4,677
Crabs, hard					1,700	$167		
Lobsters							3,900	398
Shrimp			9,200	$2,300			95,000	6,760
Squid							83,200	2,273
Total	2,300	161	9,200	2,300	1,700	167	6,781,300	268,004

Species	Otter trawls—Continued		Wire baskets		Pots					
	Shrimp				Crab		Eel		Fish	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Croaker									200	$4
Eels:										
Common							107,200	$8,434		
Conger									500	5
Mummichog							8,300	680		
Sea bass									874,900	36,214
Squirrel hake									400	4
Tautog									1,700	45
Crabs:										
Hard			200	$25	12,000	$750				
Soft and peelers			200	50	3,600	900				
Lobsters									14,200	3,391
Shrimp	5,100	$307								
Total	5,100	307	400	75	15,600	1,650	115,500	9,114	891,900	39,663

Species	Pots—Continued		Spears		Dredges			
	Lobster				Clam		Crab	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Eels, common			40,300	$4,096				
Sea bass	23,700	$1,307						
Crabs, hard							199,800	$8,490
Lobsters	200,700	46,965						
Clams:								
Hard, public					10,800	$2,839		
Hard, private					31,600	4,358		
Surf or skimmer					313,300	13,804		
Total	224,400	48,272	40,300	4,096	355,700	21,001	199,800	8,490

Fisheries of New Jersey, 1935—Continued

CATCH: BY GEAR—Continued

Species	Dredges—Continued				Tongs		Rakes	
	Oyster		Scallop					
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crabs, hard					6,900	$206	6,900	$206
Clams:								
Hard, public					706,400	111,504	2,342,900	322,414
Hard, private	27,400	$3,640			66,300	11,054	2,700	506
Surf or skimmer							600	25
Oysters:								
Market, public, spring					6,400	1,110	4,000	750
Market, public, fall					6,400	1,110		
Market, private, spring	3,905,500	310,650			135,600	18,925	63,800	9,600
Market, private, fall	4,122,200	329,935			140,200	19,798	66,600	10,050
Scallops, sea			426,600	$25,316				
Total	8,055,100	644,225	426,600	25,316	1,068,200	163,707	2,487,500	343,551

Species	Forks		Hoes		Gaffs		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Clams:								
Hard, public							266,500	$42,365
Hard, private							8,900	1,504
Soft, public			1,055,900	$69,878				
Mussels, sea							2,900	90
Oysters:								
Market, private, spring							5,500	840
Market, private, fall							6,000	961
Turtles, snapper					500	$25		
Bloodworms	100	$94						
Sandworms	300	241						
Total	400	335	1,055,900	69,878	500	25	289,800	45,860

OPERATING UNITS: BY COUNTIES

Item	Atlantic	Bergen	Burlington	Camden	Cape May	Cumberland	Gloucester
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	60	3	4		247	504	
On boats and shore:							
Regular	316	56	34		228	13	6
Casual	261		72	24	328	97	17
Total	637	59	110	24	803	614	23
Vessels:							
Motor	15	1	1		53	85	
Net tonnage	234	15	11		820	1,705	
Boats:							
Motor	183	1	44		173	19	2
Other	315	14	28	12	295	63	12
Accessory boats	11				28	3	
Apparatus:							
Purse seines:							
Menhaden					1	1	
Length, yards					456	450	
Other	1				4		
Length, yards	360				1,460		
Haul seines	13		14	12	8	10	1
Length, yards	1,152		1,415	920	407	1,060	125
Gill nets:							
Drift	191		18		293	65	6
Square yards	16,260		20,490		132,918	46,239	5,595
Runsround					4		
Square yards					9,600		
Stake	12	15	7		2	44	
Square yards	1,200	22,750	180		200	5,168	
Lines:							
Hand	26				248	157	
Hooks or baits	43				479	160	
Trawl	85				130		
Hooks	67,000				84,100		

Fisheries of New Jersey, 1935—Continued

OPERATING UNITS: By counties—Continued

Item	Atlantic	Bergen	Burlington	Camden	Cape May	Cumberland	Gloucester
Apparatus—Continued.							
Lines—Continued.	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Troll					286		
Hooks					286		
Trot with baits or snoods					5	10	
Baits or snoods					15	13,000	
Pound nets	2				73		
Weirs					77	27	
Stop nets			8	1		12	7
Square yards			7,675	240		8,250	20,500
Fyke nets	16		173	25	11	90	75
Dip nets	3						
Cast nets							2
Drop nets					15		
Otter trawls:							
Fish	19				43	1	
Yards at mouth	456				989	22	
Shrimp	1						
Yards at mouth	32						
Pots:							
Eel	38	155			130	30	
Fish					791		
Lobster	450						
Spears	2				2		
Dredges:							
Clam	2				11	4	
Yards at mouth	2				11	5	
Crab		10					
Yards at mouth		10					
Oyster	16		14			166	
Yards at mouth	17		16			264	
Scallop	10				5		
Yards at mouth	33				17		
Tongs:							
Oyster	45		20		7		
Other	251		40		213		
Rakes:							
Oyster	15		3		2		
Other	298		7		206	6	
Hoes	12						
Gaffs				1			

Item	Hudson	Hunterdon	Mercer	Middlesex	Monmouth	Ocean	Salem
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	2			2	86	131	
On boats and shore:							
Regular				18	461	252	7
Casual		15	34	36	435	485	66
Total	2	15	34	56	982	868	73
Vessels:							
Steam					3		
Net tonnage					160		
Motor	1			1	6	22	
Net tonnage	9			8	55	169	
Sail					2		
Net tonnage					17		
Total vessels	1			1	11	22	
Total net tonnage	9			8	222	169	
Boats:							
Motor				12	218	356	28
Other		3	11	41	562	234	15
Accessory boats					14		
Apparatus:							
Purse seines:							
Menhaden					3		
Length, yards					910		
Haul seines		4	7	1	9	16	13
Length, yards		835	1,440	8	160	211	1,470
Gill nets:							
Anchor				3			
Square yards				2,500			

Fisheries of New Jersey, 1935—Continued

OPERATING UNITS: By counties—Continued

Item	Hudson	Hunterdon	Mercer	Middlesex	Monmouth	Ocean	Salem
Apparatus—Continued.							
Gill nets—Continued.	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Drift					296		22
Square yards					121,320		137,840
Runaround				6	31	19	
Square yards				16,720	72,430	82,800	
Stake						55	25
Square yards						6,420	2,120
Lines:							
Hand					132	37	
Hooks or baits					168	44	
Trawl					56	102	
Hooks					30,400	51,900	
Troll					105	60	
Hooks					105	60	
Trot with baits or snoods							1
Baits or snoods							200
Pound nets					36	45	
Stop nets							28
Square yards							17,935
Fyke nets			15		65	268	134
Dip nets					37	5	
Cast nets							1
Drag nets						22	
Yards at mouth						44	
Otter trawls:							
Fish	1				2		
Yards at mouth	27				32		
Wire baskets						25	
Pots:							
Crab							10
Eel				230	681	453	
Fish						7,400	
Lobster					11,230	475	
Spears					23	15	
Dredges:							
Clam				4	17		
Yards at mouth				5	17		
Crab					37		
Yards at mouth					41		
Oyster						24	
Yards at mouth						28	
Scallop					2		
Yards at mouth					7		
Tongs:							
Oyster					1	27	
Other					2	336	
Rakes:							
Oyster					1	2	
Other				46	502	221	
Forks					14		
Hoes					167	22	

CATCH: By counties

Species	Atlantic		Bergen		Burlington		Camden		Cape May	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	400	$4								
Bluefish	93,100	4,883							697,000	$47,436
Bonito									13,500	531
Butterfish	85,200	3,498							1,430,300	60,114
Carp					23,700	$1,659	27,200	$1,632		
Catfish and bullheads	2,800	140			5,800	580	2,000	200		
Cod	200,700	7,731							196,600	8,765
Croaker	66,100	1,099							3,509,400	54,106
Cunners	3,400	34								
Drum:										
Black	300	3							100	2
Red or redfish									5,300	104
Eels:										
Common	56,500	3,108	17,000	$875	2,500	200			27,700	3,384
Conger	3,500	61							10,000	131

Fisheries of New Jersey, 1935—Continued

CATCH: BY COUNTIES—Continued

Species	Atlantic		Bergen		Burlington		Camden		Cape May	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Flounders	972,400	$53,053							1,891,500	$130,661
Frigate mackerel									8,400	104
Grayfish									100	1
Groupers									2,500	99
Hake	4,500	95							20,100	407
Herring, sea	5,000	50							10,700	107
Kingfish or "king mackerel"									13,000	533
King whiting or "kingfish"	4,000	236							11,600	461
Mackerel	25,800	1,113							43,700	1,695
Menhaden	601,200	1,510							5,819,400	13,114
Mullet	2,000	120							18,900	1,512
Mummichog									2,000	50
Pigfish									100	2
Pollock									100	3
Scup or porgy	31,500	442							1,066,600	15,611
Sea bass	62,200	3,062							657,400	34,010
Sea robin									2,500	34
Shad	1,500	110	268,100	$21,145	2,500	$625	12,700	$3,175	2,900	261
Sharks									5,200	50
Skates									33,600	168
Snapper, red									15,300	1,144
Spanish mackerel									5,900	292
Spot	1,800	54							6,900	213
Squeteagues or "sea trout":										
Gray	187,700	4,107			1,600	80			4,765,800	108,635
Spotted									2,700	120
Squirrel hake	100	1							1,400	14
Striped bass	3,600	766			200	60			100	5
Sturgeon									4,100	359
Suckers					35,800	2,506	4,800	192		
Tautog	9,200	359							6,200	82
Thimble-eyed mackerel									128,600	1,286
Tilefish									100	6
Tuna or "horse mackerel"									7,900	351
White perch	20,300	1,528			6,200	620				
Whiting	21,800	332							281,900	4,518
Crabs:										
Hard	15,200	453	10,800	405					5,100	352
King									2,105,300	7,581
Soft and peelers	200	36								
Lobsters	6,100	1,339							3,900	602
Shrimp	5,100	307							95,000	6,760
Clams:										
Hard, public	353,400	54,943			102,600	13,680			452,500	52,553
Hard, private	18,100	3,829							1,400	517
Soft, public	7,000	700								
Surf or skimmer	53,700	2,900							259,600	10,854
Mussels, sea									2,900	90
Oysters:										
Market, public, spring	2,400	240							4,000	750
Market, public, fall	2,400	240								
Market, private, spring	195,900	28,199			62,300	8,975			7,500	1,153
Market, private, fall	199,400	28,726			62,300	8,975			10,000	1,698
Scallops, sea	140,500	8,308							242,700	13,534
Squid	7,700	219							450,800	11,592
Turtles:										
Green									100	3
Loggerhead									1,400	19
Snapper							1,000	50		
Total	3,473,700	217,936	295,900	22,425	305,500	37,960	47,700	5,249	24,369,300	628,599

Fisheries of New Jersey, 1935—Continued

CATCH: BY COUNTIES—Continued

Species	Cumberland		Gloucester		Hudson		Hunterdon		Mercer	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	900	$18								
Bluefish	2,500	100								
Butterfish	1,100	49								
Carp	37,200	3,001	21,900	$1,230			300	$30	3,900	$468
Catfish and bullheads	5,100	214	8,000	280						
Croaker	22,400	480								
Eels:										
Common	10,900	1,150	1,000	150					1,800	300
Conger	300	2								
Flounders	17,300	887			30,000	$900				
Frigate mackerel	3,500	35								
Hake	1,500	23								
Menhaden	1,866,000	4,198								
Scup or porgy	2,100	85								
Sea bass	1,900	78								
Sea robin	100	1								
Shad	76,900	12,830	1,600	400			2,000	660	5,600	1,038
Spot	5,000	150								
Squeteagues or "sea trout" gray	51,200	1,315								
Squirrel hake	200	4								
Striped bass	2,100	250								
Sturgeon	700	230								
Suckers			500	40			6,000	240	6,800	340
White perch	4,100	338								
Whiting	3,700	37								
Crabs:										
Hard	100,000	3,000								
King	520,000	910								
Lobsters	100	7								
Clams:										
Hard, public	8,100	2,025								
Hard private	31,600	4,358								
Oysters:										
Market, private, spring	3,795,400	293,525								
Market, private, fall	4,011,300	312,658								
Squid	500	15								
Turtles, snapper	5,200	274	1,000	50						
Total	10,588,900	642,247	34,000	2,150	30,000	900	8,300	930	18,100	2,146

Species	Middlesex		Monmouth		Ocean		Salem	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			38,000	$191	2,000	$20		
Bluefish	46,000	$2,576	877,700	47,755	243,600	14,899		
Bonito			26,100	983	54,000	1,740		
Butterfish			452,300	16,459	1,680,300	66,014		
Carp							119,500	$8,365
Catfish and bullheads							21,600	1,296
Cod			277,900	7,975	143,300	4,916		
Crevalle			900	9				
Croaker	24,100	361	1,751,500	30,185	1,993,500	32,439		
Drum:								
Black			1,500	22	7,400	74		
Red or redfish					29,300	341	4,500	450
Eels:								
Common	4,500	374	79,200	7,508	49,400	3,865		
Conger			800	40	1,800	171		
Flounders			190,600	9,427	146,700	8,227		
Frigate mackerel			39,900	406	56,700	727		
Goosefish			13,100	65				
Grayfish			44,500	890				
Hake			7,600	112				
Herring, sea			41,500	347	201,400	1,241		
Hickory shad					2,500	25		
King whiting or "kingfish"			10,400	542	20,200	1,212		
Launce	400	100	1,500	154				
Mackerel	5,300	159	712,400	21,316	783,600	26,093		
Menhaden			41,222,500	73,057	248,600	744		
Mullet			100	2				
Mummichog	2,100	210	4,900	486				
Pollock			500	13	3,700	90		
Pompano			4,100	1,230				
Scup or porgy			2,115,700	40,555	1,969,100	30,600		
Sea bass			49,600	2,474	884,400	36,689		

Fisheries of New Jersey, 1936—Continued

CATCH: BY COUNTIES—Continued

Species	Middlesex		Monmouth		Ocean		Salem	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Sea robin			7,700	$77	34,800	$348		
Shad	400	$117	224,300	19,951	149,800	14,800	69,700	$8,575
Sharks			4,900	138	32,300	550		
Silversides					1,200	600		
Skates			26,600	309	24,000	169		
Spanish mackerel			15,800	1,260	1,900	171		
Spot			1,500	60	2,500	61		
Squeteagues or "sea trout", gray	29,600	1,185	1,039,300	38,605	1,997,000	74,786		
Squirrel hake			13,900	139	9,500	95		
Striped bass					1,700	166		
Sturgeon			2,800	441	1,100	126	2,800	534
Suckers							100	6
Tautog			3,000	60	6,000	146		
Thimble-eyed mackerel			48,700	934	67,300	1,306		
Tuna or "horse mackerel"			6,100	300	4,000	142		
White perch							4,600	552
Whiting			1,777,800	17,778	1,254,900	11,272		
Yellow perch							1,500	180
Crabs:								
Hard			308,300	13,315	26,600	2,154	15,000	938
King			8,000	30				
Soft and peelers			197,900	65,630	2,900	895	4,500	1,125
Lobsters			186,400	43,390	22,300	5,416		
Shrimp					9,200	2,300		
Clams:								
Hard, public	76,600	11,007	1,439,900	190,811	893,500	124,103		
Hard, private			5,200	1,040	80,600	11,418		
Soft, public			1,005,400	65,695	43,500	3,483		
Surf or skimmer			600	75				
Oysters:								
Market, public, spring					4,000	870		
Market, public, fall					4,000	870		
Market, private, spring			2,100	412	47,200	7,751		
Market, private, fall			2,100	412	49,900	8,275		
Scallops, sea			43,400	3,474				
Squid			162,400	4,872	429,000	11,383		
Turtles:								
Green			2,800	28	1,000	16		
Hawksbill					200	2		
Loggerhead					2,500	50		
Bloodworms			100	94				
Sandworms			300	241				
Total	189,000	16,089	54,502,100	731,774	13,695,900	513,851	243,800	22,021

SEED OYSTER FISHERY: BY GEAR

Item	Dredges		Tongs		Rakes		Total, exclusive of duplication	
OPERATING UNITS								
Fishermen:	*Number*		*Number*		*Number*		*Number*	
On vessels	1,108						1,108	
On boats and shore:								
Regular	1		61		5		67	
Casual			85		13		98	
Total	1,109		146		18		1,273	
Vessels, sail	106						106	
Net tonnage	2,207						2,207	
Boats:								
Motor	1		51		16		68	
Other			89		1		90	
Apparatus:								
Number	214		146		18			
Yards at mouth	262							
CATCH								
Oysters:	*Bushels*	*Value*	*Bushels*	*Value*	*Bushels*	*Value*	*Bushels*	*Value*
Seed, public, spring	780,300	$272,755	44,350	$11,256	2,415	$435	827,065	$284,446
Seed, public, fall			22,050	6,068	2,415	434	24,465	6,502
Seed, private, spring	225	40	450	80			675	120
Seed, private, fall	225	41	450	82			675	123
Total	780,750	272,836	67,300	17,486	4,830	869	852,880	291,191

Fisheries of New Jersey, 1935—Continued

SEED OYSTER FISHERY: BY COUNTIES

Item	Atlantic		Burlington		Cumberland	
OPERATING UNITS						
Fishermen:	*Number*		*Number*		*Number*	
On vessels					1,108	
On boats and shore:						
Regular	16		33		18	
Casual	10		15		73	
Total	26		48		1,199	
Vessels, sail					106	
Net tonnage					2,207	
Boats:						
Motor	12		40		16	
Other	13		6		71	
Apparatus:						
Dredges			2		212	
Yards at mouth			2		260	
Tongs	26		29		91	
Rakes			18			
CATCH						
Oysters:	*Bushels*	*Value*	*Bushels*	*Value*	*Bushels*	*Value*
Seed, public, spring	8,625	$1,675	10,640	$1,766	807,800	$281,005
Seed, public, fall	1,325	238	5,640	1,014	17,500	5,250
Seed, private, spring			675	120		
Seed, private, fall			675	123		
Total	9,950	1,913	17,630	3,023	825,300	286,255

NOTE.—Of the total number of persons fishing for seed oysters, 1,160 are duplicated among those fishing for market oysters or other species. Similarly the following craft and gear are duplicated: 74 sailing vessels, 30 motor boats, 11 other boats, 150 dredges, 32 tongs, and 1 rake.

PENNSYLVANIA

Fisheries of Pennsylvania, 1935 [1]

OPERATING UNITS: BY GEAR

Item	Haul seines
	Number
Fishermen, on boats and shore, casual	41
Boats, other than motor	10
Apparatus:	
Number	10
Length, yards	1,955

CATCH: BY GEAR

Species	Haul seines	
	Pounds	*Value*
Carp	5,100	$408
Shad	10,200	3,996
Suckers	15,700	1,256
Total	31,000	5,660

[1] The commercial fisheries of Pennsylvania are confined to Bucks County.

DELAWARE

Fisheries of Delaware, 1935

OPERATING UNITS: BY GEAR

Item	Purse seines, menhaden	Haul seines	Gill nets			Hand lines	Pound nets
			Drift	Run-around	Stake		
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	474						
On boats and shore:							
Regular		1	1	5	5		
Casual		248	60	21	17	20	11
Total	474	249	61	26	22	20	11
Vessels, steam	12						
Net tonnage	1,455						
Boats:							
Motor			19	3	4	5	2
Other		71	10	10	6	2	4
Accessory boats	36						
Apparatus:							
Number	12	61	40	13	30	28	22
Length, yards	6,699	17,955					
Square yards			117,875	3,980	13,020		
Hooks						44	

Item	Stop nets	Fyke nets	Dip nets	Cast nets	Otter trawls, fish	Pots	
						Eel	Lobster
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels					6		
On boats and shore:							
Regular		8	24			6	
Casual	7	29	40	1		13	12
Total	7	37	64	1	6	19	12
Vessels, motor					1		
Net tonnage					32		
Boats:							
Motor		3	10			3	3
Other	4	10	51			6	
Apparatus:							
Number	11	257	64	1	1	345	115
Square yards	1,330						
Yards at mouth					23		

Item	Dredges			Tongs, other than for oysters	By hand, other than for oysters	Total, exclusive of duplication
	Clam	Crab	Oyster			
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	25	15	47			530
On boats and shore:						
Regular						32
Casual	4	4		2	26	355
Total	29	19	47	2	26	917
Vessels:						
Steam						12
Net tonnage						1,455
Motor	4	3	7			13
Net tonnage	53	43	130			229
Total vessels	4	3	7			25
Total net tonnage	53	43	130			1,684
Boats:						
Motor	2	2				44
Other				2		138
Accessory boats						36
Apparatus:						
Number	18	12	14	2		
Yards at mouth	19	14	17			

Fisheries of Delaware, 1935—Continued

CATCH: BY GEAR

Species	Purse seines		Haul seines		Gill nets					
					Drift		Runaround		Stake	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			147,200	$1,949	800	$20				
Bluefish			2,500	47	11,000	1,056	300	$10		
Bonito					100	2				
Carp			45,400	3,326					9,600	$576
Catfish and bullheads			25,500	957						
Croaker			286,000	1,845	136,000	2,040	2,000	40		
Flounders							200	8	200	8
Gizzard shad			1,000	15						
Menhaden	83,454,600	$292,091								
Mullet							78,500	2,276		
Shad			400	80	18,400	3,390			5,900	1,074
Spot					1,500	75				
Squeteagues or "sea trout", gray			317,200	6,081	82,100	4,224	3,400	102		
Striped bass			10,200	1,095	400	37	1,000	250	1,500	375
Sturgeon					400	174				
Suckers									600	18
White perch			14,100	664	300	30	200	30	900	63
Yellow perch			300	20						
Total	83,454,600	292,091	849,600	16,079	251,000	11,048	85,600	2,716	18,700	2,114

Species	Hand lines		Pound nets		Stop nets		Fyke nets		Dip nets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives							6,900	$81		
Carp			300	$16	12,600	$1,033	2,000	120		
Catfish and bullheads			1,400	42			21,500	736		
Croaker	14,000	$420					200	20		
Eels, common							17,900	1,987		
Flounders							3,600	180		
Gizzard shad			600	30						
Scup or porgy	6,000	120								
Sea bass	9,000	360								
Squeteagues or "sea trout", gray	11,700	520					300	26		
Striped bass							3,600	450		
Tautog	1,000	20								
White perch			2,700	139			3,800	277		
Yellow perch			1,100	72			2,400	192		
Crabs:										
Hard							1,800	223	220,000	$3,520
Soft and peelers									59,300	13,237
Turtles, snapper							5,400	443		
Total	41,700	1,440	6,100	299	12,600	1,033	69,400	4,735	279,300	16,757

Species	Cast nets		Otter trawls		Pots			
					Eel		Lobster	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Butterfish			600	$24				
Carp	600	$24						
Croaker			152,600	3,173				
Drum, red or redfish			100	2				
Eels:								
Common					37,000	$4,094		
Conger			300	4				
Flounders			20,200	908				
Grayfish			2,000	160				
Hake			5,000	28				
King whiting or "kingfish"			700	23				
Scup or porgy			6,200	85				
Sea bass			12,900	188				
Squeteagues or "sea trout", gray			13,400	346				
Sturgeon			100	13				
Whiting			5,000	32				
Lobsters							4,100	$1,025
Squid			1,400	21				
Total	300	24	220,500	5,007	37,000	4,094	4,100	1,025

Fisheries of Delaware, 1935—Continued

CATCH: BY GEAR—Continued

Species	Dredges						Tongs		By hand	
	Clam		Crab		Oyster					
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crabs:										
Hard			130,100	$2,143						
King									502,000	$753
Clams:										
Hard, public	33,500	$3,290					5,400	$1,620		
Hard, private	69,500	8,110								
Mussels, sea							13,000	1,000		
Oysters, market, private, fall					581,400	$54,989				
Total	103,000	11,400	130,100	2,143	581,400	54,989	18,400	2,620	502,000	753

OPERATING UNITS: BY COUNTIES

Item	Kent	New Castle	Sussex
Fishermen:	*Number*	*Number*	*Number*
On vessels	50	6	474
On boats and shore:			
Regular		1	31
Casual	86	49	220
Total	136	56	725
Vessels:			
Steam			12
Net tonnage			1,455
Motor	12	1	
Net, tonnage	197	32	
Total vessels	12	1	12
Total net tonnage	197	32	1,455
Boats:			
Motor	9	11	24
Other	25	16	97
Accessory boats			36
Apparatus:			
Purse seines, menhaden			12
Length, yards			6,699
Haul seines	13	12	36
Length, yards	4,860	1,530	11,565
Gill nets:			
Drift	2	16	22
Square yards	1,200	90,900	25,775
Runaround			13
Square yards			3,980
Stake	5	2	23
Square yards	7,040	600	5,380
Lines, hand			28
Hooks			44
Pound nets		9	13
Stop nets	5	6	
Square yards	740	590	
Fyke nets	49	139	69
Dip nets			64
Cast nets	1		
Otter trawls, fish		1	
Yards at mouth		23	
Pots:			
Eel	25	36	284
Lobster			115
Dredges:			
Clam	18		
Yards at mouth	19		
Crab	12		
Yards at mouth	14		
Oyster	14		
Yards at mouth	17		
Tongs, other than for oysters	2		

Fisheries of Delaware, 1935—Continued

CATCH: BY COUNTIES

Species	Kent		New Castle		Sussex	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			800	$20	154,100	$2,030
Bluefish	100	$7			13,700	1,106
Bonito					100	2
Butterfish			600	24		
Carp	16,800	1,084	53,300	4,004	100	7
Catfish and bullheads	2,300	69	45,300	1,634	800	32
Croaker	126,000	734	152,600	3,173	312,200	3,631
Drum, red or redfish			100	2		
Eels:						
Common	1,200	180	13,000	1,420	40,700	4,481
Conger			300	4		
Flounders			20,200	908	4,000	196
Gizzard shad			1,600	45		
Grayfish			2,000	160		
Hake			5,000	28		
King whiting or "kingfish"			700	23		
Menhaden					83,454,600	292,091
Mullet					78,500	2,276
Scup or porgy			6,200	85	6,000	120
Sea bass			12,900	188	9,000	360
Shad	5,900	1,074	15,500	2,810	3,300	660
Spot					1,500	75
Squeteagues or "sea trout", gray	158,800	3,122	13,400	346	255,900	7,831
Striped bass	800	78			15,900	2,129
Sturgeon			500	187		
Suckers					600	18
Tautog					1,000	20
White perch	800	74	800	47	20,400	1,082
Whiting			5,000	32		
Yellow perch			900	52	2,900	232
Crabs:						
Hard	130,100	2,143	1,800	223	220,000	3,520
King	502,000	753				
Soft and peelers					59,300	13,237
Lobsters					4,100	1,025
Clams:						
Hard, public	38,900	4,910				
Hard, private	69,500	8,110				
Mussels, sea	13,000	1,000				
Oysters, market, private, fall	581,400	54,989				
Squid			1,400	21		
Turtles, snapper	2,500	250	2,900	193		
Total	1,650,100	78,577	356,800	15,629	84,658,700	336,161

SEED OYSTER FISHERY: BY GEAR

Item	Dredges		Tongs		Total, exclusive of duplication	
OPERATING UNITS						
Fishermen:	*Number*		*Number*		*Number*	
On vessels	21				21	
On boats and shore, casual			56		56	
Total	21		56		77	
Vessels, sail	3				3	
Net tonnage	39				39	
Boats:						
Motor			1		1	
Other			54		54	
Apparatus:						
Number	6		56			
Yards at mouth	7					
CATCH	*Bushels*	*Value*	*Bushels*	*Value*	*Bushels*	*Value*
Oysters, seed, public, spring	34,000	$8,500	51,200	$9,512	85,200	$18,012

NOTE.—The seed-oyster fishery in Delaware was confined to Kent County. Of the total number of persons fishing for seed oysters, 71 are duplicated among those fishing for market oysters or other species. Similarly the following craft and gear are duplicated: 2 sail vessels, 7 other boats, 4 dredges, and 2 tongs.

VESSEL FISHERIES AT NEW YORK CITY [1]

During 1935 fishing vessels of 5 net tons capacity or greater landed 39,615,000 pounds of fishery products at New York City. The landings consisted of bluefish, 1,056,000 pounds; butterfish, 552,000 pounds; cod, 5,313,000 pounds; croaker, 16,000 pounds; flounders, 12,134,000 pounds; haddock, 10,361,000 pounds; hake, 52,000 pounds; halibut, 32,000 pounds; mackerel, 3,454,000 pounds; pollock, 21,000 pounds; sea bass, 698,000 pounds; sea robin, 1,000 pounds; scup, 901,000 pounds; squeteagues or "sea trout", 3,000 pounds; swordfish, 3,000 pounds; tilefish, 2,657,000 pounds; whiting, 351,000 pounds; sea scallops, 1,989,000 pounds; and squid, 21,000 pounds. Data on the landings at New York City are also included in the catch by States.

SHAD FISHERY OF THE HUDSON RIVER

The shad fishery of the Hudson River in 1935 was prosecuted by 498 fishermen who used 259 boats, 28 haul seines, 307 gill nets, 14 stop nets, 26 scap nets, and 39 fyke nets. The total commercial catch amounted to 259,980 shad having a weight of 847,400 pounds and a value to the fishermen of $70,636. This is an increase of 84 percent in the number of shad and 96 percent in their value as compared with 1934. The average price per pound received by fishermen in both 1934 and 1935 was about 8 cents.

Gill nets accounted for 98 percent of the weight of the shad taken, while haul seines accounted for 1 percent. Small quantities taken by stop nets, scap nets, and fyke nets accounted for the remaining 1 percent.

Statistics of the catch of shad in the Hudson River also are included in the catch data for New York and New Jersey which are published elsewhere in this report.

Shad fishery of the Hudson River, 1935

Item	New York			New Jersey			Total		
Fishermen:									
On boats and shore:	*Number*	*Pounds*	*Value*	*Number*	*Pounds*	*Value*	*Number*	*Pounds*	*Value*
Regular	60			78			138		
Casual	358			2			360		
Total	418			80			498		
Boats, other than motor	238			21			259		
Apparatus:									
Haul seines	28						28		
Length, yards	3,831						3,831		
Gill nets	281			26			307		
Square yards	317,555			36,180			353,735		
Stop nets	14						14		
Square yards	121						121		
Scap nets	26						26		
Fyke nets	39						39		
Shad caught:									
With haul seines	3,592	10,200	$874				3,592	10,200	$874
With gill nets	137,487	434,500	36,615	116,003	394,100	$32,485	253,490	828,600	69,100
With stop nets	267	800	60				267	800	60
With scap nets	767	2,300	127				767	2,300	127
With fyke nets	1,864	5,500	475				1,864	5,500	475
Total	143,977	453,300	38,151	116,003	394,100	32,485	259,980	847,400	70,636

[1] Statistics on the landings at New York City are collected by J. H. Matthews, executive secretary, Middle Atlantic Fisheries Association.

FISHERIES OF THE CHESAPEAKE BAY STATES

(AREA XXIII)[10]

The yield of the commercial fisheries of the Chesapeake Bay States (Maryland and Virginia) during 1935 amounted to 265,827,300 pounds valued at $5,524,519 to the fishermen, representing a decrease of 8 percent in volume and 7 percent in value as compared with the catch in the previous year. These fisheries gave employment to 19,116 fishermen, as compared with 20,591 in 1934.

There were 585 fishery wholesale and manufacturing establishments in the two States in 1935, as compared with 544 in 1934. In 1935 these establishments employed 13,213 persons, paid $3,055,029 in salaries and wages, and produced manufactured products (canned, cured, packaged, and byproducts), valued at $9,411,465. In 1934 the wholesale and manufacturing firms employed 12,517 persons, paid $2,758,749 in salaries and wages, and produced manufactured products valued at $7,826,195.

Fisheries of the Chesapeake Bay States, 1935

SUMMARY OF CATCH

Product	Maryland		Virginia		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Fish	12,744,000	$393,246	180,145,200	$1,503,066	192,889,200	$1,896,312
Shellfish, etc.	35,491,300	1,610,335	37,446,800	2,017,872	72,938,100	3,628,207
Total	48,235,300	2,003,581	217,592,000	3,520,938	265,827,300	5,524,519

OPERATING UNITS: BY STATES

Item	Maryland	Virginia	Total
Fishermen:	*Number*	*Number*	*Number*
On vessels	696	1,422	2,118
On boats and shore:			
Regular	4,907	6,045	10,952
Casual	2,252	3,794	6,046
Total	7,855	11,261	19,116
Vessels:			
Steam		22	22
Net tonnage		2,480	2,480
Motor		125	125
Net tonnage		2,057	2,057
Sail	140		140
Net tonnage	1,694		1,694
Total vessels	140	147	287
Total net tonnage	1,694	4,537	6,231
Boats:			
Motor	2,951	3,625	6,576
Other	2,360	3,795	6,155
Accessory boats		86	86
Apparatus:			
Purse seines, menhaden		29	29
Length, yards		8,990	8,990

[10] This is the number given to this area by the North American Council on Fishery Investigations. It should be explained that there may be included under this area, craft whose principal fishing ports are in the area but at times fish elsewhere. Data on the operating units and catch of the fisheries of the Chesapeake Bay States have been taken largely from statistics collected by the State fishery agencies of Maryland and Virginia. Supplementary surveys, compilations, and analyses have been made by agents of this Bureau in order that the figures may be presented in a manner comparable with those of other sections. It should be observed that the persons engaged, gear and craft employed, and catch of the seed oyster fishery are not included among the statistics of the fishery for market oysters and other species but are shown in separate tables in this section. For a clearer understanding of the statistics published in this section, the reader is referred to the section in the latter part of this document entitled "Statistical survey procedure."

Fisheries of the Chesapeake Bay States, 1935—Continued

OPERATING UNITS: BY STATES—Continued

Item	Maryland	Virginia	Total
Apparatus—Continued.	*Number*	*Number*	*Number*
Haul seines	256	152	408
Length, yards	26,347	45,430	71,777
Gill nets:			
Anchor	189	----------	189
Square yards	31,899	----------	31,899
Drift	256	332	588
Square yards	294,666	281,395	576,061
Runaround	----------	2	2
Square yards	----------	2,400	2,400
Stake	3,095	7,380	10,475
Square yards	257,270	269,307	526,577
Lines:			
Hand	40	150	190
Hooks	40	150	190
Trot with baits or snoods	1,731	1,304	3,035
Baits or snoods	1,241,400	684,700	1,926,100
Pound nets	529	2,000	2,529
Crab pound nets	----------	12	12
Stop nets	----------	5	5
Square yards	----------	3,100	3,100
Fyke nets	2,605	667	3,272
Dip nets	1,215	1,966	3,181
Otter trawls	----------	23	23
Yards at mouth	----------	688	688
Pots:			
Crab	----------	46	46
Eel	13,597	164	13,761
Fish	----------	141	141
Turtle	----------	10	10
Scrapes	708	8	716
Yards at mouth	708	8	716
Dredges:			
Crab	----------	211	211
Yards at mouth	----------	379	379
Oyster	416	290	706
Yards at mouth	470	307	777
Tongs:			
Oyster	4,341	2,889	7,230
Other	87	660	747
Rakes:			
Oyster	----------	601	601
Other	10	86	96
Picks	----------	571	571

CATCH: BY STATES

Species	Maryland		Virginia		Total	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	4,229,200	$50,974	10,973,800	$65,096	15,203,000	$116,070
Black bass	35,200	2,881	----------	----------	35,200	2,881
Bluefish	312,500	25,491	340,100	17,675	652,600	43,166
Bonito	500	34	----------	----------	500	34
Bowfin	----------	----------	5,000	150	5,000	150
Butterfish	226,800	7,337	2,320,500	56,562	2,547,300	63,899
Cabio or crab eater	----------	----------	48,600	2,471	48,600	2,471
Carp	217,800	11,774	474,200	21,227	692,000	33,001
Catfish and bullheads	286,000	11,318	481,800	15,880	767,800	27,198
Cod	----------	----------	400	9	400	9
Crappie	5,800	204	----------	----------	5,800	204
Croaker	3,399,900	42,115	23,037,800	293,092	26,437,700	335,207
Dolphin	100	10	----------	----------	100	10
Drum:						
Black	24,100	174	38,600	605	62,700	779
Red or redfish	4,000	114	34,400	802	38,400	916
Eels, common	247,900	16,243	161,500	16,454	409,400	32,697
Flounders	33,500	2,607	671,700	33,514	705,200	36,121
Gizzard shad	42,600	764	287,600	3,254	330,200	4,018
Hake	----------	----------	23,100	397	23,100	397
Harvestfish	5,100	99	146,200	2,956	151,300	3,055
Herring, sea	----------	----------	2,100	33	2,100	33
Hickory shad	19,600	460	53,100	1,263	72,700	1,723
King whiting or "kingfish"	2,300	55	55,600	1,449	57,900	1,504
Mackerel	----------	----------	54,100	2,134	54,100	2,134
Menhaden	7,000	350	121,080,600	410,100	121,087,600	410,450

Fisheries of the Chesapeake Bay States, 1935—Continued

CATCH: BY STATES—Continued

Species	Maryland		Virginia		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Mullet	17,500	$950	36,700	$1,418	54,200	$2,368
Pigfish			11,400	357	11,400	357
Pike or pickerel	21,100	3,076	1,800	160	22,900	3,236
Pompano	100	20			100	20
Scup	122,500	1,238	1,934,700	27,856	2,057,200	29,094
Sea bass	15,000	750	211,100	8,015	226,100	8,765
Shad	800,000	83,777	2,882,900	275,345	3,682,900	359,122
Sharks			7,200	155	7,200	155
Skates			16,800	144	16,800	144
Spanish mackerel	1,500	150	36,000	2,529	37,500	2,679
Spot	17,800	619	407,100	14,486	424,900	15,105
Squeteagues or "sea trout":						
Gray	1,313,200	30,477	13,443,000	163,925	14,756,200	194,402
Spotted	5,000	495	111,800	7,534	116,800	8,029
Striped bass	927,700	78,644	374,800	39,310	1,302,500	117,954
Sturgeon	400	70	6,200	818	6,600	888
Suckers	11,400	406			11,400	406
Sunfish	2,500	60			2,500	60
Swellfish			800	16	800	16
Tautog	100	3	1,600	21	1,700	24
Tomcod			1,100	11	1,100	11
White perch	305,100	14,533	294,000	12,455	599,100	26,988
Whiting			16,100	250	16,100	250
Yellow perch	83,200	4,974	59,300	3,138	142,500	8,112
Total	12,744,000	393,246	180,145,200	1,503,066	192,889,200	1,896,312
SHELLFISH, ETC.						
Crabs:						
Hard	17,264,800	352,522	19,762,900	488,699	37,027,700	841,221
Soft and peelers	2,556,600	229,535	1,449,000	155,522	4,005,600	385,057
Lobsters			700	82	700	82
Clams:						
Hard, public	25,300	3,200	1,623,900	365,647	1,649,200	368,847
Hard, private			20,000	5,000	20,000	5,000
Mussels, sea			23,200	776	23,200	776
Oysters:[1]						
Market, public, spring	4,249,400	255,660	1,303,900	78,827	5,553,300	334,487
Market, public, fall	9,764,100	625,175	1,937,900	123,029	11,702,000	748,204
Market, private, spring	267,600	31,514	5,551,700	387,946	5,819,300	419,460
Market, private, fall	1,302,700	109,266	5,523,700	408,020	6,826,400	517,286
Squid	55,000	1,275	234,500	3,544	289,500	4,819
Terrapin, diamond back	5,800	2,188	400	180	6,200	2,368
Turtles, snapper			15,000	600	15,000	600
Total	35,491,300	1,610,335	37,446,800	2,017,872	72,938,100	3,628,207
Grand total	48,235,300	2,003,581	217,592,000	3,520,938	265,827,300	5,524,519

[1] Statistics on oysters used in this table are based on yields of 6.29 pounds of meats to the bushel for market oysters in Maryland and 6.44 pounds in Virginia.

SUPPLEMENTARY TABLE SHOWING THE PRODUCTION OF CERTAIN SHELLFISH IN NUMBER AND BUSHELS

Product	Maryland		Virginia		Total	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Crabs:						
Hard—number	51,794,400	$352,522	59,288,700	$488,699	111,083,100	$841,221
Soft and peelers—do	10,226,400	229,535	5,796,000	155,522	16,022,400	385,057
Clams:						
Hard, public—bushels	3,162	3,200	202,988	365,647	206,150	368,847
Hard, private—do			2,500	5,000	2,500	5,000
Mussels, sea—do			1,933	776	1,933	776
Oysters:						
Market, public, spring—do	675,580	255,660	202,469	78,827	878,049	334,487
Market, public, fall—do	1,552,321	625,175	300,916	123,029	1,853,237	748,204
Market, private, spring—do	42,544	31,514	862,065	387,946	904,609	419,460
Market, private, fall—do	207,107	109,266	857,717	408,020	1,064,824	517,286

Fisheries of the Chesapeake Bay States, 1935—Continued

SEED OYSTER FISHERY

Item	Maryland		Virginia		Total	
OPERATING UNITS						
Fishermen:	*Number*		*Number*		*Number*	
On vessels	209		3		212	
On boats and shore:						
Regular			1,369		1,369	
Casual			188		188	
Total	209		1,560		1,769	
Vessels:						
Motor			1		1	
Net tonnage			6		6	
Sail	39				39	
Net tonnage	758				758	
Total vessels	39		1		40	
Total net tonnage	758		6		764	
Boats:						
Motor			843		843	
Other			280		280	
Apparatus:						
Dredges	78				78	
Yards at mouth	107				107	
Tongs			1,142		1,142	
Rakes			200		200	
CATCH						
Oysters:	*Bushels*	*Value*	*Bushels*	*Value*	*Bushels*	*Value*
Seed, public, spring	229,618	$22,962	918,600	$159,585	1,148,218	$182,547
Seed, public, fall			889,100	154,715	889,100	154,715
Seed, private, spring			20,000	4,000	20,000	4,000
Total	229,618	22,962	1,827,700	318,300	2,057,318	341,262

NOTE.—Of the number of persons fishing for seed oysters, 1,475 are duplicated among those fishing for market oysters or other species. Similarly, the following craft and gear are duplicated: 40 vessels, 698 motor boats, 230 other boats, 78 dredges, 877 tongs, and 200 rakes.

Industries related to the fisheries of the Chesapeake Bay States, 1935

OPERATING UNITS, SALARIES, AND WAGES

Item	Maryland	Virginia	Total
Transporting:	*Number*	*Number*	*Number*
Persons engaged	331	691	1,022
Vessels:			
Steam		1	1
Net tonnage		103	103
Motor	167	314	481
Net tonnage	2,564	2,916	5,480
Sail	3		3
Net tonnage	85		85
Total vessels	170	315	485
Total net tonnage	2,649	3,019	5,668
Wholesale and manufacturing:			
Establishments	330	255	585
Persons engaged:			
Proprietors	432	308	740
Salaries employees	198	162	360
Wage earners:			
Average for season	6,314	5,799	12,113
Average for year	2,712	2,093	4,805
Paid to salaried employees	$321,224	$227,860	$549,084
Paid to wage earners	$1,408,063	$1,097,882	$2,505,945
Total salaries and wages	$1,729,287	$1,325,742	$3,055,029
Fishermen manufacturing	62		62

Industries related to the fisheries of the Chesapeake Bay States, 1935—Continued

PRODUCTS MANUFACTURED

Item	Maryland		Virginia	
	Quantity	*Value*	*Quantity*	*Value*
By manufacturing establishments:				
Alewives:				
Salted:				
Corned, pounds	66,600	$1,145	1,559,058	$21,614
Pickled, do	1,777,808	37,919	1,807,270	29,238
Tight-pack cut, do	(1)	(1)	2,013,060	75,808
Tight-pack roe, do	(1)	(1)	145,130	8,279
Canned, standard cases	14,884	36,562	(1)	(1)
Roe, canned, do	5,910	40,681	11,961	84,133
Dry scrap, tons	(1)	(1)	378	11,561
Croaker, fresh fillets, pounds			101,000	13,290
Menhaden products:				
Dry scrap and meal, tons			14,404	424,510
Oil, gallons			1,567,298	459,101
Sea bass, fresh fillets, pounds			68,000	10,210
Squeteagues, fresh fillets, do			196,000	25,970
Crabs, blue:				
Meat, packaged, fresh cooked, do	2,773,467	959,902	1,819,028	650,781
Dry scrap, tons	(1)	(1)	1,498	25,154
Clams, hard, canned chowder, standard cases	55,776	155,515		
Oysters, fresh shucked, gallons	2,432,669	2,683,591	2,029,423	2,292,634
Oyster-shell products:				
Poultry feed, tons	41,895	179,896	15,202	85,805
Lime, do	23,692	33,881	8,352	31,407
Lime, "burned", do			16,258	102,593
Unclassified products:				
Packaged, fresh fillets and pandressed, pounds			[2] 280,000	[2] 23,600
Dry scrap and meal, tons	[3] 850	[3] 17,550	[4] 1,310	[4] 24,731
Oil, gallons	(5)	(5)	[6] 12,400	[6] 2,843
Miscellaneous		[7] 852,166		[8] 9,395
Total		4,998,808		4,412,657
By fishermen:				
Alewives:				
Pickled, pounds	193,370	4,030		
Smoked, do	1,000	100		
Eels, salted, do	78,148	5,956		
Sturgeon roe, salted, do	50	3		
Total	272,568	10,089		
Grand total		5,008,897		4,412,657

[1] The production of this item has been included under "Unclassified products."
[2] Includes packaged fresh fillets of flounders and haddock, and pandressed croaker and squeteagues.
[3] Includes alewife and blue crab dry scrap.
[4] Includes miscellaneous acid and dry scrap.
[5] The production of this item has been included under "Miscellaneous."
[6] Includes alewife and miscellaneous oils.
[7] Includes salted tight-pack cut alewives, tight-pack alewife roe, and spot; alewife oil; smoked alewives, butterfish, carp, chubs, eels, herring bloaters, lake trout, salmon, sturgeon, tullibee, and whitefish; canned fish paste, oysters, oyster puree, shrimp soup, and terrapin soup; marine-shell buttons and novelties; and pearl essence.
[8] Includes canned alewives and blue crabs; and fresh-shucked hard clams.

NOTE.—The total value of manufactured products in the Chesapeake Bay States was as follows: By manufacturing establishments, $9,411,465; and by fishermen $10,089. Some of the above products may have been imported from another State or a foreign country; therefore, they cannot be correlated directly with the catch within the State. Of the total number of persons engaged on transporting vessels and boats, 676 have been included as fishermen, and among the total number of persons engaged in the preparation of fishermen's prepared products all have been included as fishermen.

MARYLAND

Fisheries of Maryland, 1935

OPERATING UNITS: BY GEAR

Item	Haul seines	Gill nets			Lines		Pound nets	Fyke nets
		Anchor	Drift	Stake	Hand	Trot with baits or snoods		
Fishermen:								
On boats and shore:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Regular	357	11	57	82	20	1,279	414	38
Casual	237	15	288	131	.....	131	114	106
Total	594	26	345	213	20	1,410	528	144
Boats:								
Motor	67	16	78	108	10	1,114	176	62
Other	242	2	118	44	.....	302	152	63
Apparatus:								
Number	256	189	256	3,095	40	1,731	529	2,605
Length, yards	26,347	.....	.....	.....	.....	.....	.....	.....
Square yards	.....	31,899	294,666	257,270	.....	.....	.....	.....
Hooks, baits, or snoods	.....	.....	.....	.....	40	1,241,400	.....	.....

Item	Dip nets	Pots, eel	Scrapes	Dredges, oyster	Tongs		Rakes, other than for oysters	By hand, other than for oysters	Total, exclusive of duplication
					Oyster	Other			
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	.....	.....	.....	696	.....	.....	.....	.....	696
On boats and shore:									
Regular	623	126	334	139	3,591	57	10	43	4,907
Casual	597	38	.....	.....	747	30	.....	.....	2,225
Total	1,220	164	334	835	4,338	87	10	43	7,855
Vessels, sail	.....	.....	.....	140	.....	.....	.....	.....	140
Net tonnage	.....	.....	.....	1,694	.....	.....	.....	.....	1,694
Boats:									
Motor	.....	104	.....	20	2,098	22	.....	.....	2,951
Other	1,143	33	304	41	156	57	10	5	2,360
Apparatus:									
Number	1,215	13,597	708	416	4,341	87	10	.....	.....
Yards at mouth	.....	.....	708	470	.....	.....	.....	.....	.....

CATCH: BY GEAR

Species	Haul seines		Gill nets					
			Anchor		Drift		Stake	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	17,700	$216	.....	.....	17,300	$220	11,200	$178
Black bass	14,500	1,209	.....	.....	.....	.....	900	64
Bluefish	9,300	685	.....	.....	111,200	8,760	1,300	77
Butterfish	600	18	.....	.....	.....	.....	.....	.....
Carp	175,000	9,482	.....	.....	1,100	25	3,400	185
Catfish and bullheads	59,900	2,290	.....	.....	300	10	2,000	88
Crappie	900	45	.....	.....	.....	.....	200	8
Croaker	402,400	6,593	.....	.....	2,200	61	4,900	111
Drum, black	7,000	70	.....	.....	.....	.....	.....	.....
Eels, common	2,000	113	.....	.....	.....	.....	.....	.....
Flounders	300	15	.....	.....	.....	.....	.....	.....
Gizzard shad	14,900	271	.....	.....	.....	.....	400	10
Hickory shad	200	7	.....	.....	100	5	.....	.....
King whiting or "kingfish"	100	5	.....	.....	.....	.....	.....	.....
Mullet	.....	.....	.....	.....	17,500	950	.....	.....
Pike or pickerel	7,200	1,174	.....	.....	.....	.....	1,900	170
Shad	1,000	58	16,400	$1,601	228,800	24,110	78,000	8,105
Spot	5,100	171	.....	.....	2,500	70	.....	.....
Squeteagues or "sea trout":								
Gray	30,200	1,512	.....	.....	3,300	162	700	40
Spotted	3,400	330	.....	.....	.....	.....	.....	.....
Striped bass	162,500	13,209	35,000	2,787	55,900	5,236	188,800	18,176
Suckers	1,300	72	.....	.....	.....	.....	400	12
Sunfish	700	23	.....	.....	.....	.....	300	9
White perch	46,700	2,077	300	26	6,500	342	15,100	857
Yellow perch	11,500	732	.....	.....	.....	.....	1,000	58
Crabs, soft and peelers	118,100	15,002	.....	.....	.....	.....	.....	.....
Total	1,092,500	55,579	50,700	4,414	446,700	39,951	310,500	28,148

Fisheries of Maryland, 1935—Continued

CATCH: BY GEAR—Continued

Species	Lines: Hand		Lines: Trot with baits or snoods		Pound nets		Fyke nets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives					4,177,900	$50,245	5,100	$115
Black bass					500	50	19,300	1,558
Bluefish	100,000	$10,000			90,700	5,969		
Bonito	400	32			100	2		
Butterfish					226,200	7,319		
Carp					15,800	676	22,500	1,206
Catfish and bullheads					72,800	2,890	150,000	5,990
Crappie					2,000	10	2,700	141
Croaker					2,987,700	35,264	2,700	86
Dolphin	100	10						
Drum:								
Black					17,100	104		
Red or redfish					4,000	114		
Eels:								
Common					5,500	415	11,400	695
Conger	600	12						
Flounders	20,000	2,000			13,200	592		
Gizzard shad					26,200	461	1,100	22
Harvestfish					5,100	99		
Hickory shad					19,300	448		
King whiting or "kingfish"					2,200	50		
Menhaden					7,000	350		
Pike or pickerel					1,800	281	10,200	1,451
Pompano					100	20		
Scup	10,000	100			112,500	1,138		
Sea bass	15,000	750						
Shad					473,800	49,541	200	22
Spanish mackerel					1,500	150		
Spot					10,200	378		
Squeteagues or "sea trout":								
Gray	4,000	400			1,274,800	28,353	200	10
Spotted					1,600	165		
Striped bass					480,700	38,756	4,800	480
Sturgeon					400	70		
Suckers					1,100	53	8,600	269
Sunfish							1,500	28
Tautog	100	3						
White perch					127,600	6,171	108,900	5,060
Yellow perch					5,300	317	65,400	3,867
Crabs:								
Hard			17,014,000	$346,241				
Soft and peelers			283,300	19,564				
Squid					55,000	1,275		
Total	150,200	13,307	17,297,300	365,805	10,219,700	231,726	414,600	21,000

Species	Dip nets		Pots, eel		Scrapes	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Catfish and bullheads			1,000	$50		
Eels, common			228,400	15,008		
Shad	2,800	$340				
Crabs:						
Hard	7,500	198			243,300	$6,083
Soft and peelers	1,053,700	106,856			1,101,500	88,113
Total	1,064,000	107,394	229,400	15,058	1,344,800	94,196

Species	Dredges		Tongs		Rakes		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Clams, hard, public			24,500	$3,104	500	$64	300	$32
Oysters:								
Market, public, spring	706,600	$43,165	3,542,800	212,495				
Market, public, fall	2,581,400	160,862	7,182,700	464,313				
Market, private, spring	80,800	13,163	186,800	18,351				
Market, private, fall	223,100	26,687	1,079,600	82,579				
Terrapin, diamond back							5,800	2,188
Total	3,591,900	243,877	12,016,400	780,842	500	64	6,100	2,220

Fisheries of Maryland, 1935—Continued

OPERATING UNITS: BY COUNTIES

Item	Anne Arundel	Baltimore	Calvert	Caroline	Cecil	Charles	Dorchester	Harford
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	5	25	14				184	
On boats and shore:								
Regular	535	10	239	7	36	119	834	20
Casual	330	77	83	82	81	203	135	37
Total	870	112	336	89	117	322	1,153	57
Vessels, sail	1	5	3				37	
Net tonnage	19	96	46				358	
Boats:								
Motor	346	30	137	11	41	136	551	27
Other	253	43	138	34	45	71	103	10
Apparatus:								
Haul seines	45	7	14	6	17	16	2	11
Length, yards	2,300	866	1,035	2,148	3,740	2,434	850	2,160
Gill nets:								
Anchor		5			46			
Square yards		1,235			10,550			
Drift	8	1		54	15	29	22	13
Square yards	4,466	400		22,557	16,130	83,760	27,736	18,614
Stake	10	40		85	60	921	125	185
Square yards	1,292	3,919		2,805	4,099	68,129	2,374	36,935
Lines:								
Trot with baits or snoods	96	42	65			40	666	
Baits or snoods	57,200	21,000	28,400			28,500	512,400	
Pound nets	23	14	17	9	48	22	124	4
Fyke nets	19	288		19	1,335	30	7	401
Dip nets	143		95			16	43	
Pots, eel	707	707	75	40	553	65	3,647	100
Dredges, oyster	2	10	6				80	
Yards at mouth	3	15	8				100	
Tongs:								
Oyster	712		297			177	697	

Item	Kent	Prince Georges	Queen Annes	St. Marys	Somerset	Talbot	Wicomico	Worcester
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels					396	72		
On boats and shore:								
Regular	370	5	495	424	790	565	235	223
Casual	170	22	160	248	202	122	190	110
Total	540	27	655	672	1,388	759	425	333
Vessels, sail					79	15		
Net tonnage					1,046	129		
Boats:								
Motor	194	8	280	272	241	378	155	144
Other	132	10	101	287	670	221	51	191
Apparatus:								
Haul seines	65	8	50	4	3	4	2	2
Length, yards	3,264	970	1,350	1,070	1,750	1,335	800	275
Gill nets:								
Anchor	138							
Square yards	20,114							
Drift	21	4	1		11	13	54	10
Square yards	58,564	5,866	1,466		1,441	12,724	38,750	2,192
Stake	1,072	2	16		201	13	365	
Square yards	114,904	166	2,494		4,353	1,200	14,600	
Lines:								
Hand								40
Hooks								40
Trot with baits or snoods	91		100	111	98	215	16	191
Baits or snoods	49,500		74,000	115,400	59,700	158,500	12,800	124,000
Pound nets	27	1	3	61	29	101	18	28
Fyke nets	338	72	34		32	17	13	
Dip nets	50		80	219	432	87		50
Pots, eel	892	138	236	12	10	6,390	16	
Scrapes					708			
Yards at mouth					708			
Dredges, oyster					232	32		54
Yards at mouth					266	39		39
Tongs:								
Oyster	341		560	496	320	397	294	50
Other								87
Rakes, other than for oysters								10

Fisheries of Maryland, 1935—Continued

CATCH: BY COUNTIES

Species	Anne Arundel		Baltimore		Calvert		Caroline	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	181,000	$2,337	41,100	$540	164,600	$2,041	17,900	$195
Black bass	100	11	200	25			1,100	108
Bluefish	28,000	1,556	1,400	60	500	38		
Carp	10,300	580	4,700	226	2,100	128	6,000	540
Catfish and bullheads	5,300	217	35,500	1,201	6,200	226	8,800	336
Croaker	249,900	7,172	4,300	98	48,800	506	11,000	220
Eels, common	22,600	1,540	23,400	1,259	300	15	1,200	63
Flounders	700	42			300	15		
Gizzard shad	8,400	143	7,000	111	500	20	3,000	50
Hickory shad	4,000	83	200	2	1,100	30	100	5
Pike or pickerel	600	95	700	123	100	20	200	30
Shad	45,300	4,071	700	70	33,600	2,794	17,200	2,106
Spot	4,800	151	200	4	500	25	300	15
Squeteagues or "sea trout":								
Gray	252,200	9,155	1,300	92	4,600	246	200	10
Spotted	100	10	100	10	100	10		
Striped bass	238,900	15,305	54,400	4,778	5,300	419	64,800	6,780
Sturgeon	200	40						
Suckers	200	10			600	36	200	15
Sunfish			100	5				
White perch	6,500	349	49,900	2,439	6,200	297	9,800	346
Yellow perch	600	41	10,800	593	1,700	107	1,400	120
Crabs:								
Hard	512,600	12,522	213,000	6,390	810,000	18,200		
Soft and peelers	76,200	9,250	27,000	1,350	102,400	13,647		
Oysters:								
Market, public, spring	572,800	35,250	35,000	2,250	214,600	16,161		
Market, public, fall	1,158,300	80,234	175,000	11,250	309,700	23,507		
Market, private, spring					3,600	300		
Market, private, fall					192,600	17,254		
Total	3,379,600	180,164	686,000	32,876	1,910,000	96,042	143,200	10,939

Species	Cecil		Charles		Dorchester		Harford	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	559,400	$7,246	53,100	$919	202,800	$3,004	65,700	$673
Black bass	22,500	1,777	2,500	255	300	30	7,200	560
Bluefish	5,000	300			89,900	6,779		
Carp	32,500	2,001	44,500	2,209	9,100	383	35,000	2,506
Catfish and bullheads	68,900	2,622	19,000	816	16,100	673	27,600	1,197
Crappie	400	11	500	30			300	10
Croaker	500	25	100	2	114,000	1,608		
Drum:								
Black					500	5		
Red or redfish					2,100	79		
Eels, common	9,500	499	2,000	139	84,500	5,829	6,400	371
Flounders			100	5	5,800	249		
Gizzard shad	1,200	12	3,400	51	3,800	93	1,100	23
Hickory shad	800	21	100	2	2,100	42	100	5
Pike of pickerel	9,200	1,229	1,600	265	300	41	6,300	954
Shad	56,200	6,099	53,900	5,304	81,200	8,034	29,500	3,057
Spot			200	4	500	18		
Squeteagues or "sea trout":								
Gray			700	44	17,000	744		
Spotted					500	50		
Striped bass	17,400	1,666	64,800	7,862	74,800	7,130	10,000	1,235
Suckers	2,100	48					5,800	169
Sunfish	1,400	26					1,000	29
White perch	52,200	2,009	19,400	1,063	32,100	1,420	38,100	1,739
Yellow perch	16,100	872	1,500	97	100	8	21,700	1,281
Crabs:								
Hard			463,800	8,066	4,324,500	86,490		
Soft and peelers			4,500	600	230,800	15,450		
Oysters:								
Market, public, spring			55,100	3,671	639,900	42,596		
Market, public, fall			142,500	9,503	1,414,200	93,177		
Market, private, spring					5,900	410		
Market, private, fall			62,700	4,699	10,700	743		
Terrapin, diamond back					3,500	1,503		
Total	955,300	26,463	996,000	45,606	7,367,000	276,648	255,800	13,809

Fisheries of Maryland, 1935—Continued

CATCH: BY COUNTIES—Continued

Species	Kent		Prince Georges		Queen Annes		St. Marys	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	124,100	$1,054	1,500	$21	1,800	$16	377,200	$4,415
Black bass			1,300	115				
Bluefish	1,500	85			100	6	4,300	263
Carp	14,600	455	51,100	2,356	1,000	80	800	26
Catfish and bullheads	30,700	1,104	20,200	624	4,400	236	200	8
Crappie			600	42	2,000	101		
Croaker	107,300	2,287	300	22	1,100	31	47,000	840
Eels, common	22,300	1,654	9,100	515	2,300	115	700	71
Flounders	100	6					700	40
Gizzard shad	500	5	1,200	24			8,500	161
Hickory shad	400	12					3,200	76
Pike or pickerel	1,300	205	400	72	200	20		
Shad	79,200	7,695	5,500	483	300	36	72,200	7,060
Spot	1,300	10					100	4
Squeteagues or "sea trout":								
Gray	53,400	2,733	400	32	100	5	28,100	1,116
Spotted	800	80					1,000	105
Striped bass	250,300	20,001	1,200	136	9,200	762	39,400	3,334
Sturgeon							200	30
Suckers			1,100	61	100	4		
White perch	40,800	2,115	3,000	174	4,300	244	4,100	240
Yellow perch	23,300	1,355	1,600	134	1,400	100		
Crabs:								
Hard	669,700	13,389			1,447,000	23,152	609,100	12,182
Soft and peelers	87,100	10,806			79,300	9,962	102,500	13,559
Oysters:								
Market, public, spring	388,800	19,531			693,800	33,902	287,900	19,576
Market, public, fall	813,000	53,030			1,515,600	88,408	384,400	25,503
Market, private, fall							89,000	6,973
Total	2,710,500	137,612	98,500	4,811	3,764,000	157,200	2,060,600	95,582

Species	Somerset		Talbot		Wicomico		Worcester	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	288,100	$2,940	1,881,300	$23,979	59,100	$884	110,500	$710
Bluefish	5,200	477	66,100	5,277	2,100	110	108,400	10,540
Bonito							500	34
Butterfish	2,400	117	300	15	4,100	205	220,000	7,000
Carp	700	28	4,300	203	1,100	53		
Catfish and bullheads	8,700	507	12,300	483	20,800	1,006	1,300	62
Crappie							2,000	10
Croaker	203,500	1,894	377,700	4,798	30,700	516	2,203,700	22,096
Dolphin							100	10
Drum:								
Black	8,600	84					15,000	85
Red or redfish	1,500	30					400	5
Eels:								
Common	1,700	120	54,900	3,426	3,400	375	3,000	240
Conger							600	12
Flounders	4,100	155	1,500	79	100	10	20,100	2,006
Gizzard shad	600	8	1,000	20	2,400	43		
Harvestfish							5,100	99
Hickory shad	1,000	30	6,000	142			500	10
King whiting or "kingfish"	100	5					2,200	50
Menhaden							7,000	350
Mullet							17,500	950
Pike or pickerel					200	22		
Pompano							100	20
Scup							122,500	1,238
Sea bass							15,000	750
Shad	49,600	6,364	158,300	18,569	89,100	9,034	28,200	3,001
Spanish mackerel							1,500	150
Spot	1,200	48			800	28	7,900	312
Squeteagues or "sea trout":								
Gray	17,300	752	20,400	1,026	10,200	460	907,300	14,062
Spotted	1,600	150	200	20	600	60		
Striped bass	11,200	992	62,500	5,834	22,700	2,335	800	75
Suckers					300	13	1,000	50
Tautog							100	3
White perch	4,800	335	16,200	660	13,100	723	4,600	380
Yellow perch			2,300	206	700	60		
Crabs:								
Hard	2,168,600	51,201	4,728,500	94,570	98,000	1,960	1,220,000	24,400
Soft and peelers	1,637,800	131,026	75,000	9,228	1,000	60	133,000	14,577

Fisheries of Maryland, 1935—Continued

CATCH: BY COUNTIES—Continued

Species	Somerset		Talbot		Wicomico		Worcester	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Clams, hard, public							25,300	$3,200
Oysters:								
Market, public, spring	938,300	$54,677	356,100	$23,375	67,100	$4,671		
Market, public, fall	2,477,200	152,027	1,210,200	78,600	164,000	9,936		
Market, private, spring	23,000	1,232			100,600	6,709	134,500	22,863
Market, private, fall	395,600	28,047			304,700	20,313	247,400	31,237
Squid							55,000	1,275
Terrapin, diamond back	2,300	625						
Total	8,254,700	433,871	9,035,100	270,510	996,900	59,586	5,622,100	161,862

SEED OYSTER FISHERY: BY GEAR

Item	Oyster dredges	
OPERATING UNITS	*Number*	
Fishermen, on vessels	209	
Vessels, sail	39	
Net tonnage	758	
Apparatus, number	78	
Yards at mouth	107	
CATCH	*Bushels*	*Value*
Oysters, seed, public, spring	229,618	$22,962

NOTE.—Of the persons and gear employed in the seed oyster fishery all are duplicated among those in the market oyster fishery or fisheries for other species. The Maryland seed oyster fishery was carried on by vessels from Somerset, Talbot, Dorchester, Calvert, and Baltimore Counties in the open waters of Chesapeake Bay off Anne Arundel, Kent, and Queen Annes Counties.

VIRGINIA

Fisheries of Virginia, 1935

OPERATING UNITS: BY GEAR

Item	Purse seines, menhaden	Haul seines	Gill nets			Lines	
			Drift	Runaround	Stake	Hand	Trot with baits or snoods
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	1,002						
On boats and shore:							
Regular		193	52		110	1	804
Casual		290	519	3	188	2	502
Total	1,002	483	571	3	298	3	1,306
Vessels:							
Steam	22						
Net tonnage	2,480						
Motor	7						
Net tonnage	631						
Total vessels	29						
Total net tonnage	3,111						
Boats:							
Motor		82	16	1	105		1,128
Other		152	306	2	131	3	174
Accessory boats	83	3					
Apparatus:							
Number	29	152	332	2	7,380	150	1,304
Length, yards	8,990	45,430					
Square yards			281,395	2,400	269,307		
Hooks, baits, or snoods						150	684,700

Fisheries of Virginia, 1935—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Pound nets	Crab pound nets	Stop nets	Fyke nets	Dip nets	Otter trawls
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels						90
On boats and shore:						
Regular	1,748	2	6	62	1,140	
Casual	304	2	4	80	826	
Total	2,052	4	10	142	1,966	90
Vessels:						
Motor						23
Net tonnage						385
Boats:						
Motor	491	2		39	57	
Other	417	2	5	82	1,804	
Apparatus:						
Number	2,000	12	5	667	1,966	23
Square yards			3,100			
Yards at mouth						688

Item	Pots				Scrapes	Dredges	
	Crab	Eel	Fish	Turtle		Crab	Oyster
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels						249	97
On boats and shore:							
Regular	4	9	9	1	8	55	250
Casual			7			13	
Total	4	9	16	1	8	317	347
Vessels:							
Motor						80	20
Net tonnage						771	322
Boats:							
Motor	2	2	3			17	125
Other	2	4	11	1	8	30	
Apparatus:							
Number	46	164	141	10	8	211	290
Yards at mouth					8	379	307

Item	Tongs		Rakes		Picks	By hand		Total, exclusive of duplication
	Oyster	Other	Oyster	Other		Oyster	Other	
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	3							1,422
On boats and shore:								
Regular	2,468	588	586	86	571	116	564	6,045
Casual	1,138	135	15				52	3,794
Total	3,609	723	601	86	571	116	616	11,261
Vessels:								
Steam								22
Net tonnage								2,480
Motor	1							125
Net tonnage	6							2,057
Total vessels	1							147
Total net tonnage	6							4,537
Boats:								
Motor	1,816	385	43	40	42		5	3,025
Other	582	219	389	46	456	58	119	3,795
Accessory boats								86
Apparatus:								
Number	2,889	660	601	86	571			

Fisheries of Virginia, 1935—Continued

CATCH: BY GEAR

Species	Purse seines		Haul seines		Gill nets			
					Drift		Runaround	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			587,500	$5,758	37,100	$391		
Bluefish			28,300	1,297				
Bowfin			5,000	150				
Butterfish			20,100	202				
Carp			348,100	16,901	500	10		
Catfish and bullheads			85,700	3,446				
Croaker			611,700	6,794	200	8	40,000	$450
Drum, red or redfish			1,800	37				
Eels, common			52,800	3,298				
Flounders			13,900	698				
Gizzard shad			64,500	735				
Harvestfish			20,000	150				
Hickory shad			1,300	49	500	5		
King whiting or "kingfish"			1,000	30				
Menhaden	119,230,600	$407,520						
Mullet			18,500	745	2,000	120	3,000	90
Pigfish			2,500	74				
Shad			13,300	1,612	162,000	16,180		
Spanish mackerel			200	20				
Spot			111,000	4,261	2,000	60	2,000	50
Squeteagues or "sea trout":								
Gray			148,700	6,466				
Spotted			106,300	7,231				
Striped bass			38,300	3,385	27,500	3,020		
White perch			58,500	2,648				
Yellow perch			9,100	613				
Total	119,230,600	407,520	2,348,100	66,600	231,800	19,794	45,000	590

Species	Gill nets—Con.		Lines				Pound nets	
	Stake		Hand		Trot with baits or snoods			
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	7,800	$186					10,299,000	$58,305
Bluefish	1,300	63					308,700	16,197
Butterfish							2,241,200	54,429
Cabio or crab eater							48,600	2,471
Carp							58,200	2,055
Catfish and bullheads	600	20					122,700	4,318
Croaker	13,100	309					16,567,400	185,321
Drum:								
Black							38,600	605
Red or redfish							28,600	665
Eels, common							92,000	12,082
Flounders	200	10					239,400	9,139
Gizzard shad	9,200	140					194,600	2,186
Harvestfish							126,200	2,806
Hickory shad	100	2					50,900	1,205
King whiting or "kingfish"							27,100	331
Mackerel							54,100	2,134
Menhaden							1,850,000	2,580
Mullet	7,200	245					5,400	178
Pigfish	500	10					8,400	273
Scup							442,100	6,677
Sea bass							2,700	50
Shad	207,800	22,691					2,490,800	233,830
Sharks							1,200	12
Skates							15,800	129
Spanish mackerel							35,800	2,509
Spot	1,300	48					277,800	9,860
Squeteagues or "sea trout":								
Gray	9,700	220					12,660,900	140,932
Spotted	100	5					5,400	298
Striped bass	51,800	7,117					227,900	22,759
Sturgeon							3,500	506
Tautog							1,100	15
White perch	1,000	71					103,300	4,544
Yellow perch	100	5					6,400	424
Crabs, hard					14,686,300	$308,271	62,400	1,300
Squid							194,700	2,925
Turtles, snapper			7,500	$300				
Total	311,800	31,142	7,500	300	14,686,300	308,271	48,892,900	781,050

Fisheries of Virginia, 1935—Continued

CATCH: BY GEAR—Continued

Species	Crab pound nets		Stop nets		Fyke nets		Dip nets	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives					42,400	$456		
Carp			23,700	$585	43,400	1,661		
Catfish and bullheads			49,000	980	153,800	5,216		
Croaker					52,400	1,018		
Eels, common					8,300	671		
Flounders					4,100	145		
Gizzard shad					19,300	193		
Hickory shad					300	2		
Mullet					600	40		
Pike or pickerel					1,800	160		
Shad					9,000	1,032		
Squeteagues or "sea trout", gray					15,800	478		
Striped bass					29,300	3,029		
White perch					116,000	4,992		
Yellow perch					43,700	2,096		
Crabs:								
Hard	12,000	$300					156,000	$2,540
Soft and peelers	6,000	600					1,280,700	137,998
Total	18,000	900	72,700	1,565	540,000	21,187	1,436,700	140,538

Species	Otter trawls		Pots					
			Crab		Eel		Fish[6]	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bluefish	1,800	$118						
Butterfish	59,200	1,931						
Carp							300	$15
Catfish and bullheads							70,000	1,900
Cod	400	9						
Croaker	5,753,000	99,192						
Drum, red or redfish	4,000	100						
Eels, common	2,100	23			4,400	$296	1,900	84
Flounders	414,100	23,522						
Hake	23,100	397						
Herring, sea	2,100	33						
King whiting or "kingfish"	27,500	1,088						
Scup	1,492,600	21,179						
Sea bass	208,400	7,965						
Sharks	6,000	143						
Skates	1,000	15						
Spot	13,000	207						
Squeteagues or "sea trout", gray	608,100	15,831						
Sturgeon	2,700	312						
Swellfish	800	16						
Tautog	500	6						
Tomcod	1,100	11						
White perch	15,200	200						
Whiting	16,100	250						
Crabs:								
Hard			48,000	$500				
Soft and peelers			7,700	804				
Lobsters	700	82						
Squid	39,800	619						
Total	8,693,300	173,249	55,700	1,304	4,400	296	72,200	1,999

Species	Pots—Con.		Scrapes		Dredges			
	Turtle				Crab		Oyster	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crabs:								
Hard			6,000	$90	4,792,200	$175,698		
Soft and peelers			33,000	3,960				
Oysters:								
Market, private, spring							2,576,300	$186,037
Market, private, fall							4,546,800	338,621
Turtles, snapper	7,500	$300						
Total	7,500	300	39,000	4,050	4,792,200	175,698	7,123,100	524,658

Fisheries of Virginia, 1935—Continued

CATCH: BY GEAR—Continued

Species	Tongs		Rakes		Picks		By hand	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crabs, soft and peelers							121,600	$12,160
Clams:								
Hard, public	1,021,900	$216,627	170,400	$41,120	303,200	$75,800	128,400	32,100
Hard, private	20,000	5,000						
Mussels, sea							23,200	776
Oysters:								
Market, public, spring	1,297,000	78,421	900	56			6,000	350
Market, public, fall	1,869,800	118,098	39,300	3,251			28,800	1,680
Market, private, spring	2,143,800	140,544	831,600	61,365				
Market, private, fall	840,700	59,919	136,200	9,480				
Terrapin, diamond back							400	180
Total	7,193,200	618,609	1,178,400	115,272	303,200	75,800	308,400	47,246

OPERATING UNITS: BY COUNTIES

Item	Accomac	Arlington	Caroline	Charles City	Chesterfield	Dinwiddie	Elizabeth City	Essex	Fairfax
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	6						123		
On boats and shore:									
Regular	1,302			11			161	81	12
Casual	175	20	2	132	53	11	61	58	39
Total	1,483	20	2	143	53	11	345	139	51
Vessels, motor	2						31		
Net tonnage	28						418		
Boats:									
Motor	571	8		4			54	43	8
Other	676	2	2	82	31	10	30	50	29
Apparatus:									
Haul seines	13			6	1			9	4
Length, yards	6,800			925	300			1,800	900
Gill nets:									
Drift		10		83	26	10			10
Square yards		19,600		58,320	7,770	2,595			14,100
Stake	1			170				3	
Square yards	340			5,260				2,590	
Lines:									
Trot with baits or snoods	179						20	5	
Baits or snoods	114,000						11,000	2,500	
Pound nets	215						200	4	
Stop nets					1				1
Square yards					1,000				300
Fyke nets	3		3	10	3			5	285
Dip nets	265								
Otter trawls							12		
Yards at mouth							358		
Pots:									
Eel				20					
Fish				31	26				
Scrapes	8								
Yards at mouth	8								
Dredges:									
Crab	47						30		
Yards at mouth	51						60		
Oyster	250						10		
Yards at mouth	240						17		
Tongs:									
Oyster	752							73	
Other	254						49		
Rakes, oyster	226								
Picks	261								

Fisheries of Virginia, 1936—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Gloucester	Henrico	Isle of Wight	James City	King and Queen	King George	King William	Lancaster	Mathews
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	26							469	36
On boats and shore:									
Regular	264		366	25		41		451	403
Casual	101	53	96	72	46	86	96	553	289
Total	391	53	462	97	46	127	96	1,473	728
Vessels:									
Steam								8	
Net tonnage								820	
Motor	9							9	10
Net tonnage	101							391	115
Total vessels	9							17	10
Total net tonnage	101							1,211	115
Boats:									
Motor	168		339	18	1	77		488	263
Other	46	27	51	39	34	66	43	387	112
Accessory boats								38	
Apparatus:									
Purse seines, menhaden								13	
Length, yards								4,230	
Haul seines		2			1	4	1		3
Length, yards		175			200	1,100	90		2,100
Gill nets:									
Drift		28		30	15	10	34		
Square yards		11,250		15,600	4,800	8,200	18,540		
Stake	100		2,921	1,344	401	575	201		120
Square yards	2,980		87,630	40,125	12,030	23,000	3,318		2,880
Lines:									
Hand					100				
Hooks					100				
Trot with baits or snoods	52		92			39		114	97
Baits or snoods	20,800		45,400			19,000		57,000	47,000
Pound nets	120		4	10		43		172	537
Crab pound nets									12
Fyke nets	11		65	24		39	4		
Dip nets						30		323	10
Otter trawls									1
Yards at mouth									30
Pots, fish						9			
Dredges:									
Crab	18								14
Yards at mouth	36								28
Oyster								8	8
Yards at mouth								13	12
Tongs:									
Oyster	40		319					384	27
Other	124								43

Item	Middlesex	Nansemond	New Kent	Norfolk	Northampton	Northumberland	Prince George	Princess Anne
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	13	3		42		550		
On boats and shore:								
Regular	378	79	2	69	611	979	10	61
Casual	557	86	44	81	40	499	42	104
Total	948	168	46	192	651	2,028	52	165
Vessels:								
Steam						14		
Net tonnage						1,660		
Motor	4	1		7		3		
Net tonnage	59	6		204		318		
Total vessels	4	1		7		17		
Total net tonnage	59	6		204		1,978		
Boats:								
Motor	363	91	1	47	245	364	4	74
Other	93	11	26	62	377	1,010	27	64
Accessory boats						48		

Fisheries of Virginia, 1935—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Middlesex	Nansemond	New Kent	Norfolk	Northampton	Northumberland	Prince George	Princess Anne
Apparatus:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Purse seines, menhaden						16		
Length, yards						4,760		
Haul seines	3		3	5	4		8	41
Length, yards	2,300		640	1,600	1,800		2,150	8,900
Gill nets:								
Drift			17	4			23	
Square yards			88,500	1,200			7,570	
Stake		270	127	328	15			
Square yards		10,800	3,810	9,150	360			
Lines, trot with baits or snoods	68	24		81	140	203		38
Baits or snoods	34,000	14,000		40,000	78,600	103,500		19,000
Pound nets	14			31	134	348		6
Stop nets							3	
Square yards							1,800	
Fyke nets		8	5				8	29
Dip nets	96				340	862		
Otter trawls				1				
Yards at mouth				32				
Pots:								
Crab						15		
Fish			24				51	
Dredges:								
Crab	6					2		
Yards at mouth	12					4		
Oyster	2			12				
Yards at mouth	3			22				
Tongs:								
Oyster	455	96			144	190		15
Other					98			6
Rakes, oyster					375			
Picks					310			

Item	Prince William	Richmond	Southampton	Stafford	Surry	Warwick	Westmoreland	York
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels						7		147
On boats and shore:								
Regular	12	84		43	3	56	217	324
Casual	41	54	45	25	24	14	187	8
Total	53	138	45	68	27	77	404	479
Vessels, motor						2		47
Net tonnage						34		383
Boats:								
Motor	11	42		23	5	35	132	146
Other	18	68	7	37	19	5	170	84
Apparatus:								
Haul seines	8	3	7	8	5		3	10
Length, yards	1,700	700	1,050	1,700	1,300		800	6,400
Gill nets:								
Drift	6	24			2			
Square yards	7,260	14,400			1,600			
Runaround								2
Square yards								2,400
Stake	16			112	226	448	2	
Square yards	7,800			36,350	6,780	13,440	664	
Lines:								
Hand		50						
Hooks		50						
Trot with baits or snoods		8		10		4	102	28
Baits or snoods		4,800		5,300		2,200	52,000	14,600
Pound nets		37		15		13	73	24
Fyke nets	63			44	17	19	12	10
Dip nets							40	
Otter trawls						1		
Yards at mouth						30		238
Pots:								
Crab							31	
Eel	34	10		100				
Turtle		10						
Dredges, crab						2		92
Yards at mouth						4		184
Tongs:								
Oyster		51				30	172	141
Other								86
Rakes, other than for oysters								86

Fisheries of Virginia, 1936—Continued

CATCH: BY COUNTIES

Species	Accomac		Arlington		Caroline		Charles City	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	629,500	$3,333					17,000	$200
Bluefish	35,600	2,776						
Butterfish	487,600	15,879						
Cabio or crab eater	18,400	980						
Carp					100	$2	6,500	154
Catfish and bullheads	900	36			400	12	24,200	578
Croaker	2,240,100	37,164						
Drum:								
Black	37,600	595						
Red or redfish	13,000	468						
Eels	22,500	2,200			200	13	700	37
Flounders	22,500	1,070						
Harvestfish	8,900	372						
Hickory shad	1,500	15						
King whiting or "kingfish"	4,100	63						
Mackerel	2,100	52						
Menhaden	65,000	110						
Mullet	8,500	456						
Pigfish	1,400	64						
Pike or pickerel							400	40
Scup	14,300	242						
Shad	152,100	12,925	16,500	$1,135			39,800	5,004
Sharks	200	2						
Skates	9,800	89						
Spanish mackerel	1,000	46						
Spot	46,900	1,925						
Squeteagues or "sea trout":								
Gray	1,583,300	28,438						
Spotted	8,400	356						
Striped bass	17,500	1,790					4,100	400
Sturgeon	300	85						
Tautog	400	4						
White perch	5,200	152			500	40	3,100	150
Yellow perch					200	15		
Crabs:								
Hard	2,076,600	47,490						
Soft and peelers	600,200	66,930						
Clams, hard, public	693,200	172,900						
Mussels, sea	23,200	776						
Oysters:								
Market, public, spring	264,600	17,976						
Market, public, fall	703,400	48,077						
Market, private, spring	614,500	48,999						
Market, private, fall	253,800	19,629						
Squid	90,300	1,355						
Terrapin, diamond back	400	180						
Total	10,758,800	535,999	16,500	1,135	1,400	82	95,800	6,563

Species	Chesterfield		Dinwiddie		Elizabeth City		Essex		Fairfax	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	20,600	$196			252,400	$1,270	300	$6	1,600	$32
Bluefish					63,500	2,576				
Butterfish					260,200	4,456				
Cabio or crab eater					1,700	121				
Carp	7,100	320			100	3	7,800	345	25,100	870
Catfish and bullheads	18,000	894					7,400	268	73,600	2,180
Cod					100	2				
Croaker					7,355,200	90,212	2,000	80		
Drum, red or redfish					2,600	56				
Eels	200	16			500	6	1,800	146	1,900	124
Flounders					280,200	15,574				
Gizzard shad					20,000	105	9,100	248	13,600	182
Hake					6,300	130				
Harvestfish					74,600	1,500				
Herring, sea					1,900	29				
Hickory shad	200	7								
King whiting or "kingfish"					35,400	709				
Menhaden					40,000	40				
Mullet	200	10								
Pike or pickerel									900	80

Fisheries of Virginia, 1935—Continued

CATCH: BY COUNTIES—Continued

Species	Chesterfield		Dinwiddie		Elizabeth City		Essex		Fairfax	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Scup					985,000	$13,999				
Sea bass					104,700	4,167				
Shad	5,800	$672	400	$69	207,600	21,175	400	$55	40,500	$2,635
Sharks					700	28				
Spanish mackerel					13,900	1,340				
Spot					38,200	743				
Squeteagues or "sea trout", gray					2,127,200	24,671	300	12		
Striped bass	100	8	400	48	1,500	120	1,000	112	9,600	985
Sturgeon					3,400	402				
Tautog					1,000	11				
Tomcod					1,100	11				
White perch					22,200	415	7,200	563	37,400	1,199
Whiting					3,700	38				
Yellow perch							2,100	150	24,900	1,210
Crabs, hard					1,596,800	53,496	19,900	548		
Lobsters					500	54				
Clams:										
Hard, public					56,000	14,000				
Hard, private					20,000	5,000				
Oysters:										
Market, public, spring							42,000	2,400		
Market, public, fall							25,200	1,440		
Market, private, spring					337,800	33,782	79,800	4,560		
Market, private, fall					1,017,600	101,747	63,000	3,600		
Squid					28,500	389				
Total	52,200	2,124	800	117	14,962,100	392,377	269,300	14,533	229,100	9,497

Species	Gloucester		Henrico		Isle of Wight		James City	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	144,300	$975	1,500	$18	25,600	$236	9,000	$129
Bluefish	31,200	1,790						
Butterfish	56,300	1,150						
Cabio or crab eater	900	36						
Carp			8,000	240	9,400	378	10,800	391
Catfish and bullheads	1,600	55	2,500	55	12,000	351	9,400	318
Croaker	3,413,100	44,640			42,500	836	14,200	286
Eels	100	5			1,800	126		
Flounders	68,000	2,530			500	24		
Gizzard shad	400	4	1,500	15	19,700	226		
Harvestfish	20,300	450						
King whiting or "kingfish"	300	5						
Mullet					2,700	81		
Shad	166,800	18,030	4,400	502	55,800	7,576	65,400	6,996
Spot	28,600	855						
Squeteagues or "sea trout", gray	1,556,400	17,600			14,200	407	3,100	126
Striped bass	600	59	1,000	148	22,000	2,565	15,300	1,532
White perch	3,000	131	200	16	23,000	950	6,600	280
Crabs, hard	853,500	24,731			761,800	15,870		
Clams, hard, public	381,500	71,535						
Oysters:								
Market, public, spring	20,000	1,300			60,800	4,053		
Market, public, fall	26,000	1,650			235,500	15,700		
Market, private, spring	145,400	8,725			75,100	5,000		
Market, private, fall	39,400	2,624			8,700	586		
Total	6,957,700	198,880	19,100	994	1,371,100	54,965	133,800	10,058

Fisheries of Virginia, 1936—Continued

CATCH: BY COUNTIES—Continued

Species	King and Queen		King George		King William		Lancaster	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives			72,700	$1,243	14,400	$230	1,884,300	$10,953
Bluefish							11,200	594
Butterfish							9,900	327
Cabio or crab eater							2,300	100
Carp			9,800	424			1,500	30
Catfish and bullheads	600	$20	38,300	1,680	400	20		
Croaker							380,000	3,681
Drum, black							1,000	10
Eels			7,400	614				
Flounders			2,500	79			6,800	290
Gizzard shad			78,500	807			2,300	20
Harvestfish							9,300	198
Hickory shad	500	10	3,500	104	400	9	2,000	43
Menhaden							50,832,000	174,811
Mullet			200	20	400	20		
Shad	2,600	470	32,100	4,043	11,500	1,323	119,800	8,365
Skates							4,000	20
Spanish mackerel							200	20
Spot							300	9
Squeteagues or "sea trout":								
Gray			3,500	130			333,900	5,249
Spotted							1,500	120
Striped bass	400	45	53,400	7,657	800	96	34,800	3,639
Sturgeon							600	110
Tautog							200	6
White perch	400	20	32,200	1,748	100	4	4,500	280
Yellow perch			3,100	208				
Crabs:								
Hard			338,400	5,640			1,003,200	22,800
Soft and peelers			7,600	1,260			193,800	19,400
Oysters:								
Market, public, spring							317,000	18,115
Market, public, fall							440,000	25,338
Market, private, spring							422,800	24,165
Market, private, fall							327,800	20,231
Turtles, snapper	5,000	200						
Total	9,500	765	683,200	25,657	28,000	1,702	56,347,000	338,924

Species	Mathews		Middlesex		Nansemond		New Kent	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	526,400	$3,480	4,400	$72	2,000	$20	35,000	$350
Bluefish	97,600	4,784	12,000	390				
Butterfish	155,300	5,272						
Cabio or crab eater	4,200	222						
Carp			6,000	120			5,300	208
Catfish and bullheads			2,000	40			7,600	326
Cod	100	4						
Croaker	3,618,500	31,411	208,100	1,120	3,200	64		
Drum, red or redfish	2,600	45						
Eels					200	12		
Flounders	53,200	2,162	5,100	308				
Gizzard shad							6,000	55
Hake	1,500	23						
Harvestfish	5,400	186						
Hickory shad	6,000	200	300	12				
King whiting or "kingfish"	2,200	80						
Menhaden	130,000	150	30,000	60				
Mullet	2,100	60						
Scup	117,200	1,360						
Sea bass	14,200	511						
Shad	1,048,500	99,540	2,100	305	4,300	482	10,400	1,408
Spanish mackerel	2,500	162						
Spot	41,600	791	20,200	404				

Fisheries of Virginia, 1935—Continued

CATCH: BY COUNTIES—Continued

Species	Mathews		Middlesex		Nansemond		New Kent	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Squeteagues or "sea trout":								
Gray	2,928,600	$40,860	7,400	$79				
Spotted	16,100	665	10,000	550				
Striped bass	15,800	1,038	13,200	906	400	$40	900	$95
Sturgeon	100	7						
White perch	300	6	500	25	2,100	52	2,500	162
Whiting	3,300	50						
Yellow perch					1,800	70		
Crabs:								
Hard	1,581,300	35,930	1,048,200	20,833	264,000	6,000		
Soft and peelers	30,000	3,000	50,400	7,400				
Clams, hard, public	30,800	7,700						
Oysters:								
Market, public, spring	600	40	504,100	28,805	3,400	300		
Market, public, fall	10,300	686	241,400	13,800	1,300	84		
Market, private, spring	181,100	15,502	190,700	14,480	87,800	7,300		
Market, private, fall	297,200	25,428	122,500	10,635	160,400	14,730		
Squid	1,600	35						
Total	10,926,200	281,390	2,478,600	100,344	530,900	29,154	67,700	2,604

Species	Norfolk		Northampton		Northumberland		Prince George	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	57,000	$465	71,000	$675	5,758,800	$28,770	30,800	$256
Bluefish	3,000	180	32,200	1,951	30,900	1,320		
Butterfish	59,600	829	1,231,600	27,197	15,700	251		
Cabio or crab eater	200	10	19,100	963	1,700	35		
Carp					16,400	388	20,600	487
Catfish and bullheads							115,800	2,307
Croaker	232,500	3,197	1,933,800	26,561	757,900	10,799		
Drum, red or redfish	3,000	60	9,100	114	2,900	35		
Eels	1,500	15	55,500	8,881	1,300	112	1,700	68
Flounders	67,900	2,553	34,100	1,365	15,000	444		
Gizzard shad							4,500	33
Hake	11,100	194						
Harvestfish	20,000	150	7,700	100				
Hickory shad	6,000	90	200	8	20,000	368	500	25
King whiting or "kingfish"			1,200	36				
Mackerel			52,000	2,082				
Menhaden					69,983,600	234,929		
Mullet	3,000	150	7,800	157				
Pigfish	2,700	88	1,000	15				
Scup	146,900	2,242	427,600	6,431				
Sea bass	58,400	2,166	2,700	50				
Shad	70,600	7,873	9,200	755	617,000	54,519	12,500	1,229
Sharks			1,000	10				
Skates			2,000	20				
Spanish mackerel	12,000	600	4,800	221				
Spot	70,000	3,560	113,900	4,572	2,400	64		
Squeteagues or "sea trout":								
Gray	91,000	1,203	3,709,700	17,628	419,100	8,354	1,100	55
Spotted	3,000	150	4,200	281	2,500	102		
Striped bass	500	50	2,100	150	65,500	5,880		
Sturgeon	900	108						
White perch			7,500	78	3,000	180	1,200	40
Whiting	8,000	147						
Yellow perch							300	9
Crabs:								
Hard	972,000	24,300	1,670,000	42,000	2,935,300	55,905		
Soft and peelers			261,200	26,436	296,500	30,160		
Clams, hard, public			148,500	35,712				
Oysters:								
Market, public, spring			900	56	5,800	331		
Market, public, fall			2,200	160	78,100	4,675		
Market, private, spring	1,848,900	117,085	844,800	62,135	262,400	16,123		
Market, private, fall	2,874,300	183,958	75,200	5,070	194,000	12,043		
Squid	6,600	132	104,400	1,570				
Total	6,630,600	351,555	10,848,200	273,440	81,485,800	465,787	189,000	4,509

Fisheries of Virginia, 1936—Continued

CATCH: BY COUNTIES—Continued

Species	Princess Anne		Prince William		Richmond		Southampton	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	80,000	$900	22,000	$200	29,900	$606	446,000	$4,200
Bluefish	10,600	622			100	4		
Bowfin	5,000	150						
Butterfish	4,100	122			1,500	90		
Cabio or crab eater	100	4						
Carp	262,000	13,600	23,300	960	25,000	997		
Catfish and bullheads	5,000	150	34,300	1,782	78,000	2,388		
Croaker	508,000	6,531			5,300	210		
Drum, red or redfish	800	12						
Eels	50,000	3,000	5,200	488	3,200	223		
Flounders	4,400	140			500	26		
Gizzard shad	25,000	250	2,200	22	47,600	725		
Hickory shad			500	5	1,300	67		
King whiting or "kingfish"	1,000	30						
Mullet	8,200	326			600	48		
Pigfish	6,300	190						
Pike or pickerel			500	40				
Shad	7,200	703	23,600	2,241	9,300	1,462	3,200	320
Spanish mackerel	1,200	100						
Spot	25,000	1,175			100	5		
Squeteagues, or "sea trout":								
Gray	185,800	8,100			7,100	399		
Spotted	31,100	2,160						
Striped bass			20,500	2,330	20,700	2,121		
White perch	29,000	1,120	85,400	1,659	14,200	1,017		
Yellow perch	8,000	240	4,000	230	5,900	396		
Crabs, hard	516,000	10,750			56,100	1,520		
Clams, hard, public	5,900	2,200						
Oysters:								
Market, public, spring					26,000	1,533		
Market, public, fall					21,200	1,269		
Market, private, spring	5,000	295			60,700	3,469		
Market, private, fall	19,100	3,585			58,500	3,340		
Turtles, snapper					10,000	400		
Total	1,803,800	56,455	171,500	9,957	482,800	22,255	449,200	4,520

Species	Stafford		Surry		Warwick		Westmoreland		York	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	1,000	$20	8,900	$82	15,100	$125	808,300	$6,024	4,000	$30
Bluefish					2,600	114	3,000	240	6,600	334
Butterfish					24,000	541			14,700	448
Carp	8,100	390	19,400	844			1,900	76		
Catfish and bullheads	21,300	1,405	13,300	405			15,200	610		
Cod									200	3
Croaker			1,000	20	809,200	13,830	20,200	308	1,493,000	22,142
Drum, red or redfish					100	3			300	9
Eels	1,200	84	600	48	100	2	3,900	234		
Flounders					80,800	1,858			80,200	5,091
Gizzard shad	500	5	10,700	97			46,000	460		
Hake					4,200	50				
Herring, sea									200	4
Hickory shad							10,200	300		
King whiting, or "kingfish"					3,200	119			8,200	407
Mullet									3,000	90
Scup					173,900	2,139			69,800	1,443
Sea bass					18,000	679			13,100	442
Shad	66,600	5,366	4,500	548	16,200	1,790	31,400	3,193	24,800	2,636
Sharks									5,300	115
Skates									1,000	15
Spanish mackerel					400	40				
Spot					9,000	143			10,900	240
Squeteagues or "sea trout":										
Gray					119,200	1,777	136,800	4,104	215,300	4,733
Spotted									35,000	3,150
Striped bass	6,900	700	5,100	590	4,100	400	42,000	4,481	14,600	1,325
Sturgeon					400	33			500	73
Swellfish									800	16
White perch	18,600	882	1,900	60	5,600	200	24,100	994	2,500	32
Whiting					900	11			200	4
Yellow perch	8,800	592					200	18		

Fisheries of Virginia, 1935—Continued

CATCH: BY COUNTIES—Continued

Species	Stafford		Surry		Warwick		Westmoreland		York	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crabs:										
Hard	36,000	$900			55,600	$1,020	577,500	$10,100	3,400,700	$108,866
Soft and peelers							9,300	936		
Lobsters					200	28				
Clams, hard, public									308,000	61,600
Oysters:										
Market, public, spring					40,300	2,688	18,400	1,230		
Market, public, fall							153,300	10,210		
Market, private, spring					11,600	775	4,900	326	378,400	25,225
Market, private, fall							9,200	614	3,000	200
Squid					900	27			2,200	36
Total	169,000	10,344	65,400	$2,694	1,345,600	28,392	1,915,800	44,458	6,096,500	238,709

SEED OYSTER FISHERY: BY GEAR

Item	Tongs		Rakes		By hand		Total, exclusive of duplication	
OPERATING UNITS								
Fishermen:	*Number*		*Number*		*Number*		*Number*	
On vessels	3						3	
On boats and shore:								
Regular	1,129		200		40		1,369	
Casual	188						188	
Total	1,320		200		40		1,560	
Vessels:								
Motor	1						1	
Net tonnage	6						6	
Boats:								
Motor	843						843	
Other	80		200				280	
Apparatus, number	1,142		200					
CATCH								
Oysters:	*Bushels*	*Value*	*Bushels*	*Value*	*Bushels*	*Value*	*Bushels*	*Value*
Seed, public, spring	898,600	$155,785	15,000	$3,000	5,000	$800	918,600	$159,585
Seed, public, fall	874,100	152,115	5,000	1,000	10,000	1,600	889,100	154,715
Seed, private, spring			20,000	4,000			20,000	4,000
Total	1,772,700	307,900	40,000	8,000	15,000	2,400	1,827,700	318,300

SEED OYSTER FISHERY: BY COUNTIES

Item	Accomac		Elizabeth City		Gloucester	
OPERATING UNITS						
Fishermen:	*Number*		*Number*		*Number*	
On boats and shore:						
Regular	152		45		155	
Casual					62	
Total	152		45		217	
Boats:						
Motor	66		20		144	
Other			10		20	
Apparatus, tongs	93		36		219	
CATCH						
Oysters:	*Bushels*	*Value*	*Bushels*	*Value*	*Bushels*	*Value*
Seed, public, spring	66,200	$9,980	27,000	$4,050	164,300	$24,645
Seed, public, fall	61,600	9,340	27,000	4,050	164,200	24,630
Total	127,800	19,320	54,000	8,100	328,500	49,275

Fisheries of Virginia, 1935—Continued

SEED OYSTER FISHERY: BY COUNTIES—Continued

Item	Isle of Wight		Mathews		Nansemond	
OPERATING UNITS						
Fishermen:	*Number*		*Number*		*Number*	
On vessels					3	
On boats and shore:						
Regular	339		17		72	
Casual	30		30		63	
Total	369		47		138	
Vessels:						
Motor					1	
Net tonnage					6	
Boats:						
Motor	289		20		67	
Other	30					
Apparatus, tongs	319		37		96	
CATCH						
Oysters:	*Bushels*	*Value*	*Bushels*	*Value*	*Bushels*	*Value*
Seed, public, spring	267,700	$61,155	27,700	$4,150	96,200	$14,425
Seed, public, fall	259,300	59,895	27,800	4,170	89,800	13,470
Total	527,000	121,050	55,500	8,320	186,000	27,895

Item	Norfolk		Northampton		Warwick		York	
OPERATING UNITS								
Fishermen:								
On boats and shore:	*Number*		*Number*		*Number*		*Number*	
Regular	24		205		249		111	
Casual			3					
Total	24		208		249		111	
Boats:								
Motor	4		4		161		68	
Other	20		200					
Apparatus:								
Tongs	24		8		199		111	
Rakes			200					
CATCH								
Oysters:	*Bushels*	*Value*	*Bushels*	*Value*	*Bushels*	*Value*	*Bushels*	*Value*
Seed, public, spring	12,000	$1,800	15,000	$3,000	159,200	$23,880	83,300	$12,500
Seed, public, fall			17,000	2,800	159,200	23,880	83,200	12,480
Seed, private, spring			20,000	4,000				
Total	12,000	1,800	52,000	9,800	318,400	47,760	166,500	24,980

NOTE.—Of the total number of persons fishing for seed oysters, 1,266 are duplicated among those fishing for market oysters or other species. Similarly, the following craft and gear are duplicated: 1 vessel, 698 motorboats, 230 other boats, 877 tongs, and 200 rakes.

SHAD AND ALEWIFE FISHERIES OF THE POTOMAC RIVER

The catch of shad in the Potomac River in 1935 amounted to 199,646 in number, 631,171 pounds in weight, and their total value to the fishermen was $55,791. The catch of alewives for the same season amounted to 11,142,750 in number, with a total weight of 4,457,100 pounds, and a value to the fishermen of $26,650. These figures show an increase of 11 percent in the weight and 17 percent in the value of shad as compared with 1934, and an increase of 120 percent in weight and 64 percent in the value of alewives.

Approximately 66 percent of the shad, in weight, were taken with pound nets, and 34 percent, with gill nets. More than 99½ percent of the alewives were taken with pound nets, only a small quantity being taken with gill nets.

Statistics of the catch of shad and alewives in Potomac River are also included in the catch data for Maryland and Virginia which are published elsewhere in this report.

Shad and alewife fisheries of the Potomac River, 1935

Item	Maryland			Virginia			Total		
	Number	*Pounds*	*Value*	*Number*	*Pounds*	*Value*	*Number*	*Pounds*	*Value*
Fishermen on boats and shore:									
Regular	14			299			313		
Casual	108			129			237		
Total	222			428			650		
Boats:									
Motor	44			130			174		
Other	24			118			142		
Apparatus:									
Pound nets	32			293			325		
Gill nets	791			629			1,420		
Square yards	143,845			103,110			246,955		
Shad caught:									
With pound nets	8,646	29,672	$3,343	127,920	385,100	$34,027	136,566	414,772	$37,370
With gill nets	15,419	52,499	5,014	47,661	163,900	13,407	63,080	216,399	18,421
Total	24,065	82,171	8,357	175,581	549,000	47,434	199,646	631,171	55,791
Alewives caught:									
With pound nets	555,750	222,300	2,738	10,532,000	4,212,800	23,712	11,087,750	4,435,100	26,450
With gill nets				55,000	22,000	200	55,000	22,000	200
Total	555,750	222,300	2,738	10,587,000	4,234,800	23,912	11,142,750	4,457,100	26,650

TRADE IN FISHERY PRODUCTS IN WASHINGTON, D. C.[11]

The muncipal fish wharf and market in Washington, D. C., is located in the southwestern part of the city on an arm of the Potomac River. At the present time 16 firms have stalls in this market, 2 are located in the immediate vicinity of the market, 3 have stalls in the Center Market, located at Fifth and K Streets NW., and 2 are located in other parts of the city. Altogether there are 23 firms which employ 121 persons who received $136,560 in salaries and wages during 1935. Of the total employees 86 were regularly employed. These firms conduct mainly a wholesale business although some retail trade is carried on.

The facilities for handling fish and oysters from boats and vessels that may land at the wharf are good, but only a comparatively small quantity are brought into the city by this method. In the fall and winter, considerable quantities of shell oysters are landed, but most of the oysters handled in Washington are brought in already shucked from Maryland and Virginia, by trucks and other transportation facilities.

During the year 1935 the receipts of fresh and frozen fishery products as received at the municipal fish wharf amounted to 12,187,970 pounds. This is an increase of 23 percent as compared with 1934, and an increase of 24 percent as compared with the 5-year average.

During 1935 two firms in Washington, D. C., smoked fishery products, and one firm produced shucked oysters. The total value of the products produced by these firms amounted to $22,960.

[11] Trade of fishery products handled at the municipal wharf, Washington, D. C., are reported to the Bureau by agents of the Health Department, District of Columbia.

Fishery products received at Municipal Fish Wharf and Market, Washington, D. C., 1935

Species	January	February	March	April	May	June	July	August	September	October	November	December	Total
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Alewives (river herring)	4,900	14,300	108,000	236,600	274,205	6,700							644,705
Bluefish	5,300	4,500	4,800	27,700	40,200	10,000	11,600	21,200	31,400	48,700	20,800	22,800	249,000
Butterfish	3,100	7,700	1,400	29,800	56,500	90,000	75,000	31,200	18,600	14,700	9,300	500	337,800
Carp	12,800	4,100	17,100	26,150	23,350	12,050	6,500	5,600	12,800	13,900	18,300	10,050	162,700
Catfish	1,400	2,000	20,300	14,900	26,300	28,260	11,600	13,600	9,300	9,300	12,100	5,100	154,160
Cod	1,400	1,300	1,700	2,000	2,800		1,000	1,200	200	1,500	1,300	1,200	15,600
Croaker	115,800	130,000	268,500	405,100	467,400	307,600	406,000	499,400	228,000	217,000	156,600	169,000	3,370,400
Drum, red or redfish	300		100	6,300						400	1,000	9,300	17,400
Eels	100	200	2,100	2,525	1,540	800	100	300	700	800	700	1,000	10,865
Flounders	38,600	47,000	36,925	21,325	23,550	17,725	17,600	22,400	17,900	26,100	18,100	16,640	303,865
Gizzard shad	6,800	4,400	6,000	1,600				325	6,600	4,200	16,700	7,600	54,225
Haddock	43,065	42,240	48,985	52,050	30,700	30,100	28,050	32,100	34,850	47,505	36,650	22,410	448,745
Hake	1,400	500	1,300								1,800	6,200	11,200
Halibut	5,800	8,200	7,700	5,700	15,200	13,450	13,400	10,400	5,200	12,100	5,700	7,200	110,050
Hickory shad or "jacks"	3,800	2,750	550	500									7,600
Kingfish or "king mackerel"			2,500	2,800	3,400			400		1,800	2,400	1,600	14,900
Mackerel	21,800	27,600	15,500	18,700	35,350	33,300	25,450	23,200	17,400	21,000	16,100	35,800	291,200
Menhaden									4,600	72,600		200	77,400
Mullet	8,700	5,900	3,800			800	200	2,200	2,200	13,800	6,200	13,150	56,950
Perch	10,400	12,100	50,400	44,000	17,800	12,400	3,700	1,350	2,700	9,400	10,200	7,300	181,750
Pike or pickerel			400	150					400	600	600	1,100	3,250
Pollock	200							200	400	100	200	200	1,300
Pompano				100	100		100				400		700
Salmon	3,800	6,400	3,900	4,700	9,800	9,200	13,600	8,200	4,100	7,300	9,200	6,100	86,300
Scup or porgy	37,100	36,200	51,300	21,600	4,200	4,200	6,600	7,600	9,000	2,000		1,200	181,000
Sea bass	36,500	53,100	28,800	26,200	22,200	11,800	13,400	12,300	9,900	5,100	4,500	3,800	227,600
Shad	14,320	27,100	100,480	145,100	188,110	13,800				18,700	6,600	3,000	517,210
Sheepshead											200		200
Skates											100		100
Smelt	935	3,385	5,160	1,610					75	250	300	4,505	16,220
Snapper, red	200	600	900	1,100	400	500	7,000	200	300	700	1,300	1,350	14,550
Spot		400			2,200	3,600	800	2,600	18,200	53,800	8,100	12,200	101,900
Squeteagues or "sea trout"	92,600	82,400	98,100	125,900	351,400	278,200	272,000	219,000	344,800	290,800	98,400	126,800	2,380,400
Striped bass	7,000	4,600	35,900	29,300	12,400	2,100	5,500	8,550	22,700	53,100	34,700	15,900	231,750
Sturgeon	373			40	665	310	190			172	29		1,779
Swordfish	400	300	375	300	285	350	580	1,460	817	750	711	1,970	8,298
Tilefish	100		300		600	400					100		1,500
Tuna									200				200
Whitefish	200						100		300	1,000	600		2,200
Whiting				1,700							800	18,000	20,500
Yellowtail									400				400

Fishery products received at Municipal Fish Wharf and Market, Washington, D. C., 1935—Continued

Species	January	February	March	April	May	June	July	August	September	October	November	December	Total
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Crabs:													
Hard		1,000		200	10,200	58,100	84,500	96,400	28,600	7,500			286,500
Soft			2,475	1,530	5,310	19,665	9,135	9,675	9,495	3,285	45		60,615
Meat	2,605	2,645	3,410	9,465	23,900	44,175	55,800	53,125	41,045	19,055	10,750	6,610	272,585
Sea crawfish or "spiny lobster":													
Alive	75	525	500	50					100	50	200		1,500
Meat	160	55	285	60					50		85	350	1,045
Lobsters:													
Alive	480	500	325	575	3,750	5,775	3,725	3,225	390	575	451	350	20,121
Meat	25	80	525	78					203	80	170	500	1,661
Shrimp:													
Green	9,875	7,250	5,500	11,625	15,750	33,750	25,500	33,000	15,000	16,438	14,625	10,625	198,938
Cooked	4,470	3,360	3,655	5,160	12,500	19,750	6,725	7,000	2,455	3,580	3,900	7,425	79,980
Squid	700	200	300	1,000	4,200	1,600	400					800	9,200
Clams, hard	4,096	3,648	3,872	5,440	9,056	8,224	7,424	8,128	7,392	7,360	4,320	4,736	[1] 73,696
Oysters:													
In the shell (meat)	28,966	30,310	35,378	12,894	1,890				7,182	37,639	50,232	50,554	[2] 255,045
Opened (meat)	82,644	73,194	50,225	18,795					33,162	83,808	92,348	114,642	[2] 548,818
Scallops	968	1,424	2,568	5,392	8,120	9,080	7,720	5,744	2,120	3,640	2,768	5,416	54,960
Frogs				80				84		30			194
Terrapin		72											72
Turtles					4,140	828					200		5,168
Total	614,257	653,538	1,032,293	1,327,934	1,709,471	1,088,592	1,120,999	1,141,366	951,236	1,132,217	680,884	735,183	12,187,970

[1] 9,212 bushels. [2] 36,435 bushels. [3] 62,722 gallons.

NOTE.—Hard clams have been converted to pounds on the basis of 8 pounds of meats to the bushel, and oysters on the basis of 7 pounds of meats to the bushel, and 8¾ pounds to the gallon.

FISHERIES OF THE SOUTH ATLANTIC AND GULF STATES

(South Atlantic, Area XXIV; Gulf, Area XXV)[12]

The most recent complete fishery statistics for the South Atlantic and Gulf States (North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, and Texas) are those collected for the year 1934. In that year the yield of the commercial fisheries amounted to 447,913,900 pounds, valued at $9,993,660 to the fishermen, representing an increase of 49 percent in volume and 55 percent in value as compared with the catch in 1932, the most recent previous year for which statistics are available. Detailed statistics of these fisheries for 1934 appear in "Fishery Industries of the United States, 1935", Appendix II to the Report of the United States Commissioner of Fisheries for the fiscal year 1936. A summary of these fisheries appears in the following tables.

Fisheries of the South Atlantic and Gulf States, 1934

OPERATING UNITS: BY STATES

Item	North Carolina	South Carolina	Georgia	Florida
	Number	*Number*	*Number*	*Number*
Fishermen:				
On vessels	723	20	139	870
On boats and shore:				
Regular	2,620	596	381	5,461
Casual	2,012	877	468	1,177
Total	5,355	1,493	988	7,508
Vessels:				
Motor	93	5	46	202
Net tonnage	1,340	67	421	3,316
Sail	30			
Net tonnage	298			
Total vessels	123	5	46	202
Total net tonnage	1,638	67	421	3,316
Boats:				
Motor	1,344	94	122	2,064
Other	1,829	762	423	2,966
Accessory boats	112		6	18
Apparatus:				
Purse seines:				
Menhaden	31		2	5
Length, yards	7,940		600	1,475
Other	1			1
Length, yards	175			350
Haul seines:				
Common	412	27	8	116
Length, yards	53,160	3,880	800	39,455
Long	87			75
Length, yards	86,475			50,300
Gill nets:				
Anchor	1,840	190	47	26
Square yards	1,128,700	129,296	11,375	38,600
Drift	220	285	165	105
Square yards	469,170	217,120	103,540	185,790
Runaround	159	16	12	2,259
Square yards	66,730	4,050	3,570	1,820,749
Stake	4,931		5	6
Square yards	388,205		1,800	2,340
Trammel nets				181
Square yards				129,839
Lines:				
Hand	81	175	39	1,549
Hooks	172	495	39	2,155
Troll	45			1,029
Hooks	45			1,137

[12] These are the numbers given to these areas by the North American Council on Fishery Investigations. The catch in the Mississippi River and tributaries is not included in this section. For a clearer understanding of the statistics published in this section, the reader is referred to the section in the latter part of this document entitled "Statistical survey procedure."

Fisheries of the South Atlantic and Gulf States, 1934—Continued

OPERATING UNITS: BY STATES—Continued

Item	North Carolina	South Carolina	Georgia	Florida
Apparatus—Continued.				
Lines—Continued.	*Number*	*Number*	*Number*	*Number*
Trot with baits or snoods	423	6	32	30
Baits or snoods	342,800	4,500	10,080	6,740
Trot with hooks	50		40	106
Hooks	6,200		2,840	42,360
Pound nets	1,522			17
Weirs	12			
Wheels	33			
Stop nets				9
Square yards				15,670
Fyke nets	480			
Dip nets:				
Common	480			57
Drop				24
Cast nets			10	18
Otter trawls:				
Fish				2
Yards at mouth				63
Shrimp	130	50	149	264
Yards at mouth	2,634	1,009	3,248	5,324
Pots:				
Crab			48	1,648
Eel	750			40
Fish	730		50	3,020
Sea crawfish				958
Spears	65	20		31
Dredges:				
Clam				1
Oyster	143		3	4
Yards at mouth	147		3	4
Scallops				6
Yards at mouth				11
Tongs, oyster	249	11	90	391
Rakes, other than for oysters	431	2		2
Forks				52
Grabs		317	20	28
Coquina scoops				1
Hooks, sponge				241
Diving outfits				53

Item	Alabama	Mississippi	Louisiana	Texas	Total
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	122	557	369	114	2,914
On boats and shore:					
Regular	436	917	4,529	1,068	16,008
Casual	125	232	626	459	5,976
Total	683	1,706	5,524	1,641	24,898
Vessels:					
Motor	34	144	151	35	710
Net tonnage	339	1,905	1,056	345	8,789
Sail					30
Net tonnage					298
Total vessels	34	144	151	35	740
Total net tonnage	339	1,905	1,056	345	9,087
Boats:					
Motor	184	341	1,698	462	6,309
Other	160	361	1,243	345	8,089
Accessory boats			62		198
Apparatus:					
Purse seines:					
Menhaden					38
Length, yards					10,015
Other					2
Length, yards					525
Haul seines:					
Common	8	1	95	23	690
Length, yards	4,350	300	21,404	2,500	125,849
Long					162
Length, yards					136,775
Gill nets:					
Anchor					2,103
Square yards					1,307,971

Fisheries of the South Atlantic and Gulf States, 1934—Continued

OPERATING UNITS: BY STATES—Continued

Item	Alabama	Mississippi	Louisiana	Texas	Total
Apparatus—Continued.					
Gill nets—Continued.	*Number*	*Number*	*Number*	*Number*	*Number*
Drift					775
Square yards					975,620
Runaround				84	2,530
Square yards				18,344	1,913,443
Stake	16			215	5,173
Square yards	2,450			53,662	448,457
Trammel nets	57	27	75	85	425
Square yards	18,745	7,370	13,599	40,240	209,793
Lines:					
Hand	126	159	242	356	2,727
Hooks	204	178	253	356	3,852
Troll				17	1,091
Hooks				17	1,199
Trot with baits or snoods	38	99	380	36	1,044
Baits or snoods	7,640	19,260	83,035	13,200	487,255
Trot with hooks	112		4	68	380
Hooks	11,550		1,800	52,150	116,900
Pound nets					1,539
Weirs					12
Wheels					33
Stop nets					9
Square yards					15,670
Fyke nets	10				490
Dip nets:					
Common			159	6	702
Drop		120	13,369		13,513
Cast nets		64	178	1	271
Otter trawls:					
Fish					2
Yards at mouth					63
Shrimp	160	366	1,611	319	3,049
Yards at mouth	2,067	4,658	19,354	5,066	43,360
Brush traps			25,250		25,250
Pots:					
Crab					1,696
Eel					790
Fish	78				3,878
Sea crawfish					958
Spears	60	72		105	353
Dredges:					
Clam					1
Oyster	9	398	57	48	662
Yards at mouth	9	398	58	53	672
Scallops					6
Yards at mouth					11
Tongs, oyster	106	224	758	196	2,025
Rakes, other than for oysters					435
Forks					52
Grabs					365
Coquina scoops					1
Hooks, sponge					241
Diving outfits					53

CATCH: BY STATES

Species	North Carolina		South Carolina		Georgia	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	14,897,000	$90,901				
Black bass	1,500	75				
Bluefish	1,766,500	63,515	3,000	$180		
Bowfin	600	6				
Butterfish	43,500	745				
Carp	108,600	4,316				
Catfish and bullheads	162,600	3,173			52,500	$3,150
Cero	4,400	220				
Croaker	7,682,800	91,058			7,000	280
Drum, red or redfish	132,500	2,750	3,500	105	2,500	125
Eels	44,300	2,043				
Flounders	987,500	42,150	31,500	1,775	3,300	96
Gizzard shad	24,000	230				
Grunts			9,100	273		
Harvestfish or "starfish"	820,000	12,325				
Hickory shad	99,700	4,634	4,500	450	10,500	1,042
King whiting or "kingfish"	302,000	7,240	14,000	420	12,000	380

Fisheries of the South Atlantic and Gulf States, 1934—Continued

CATCH: BY STATES—Continued

Species	North Carolina		South Carolina		Georgia	
FISH—continued	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Menhaden	106,651,100	$355,503			18,751,500	$63,859
Mullet	3,889,300	105,289	700,000	$19,000	59,000	2,600
Pigfish	92,000	1,130				
Pike or pickerel	1,200	66				
Pinfish or sailors choice	180,000	900				
Pompano	400	60				
Sea bass	75,400	3,045	106,200	4,560	23,000	690
Shad	1,274,000	193,187	208,600	31,290	232,000	38,400
Sharks			12,000	120		
Sheepshead	3,700	80				
Spadefish	6,000	150				
Spanish mackerel	47,700	2,358				
Spot	4,788,000	73,055	10,500	315	13,000	400
Squeteagues or "sea trout":						
Gray	7,729,400	180,588	2,000	130		
Spotted	1,849,100	96,165	13,500	945	56,000	4,480
Striped bass	362,000	35,675				
Sturgeon	1,600	160	50,000	3,500	11,600	928
Sunfish	100	1				
White perch	522,200	22,343				
Yellow perch	17,200	480				
Total	154,567,900	1,395,596	1,168,400	63,063	19,233,900	116,490
SHELLFISH, ETC.						
Crabs:						
Hard [1]	4,543,600	67,238	8,000	160	483,500	7,252
Soft and peelers	251,400	36,210				
Shrimp	2,563,900	80,367	1,801,400	54,042	6,842,900	203,127
Clams:						
Hard, public [2]	338,000	33,647	47,000	5,862		
Octopus			1,500	90		
Oysters: [3]						
Market, public, spring	436,700	18,117	1,329,100	41,347		
Market, public, fall	699,300	33,125	471,500	17,684		
Market, private, spring	21,700	1,550	614,600	22,169	327,600	16,588
Market, private, fall	3,000	300	446,700	20,574	241,100	14,773
Scallops, bay	36,000	6,000				
Terrapin, diamond back	400	75	3,000	300	11,900	1,280
Total	8,894,000	276,629	4,722,800	162,228	7,907,000	243,020
Grand total	163,461,900	1,672,225	5,891,200	225,291	27,140,900	359,510

Species	Florida		Alabama		Mississippi	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives	214,900	$1,055				
Amberjack	4,000	80				
Black bass	422,900	25,195				
Bluefish	1,933,900	100,675	28,600	$754		
Blue runner or hardtail	181,100	3,074	2,900	58		
Buffalofish			18,600	744		
Cabio or crab eater	7,400	181				
Catfish and bullheads	2,854,200	93,477	120,600	7,636	30,300	$606
Cigarfish	4,500	90				
Crappie	462,300	11,956				
Crevalle	111,000	1,565	2,600	58		
Croaker	52,400	1,194	21,200	386	13,600	339
Dolphin	8,000	240				
Drum:						
Black	100,100	2,165	700	20	3,800	59
Red or redfish	1,016,900	24,277	64,700	2,442	73,000	2,888
Eels	18,400	553				
Flounders	74,800	3,142	35,900	2,718	42,000	2,410
Groupers	3,341,400	79,400	151,200	3,356	55,000	1,250
Grunts	40,300	1,138				
Hickory shad	42,900	352				
Hogfish	6,000	180				
Jewfish	13,400	408				
Kingfish or "king mackerel"	2,638,100	116,097				
King whiting or "kingfish"	324,600	7,844	4,800	90	3,600	89
Mackerel	200	9				
Menhaden	38,983,400	121,643				

See footnotes at end of table.

Fisheries of the South Atlantic and Gulf States, 1934—Continued

CATCH: BY STATES—Continued

Species	Florida		Alabama		Mississippi	
FISH—continued	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Mojarro	19,100	$391				
Mullet	23,966,300	641,127	1,168,200	$28,387	644,500	$14,222
Muttonfish	198,900	8,839				
Paddlefish or spoonbill cat			600	36		
Permit	1,700	34				
Pigfish	94,800	1,823				
Pinfish or sailors choice	31,000	620				
Pompano	437,500	78,134	1,800	270		
Porgies	38,500	934				
Sawfish	17,500	35				
Sea bass	52,000	2,022				
Sea catfish	105,000	210				
Shad	782,200	66,986				
Sharks	3,217,500	8,535				
Sheepshead	605,900	13,266	8,000	305	23,000	920
Skates	175,000	350				
Snapper:						
Mangrove	228,700	7,017				
Red	4,067,800	224,271	950,500	51,859	123,200	6,720
Snook or sergeantfish	421,800	9,946				
Spanish mackerel	6,734,200	271,787	11,900	533		
Spot	85,100	1,687	7,700	141		
Squeteagues or "sea trout":						
Gray	10,000	500				
Spotted	3,083,200	163,275	137,500	9,153	146,900	8,814
White	14,300	296	7,600	176	153,500	3,838
Sturgeon	1,000	60	8,400	912		
Sunfish	517,500	13,544				
Tenpounder	27,500	482	1,200	12		
Tripletail	600	12				
Tuna or "horse mackerel"	4,300	161				
Turbot	1,500	45				
Wahoo	2,000	60				
White perch	18,200	728				
Yellowtail	81,400	4,677				
Total	97,899,100	2,117,034	2,755,200	110,046	1,312,400	42,155
SHELLFISH, ETC.						
Crabs:						
Hard [1]	182,800	3,474	257,400	3,677	602,700	7,114
King	500,000	600				
Soft and peelers			1,600	312	4,200	720
Stone	80,600	5,737				
Sea crawfish or spiny lobster	351,300	17,166				
Shrimp	16,292,200	497,870	4,556,600	115,176	15,329,800	292,522
Clams:						
Coquina	5,800	975				
Hard, public [1]	535,000	26,082				
Conchs	2,500	75				
Oysters: [1]						
Market, public, spring	827,400	40,572	195,500	11,509	3,749,800	244,374
Market, public, fall	509,700	30,573	164,600	9,685	1,154,100	65,416
Market, private, spring	361,800	16,650	5,400	450		
Market, private, fall	337,100	13,830	26,300	2,190		
Scallops:						
Bay	74,100	6,596				
Sea	120,200	17,891				
Terrapin, diamond back			1,400	361		
Turtles:						
Green	4,600	244				
Soft shell	61,200	797				
Sponges:						
Grass	45,400	24,699				
Sheepswool	458,500	720,277				
Velvet	200	110				
Wire	14,400	7,894				
Yellow	136,800	84,690				
Total	20,901,600	1,516,788	5,208,800	143,360	20,840,600	610,146
Grand total	118,800,700	3,634,722	7,964,000	253,406	22,153,000	652,301

See footnotes at end of table.

Fisheries of the South Atlantic and Gulf States, 1934—Continued

CATCH: BY STATES—Continued

Species	Louisiana		Texas		Total	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Alewives					15,111,900	$91,956
Amberjack					4,000	80
Black bass					424,400	25,270
Bluefish					3,732,000	165,124
Blue runner or hardtail					184,000	3,132
Bowfin					600	6
Buffalofish					18,600	744
Butterfish					43,500	745
Cabio or crab eater					7,400	181
Carp					108,600	4,316
Catfish and bullheads	197,000	$6,870	63,100	$1,712	3,489,300	116,624
Cero					4,400	220
Cigarfish					4,500	90
Crappie					462,300	11,956
Crevalle	1,100	35			114,700	1,658
Croaker	300,900	15,177	296,100	9,333	8,374,000	117,767
Dolphin					8,000	240
Drum:						
Black	198,500	7,128	2,252,700	59,648	2,555,800	69,020
Red or redfish	492,500	28,200	1,579,100	95,433	3,364,700	156,220
Eels					62,700	2,596
Flounders	24,300	1,895	97,700	8,469	1,297,000	62,655
Garfish	500	2			500	2
Gizzard shad					24,000	230
Groupers	18,400	770	3,700	80	3,569,700	84,946
Grunts					49,400	1,411
Harvestfish or "starfish"					820,000	12,325
Hickory shad					157,600	6,478
Hogfish					6,000	180
Jewfish	5,000	140	28,300	695	46,700	1,243
Kingfish or "king mackerel"	13,400	445	9,600	384	2,661,100	116,926
King whiting or "kingfish"					661,000	16,063
Mackerel					200	9
Menhaden					164,386,000	541,005
Mojarro					19,100	391
Mullet	18,000	275	39,600	792	30,484,900	811,695
Muttonfish					198,900	8,839
Paddlefish or spoonbill cat					600	36
Permit					1,700	34
Pigfish					186,800	2,953
Pike or pickerel					1,200	66
Pinfish or sailors choice					211,000	1,520
Pompano			2,400	327	442,100	78,791
Porgies					38,500	934
Sawfish					17,500	35
Sea bass					256,600	10,317
Sea catfish					105,000	210
Shad					2,496,800	329,863
Sharks					3,229,500	8,655
Sheepshead	267,500	14,556	290,800	9,785	1,198,900	38,912
Skates					175,000	350
Snapper:						
Mangrove					228,700	7,017
Red	79,000	4,550	635,400	36,092	5,855,900	323,492
Snook or sergeantfish			6,500	565	428,300	10,511
Spadefish					6,000	150
Spanish mackerel	1,900	96	173,600	11,001	6,969,300	285,775
Spot	1,900	67			4,906,200	75,705
Squeteagues or "sea trout":						
Gray					7,741,400	181,218
Spotted	1,073,000	87,046	2,351,700	173,413	8,710,900	543,291
White	444,900	11,038	110,200	2,951	730,500	18,299
Striped bass					362,000	35,675
Sturgeon					72,600	5,560
Sunfish					517,600	13,545
Tenpounder					28,700	494
Tripletail	200	4			800	16
Tuna or "horse mackerel"					4,300	161
Turbot					1,500	45
Wahoo					2,000	60
White perch					540,400	23,071
Yellow perch					17,200	480
Yellowtail					81,400	4,677
Total	3,138,000	178,297	7,940,500	410,680	288,015,400	4,434,261

Fisheries of the South Atlantic and Gulf States, 1934—Continued

CATCH: BY STATES—Continued

Species	Louisiana		Texas		Total	
SHELLFISH, ETC.						
Crabs:	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Hard [1]	11,676,500	$163,942	258,100	$12,704	18,012,600	$265,561
King					500,000	600
Soft and peelers	651,200	85,569			908,400	122,811
Stone					80,600	5,737
Sea crawfish or spiny lobster					351,300	17,166
Shrimp	55,572,300	1,442,370	16,358,600	383,054	119,317,700	3,068,528
Clams:						
Coquina					5,800	975
Hard, public [2]					920,000	65,591
Conchs					2,500	75
Octopus					1,500	90
Oysters: [3]						
Market, public, spring	1,043,700	79,316	689,700	54,084	8,271,900	489,319
Market, public, fall	276,400	34,205	622,100	51,120	3,897,700	241,808
Market, private, spring	1,972,700	132,580			3,303,800	189,993
Market, private, fall	2,298,900	168,214			3,353,100	219,881
Scallops:						
Bay					110,100	12,596
Sea					120,200	17,891
Terrapin, diamond back					16,700	2,016
Turtles:						
Green					4,600	244
Loggerhead	3,500	70			3,500	70
Soft shell					61,200	797
Sponges:						
Grass					45,400	24,699
Sheepswool					458,500	720,257
Velvet					200	110
Wire					14,400	7,894
Yellow					136,800	84,690
Total	73,495,200	2,106,266	17,928,500	500,962	159,898,500	5,559,399
Grand total	76,633,200	2,284,563	25,869,000	911,642	447,913,900	9,993,660

[1] Statistics on hard crabs used in this table are based on yields of 4 pounds per dozen in North Carolina and South Carolina; 6 pounds in Georgia; 6.28 pounds in Florida; 7 pounds in Alabama; 6.09 pounds in Mississippi; 5.43 pounds in Louisiana; and 5.5 pounds in Texas.

[2] Statistics on hard clams used in this table are based on yields of 8 pounds of meats per bushel in all States.

[3] Statistics on oysters used in this table are based on yields of 5.58 pounds of meats per bushel in North Carolina; 4.74 in South Carolina; 5.88 in Georgia; 3.57 in Florida; 3.29 in Alabama; 2.22 in Mississippi; 4.32 in Louisiana; and 4.41 in Texas.

NOTE.—The catch for Mississippi includes the following products taken by Mississippi craft in Louisiana waters: Shrimp, 8,374,100 pounds, valued at $166,360; oysters, market, spring, 3,667,700 pounds of meats, valued at $237,876; and oysters, market, fall, 938,100 pounds, valued at $49,790. Of the total catch for Florida all of the mackerel and sea scallops were taken off the coast of New York. In addition 114,600 pounds of bluefish, valued at $8,938, and 1,300 pounds of tuna or "horse mackerel", valued at $41, were taken in the same waters. The seed oyster fishery was prosecuted in this section only in North Carolina where 12 regular fishermen using 6 sailboats and 12 dredges took 17,450 bushels of seed oysters, valued at $2,617, from public beds. All of these fishermen, craft, and gear were duplicated among those in the fisheries for market oysters or other species.

Industries related to the fisheries of the South Atlantic and Gulf States

OPERATING UNITS, SALARIES, AND WAGES, 1934

Item	North Carolina	South Carolina	Georgia	Florida
Transporting:				
Persons engaged:	*Number*	*Number*	*Number*	*Number*
On vessels	87	104	23	56
On boats	11	58	10	86
Total	98	162	33	142
Vessels:				
Motor	48	10	7	31
Net tonnage	427	120	86	456
Sail	----------	33	----------	----------
Net tonnage	----------	301	----------	----------
Total vessels	48	43	7	31
Total net tonnage	427	421	86	456
Boats	9	58	5	88
Wholesale and manufacturing:				
Establishments	84	31	29	241
Persons engaged:				
Proprietors	104	40	37	253
Salaried employees	21	18	15	157
Wage earners:				
Average for season	1,269	564	945	1,796
Average for year	465	223	235	916
Paid to salaried employees	$55,397	$34,020	$31,001	$242,609
Paid to wage earners	$219,778	$112,743	$127,355	$544,963
Total salaries and wages	$275,175	$146,763	$158,356	$787,572
Fishermen manufacturing	267	8	14	402

Item	Alabama	Mississippi	Louisiana	Texas	Total
Transporting:					
Persons engaged:	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	10	----------	117	----------	397
On boats	----------	10	6	----------	181
Total	10	10	123	----------	578
Vessels:					
Motor	5	----------	56	----------	157
Net tonnage	37	----------	505	----------	1,631
Sail	----------	----------	----------	----------	33
Net tonnage	----------	----------	----------	----------	301
Total vessels	5	----------	56	----------	190
Total net tonnage	37	----------	505	----------	1,932
Boats	----------	5	3	----------	168
Wholesale and manufacturing:					
Establishments	20	40	103	43	591
Persons engaged:					
Proprietors	15	37	109	42	637
Salaried employees	31	56	85	26	409
Wage earners:					
Average for season	357	2,382	4,452	1,543	13,308
Average for year	178	874	1,031	278	4,200
Paid to salaried employees	$34,046	$86,119	$138,963	$52,963	$675,118
Paid to wage earners	$67,951	$302,140	$634,720	$189,044	$2,198,694
Total salaries and wages	$101,997	$388,259	$773,683	$242,007	$2,873,812
Fishermen manufacturing	122	61	50	63	987

Industries related to the fisheries of the South Atlantic and Gulf States—Continued

PRODUCTS MANUFACTURED

Item	North Carolina		South Carolina		Georgia		Florida	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
By manufacturing establishments:								
Alewife roe, canned standard cases	12,249	$81,231						
Groupers:								
Fresh fillets pounds							60,082	$12,538
Fresh steaks do							356,561	53,259
Menhaden products:								
Acid scrap tons	5,271	84,106					6,297	104,826
Dry scrap do	2,802	81,970			(1)	(1)	3,964	112,722
Meal do	1,192	41,754					2,330	86,292
Oil gallons	356,331	96,771			(1)	(1)	259,899	73,336
Mullet, salted [2] pounds	507,300	22,419					337,800	17,290
Snapper, fresh steaks do							10,000	2,000
Crab meat, packaged, fresh cooked [2] pounds	437,042	143,437			57,500	$15,095	16,700	6,300
Shrimp:								
Cooked and peeled [2] do					(1)	(1)		
Canned standard cases					177,795	838,991	(1)	(1)
Sea crawfish meat, packaged, fresh cooked [2] pounds							56,500	21,738
Clams, hard, canned chowder standard cases							1,168	4,702
Marine-shell products, novelties								7,175
Miscellaneous novelties								2,725
Oysters:								
Fresh shucked [3] gallons	109,645	93,945	(1)	(1)	32,207	32,742	115,667	150,770
Canned standard cases			85,891	$336,718	(1)	(1)	(1)	(1)
Shell products:								
Poultry feed tons	(1)	(1)	(1)	(1)			49,980	224,290
Lime do	326	1,534					(1)	(1)
Unclassified products:								
Packaged fresh and frozen [3] pounds	[4] 48,165	[4] 6,884	(5)	(5)	(5)	(5)	[6] 64,814	[6] 14,127
Canned standard cases					(5)	(5)	[7] 61,349	[7] 329,916
Miscellaneous [3]		[8] 24,602		[9] 74,970		[10] 81,447		[11] 18,012
Total		678,653		411,718		968,275		1,242,018
By fishermen:								
Alewives:								
Corned pounds	3,542,000	37,090						
Tight-pack cut do	54,200	2,168						
Tight-pack roe do	103,700	5,185						
Mullet:								
Salted do	10,000	400						
Smoked do							4,500	1,175
Roe, salted do							153,700	9,222
Oysters, fresh shucked gallons	4,850	3,790	957	957	7,335	7,335	10,319	13,298
Scallops, bay, fresh shucked gallons	4,000	8,000					7,260	7,560
Crab meat, packaged, fresh cooked pounds							5,295	1,733
Total		56,632		957		7,335		32,988
Grand total		735,286		412,675		975,610		1,275,006

[1] This item has been included under "Unclassified products."
[2] Data are for 1934.
[3] Both 1934 and 1935 data are included in these items.
[4] Includes fresh fillets of bluefish, croaker, red drum, flounders, king whiting, mullet, sea bass, and squeteagues.
[5] This item has been included under "Miscellaneous."
[6] Includes fresh fillets of bluefish, mullet, red snapper, Spanish mackerel, and squeteagues; frozen fillets of bluefish, groupers, mullet, red snapper, Spanish mackerel, and squeteagues; fresh steaks of cabio, cero, red drum, and snook; frozen steaks of groupers, and snook; and fresh-shucked scallops.
[7] Includes canned shrimp, hard-clam products, coquina-clam broth, conch chowder, oysters, fish chowder, and turtle products.
[8] Includes corned alewives, salted spot, and oyster-shell poultry feed.
[9] Includes fresh-shucked oysters and oyster-shell poultry feed.
[10] Includes cooked and peeled, and pickled shrimp; canned oysters; and menhaden products.
[11] Includes salted mullet roe; smoked fillets of king whiting, mullet, and Spanish mackerel; shark hides, fins, and oil; king crab scrap; fish meal; and oyster-shell lime.

Industries related to the fisheries of the South Atlantic and Gulf States—Continued

PRODUCTS MANUFACTURED—Continued

Item	Alabama		Mississippi		Louisiana		Texas	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
By manufacturing establishments:								
Groupers, fresh steaks pounds	(1)	(1)						
Mullet, salted [2] do			(1)	(1)				
Snapper, fresh steaks do	(1)	(1)						
Crab meat, packaged, fresh cooked [3] pounds			77,500	$20,025	350,778	$72,144		
Shrimp:								
Fresh and frozen packaged [3] pounds							2,299,800	$379,467
Cooked and peeled [3] pounds			592,415	130,332			61,899	11,162
Sun dried [4] do					1,762,974	265,344		
Canned standard cases	59,634	$233,408	280,052	1,171,223	469,813	2,011,537	(1)	(1)
Meal tons					2,131	45,793		
Oysters:								
Fresh shucked [4] gallons	15,390	19,238	54,631	92,873	207,248	313,993	74,506	109,345
Canned standard cases	25,717	103,700	241,809	982,539	37,905	151,898		
Shell products:								
Poultry feed tons	(1)	(1)	5,220	21,675	(1)	(1)	21,398	66,872
Lime do	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Unclassified products:								
Packaged, fresh and frozen [3] pounds	(5)	(5)						
Canned standard cases			(5)	(5)	(5)	(5)	(5)	(5)
Miscellaneous [5]		[12] 20,021		[13] 2,130		[14] 415,573		[16] 301,083
Total		376,867		2,420,797		3,276,282		867,929
By fishermen:								
Mullet, salted pounds	10,000	500						
Oysters, fresh shucked gallons	11,360	11,915	2,614	2,614			8,929	10,367
Crab meat, packaged, fresh cooked pounds	19,700	4,925					3,860	641
Shrimp, sun dried do					7,500	825		
Total		17,340		2,614		825		11,008
Grand total		393,707		2,423,411		3,277,107		878,937

[1] This item has been included "Unclassified products."
[2] Data for 1934.
[3] Both 1934 and 1935 data are included in these items.
[4] This item has been included under "Miscellaneous."
[12] Includes fresh fillets of red snapper and squeteagues; fresh steaks of groupers and red snapper; and oyster-shell products.
[13] Includes salted mullet, canned shrimp soup, and oyster-shell lime.
[14] Includes canned crawfish, frog, and turtle products, and oyster-shell products.
[16] Includes canned shrimp and oyster-shell lime.

NOTE.—Unless otherwise indicated data are for 1935. The total value of the manufactured products for the South Atlantic and Gulf States was as follows: By manufacturing establishments, $10,242,039; and by fishermen, $129,700. Some of the above products may have been manufactured from products imported from another State or country, therefore, they cannot be correlated directly with the catch within the State.

SPONGES SOLD AT THE EXCHANGE, TARPON SPRINGS, FLA.

During 1935 sponges handled on the exchange at Tarpon Springs, Fla., amounted to 388,888 pounds, valued at $620,156. This is a decrease of 22 percent in quantity and 8 percent in value as compared with the transactions on the exchange during 1934. Of the total sponges sold on the exchange during 1935, 110,694 pounds, valued at $272,685, were large wool; 23,061 pounds, valued at $36,351, were medium and small wool; 136,424 pounds, valued at $218,933, were wool rags; 80,311 pounds, valued at $67,027, were yellow; 21,660 pounds, valued at $15,600, were grass; and 16,738 pounds, valued at $9,560, were wire. It is estimated that sponges valued at $4,000 were sold outside the exchange.

FISHERIES OF THE PACIFIC COAST STATES [13]

The yield of the commercial fisheries of the Pacific Coast States (Washington, Oregon, and California) during 1935 amounted to 1,676,236,200 pounds, valued at $23,088,810 to the fishermen, representing an increase of 8 percent in volume and 16 percent in value as compared with the catch in the previous year. These fisheries gave employment to 20,583 fishermen as compared with 19,232 in 1934.

There were 337 fishery wholesale and manufacturing establishments in the three States in 1935 as compared with 323 in 1934. During 1935 these establishments employed 14,750 persons, paid $6,531,351 in salaries and wages, and produced manufactured products (canned, cured, packaged, and byproducts) valued at $51,243,348. In 1934 the wholesale and manufacturing firms employed 13,220 persons, paid $7,031,444 in salaries and wages, and produced manufactured products, valued at $41,007,888.

Fisheries of the Pacific Coast States, 1935

SUMMARY OF CATCH

Product	Washington		Oregon	
	Pounds	*Value*	*Pounds*	*Value*
Fish	114,732,100	$5,370,790	82,780,900	$1,895,550
Shellfish, etc	9,354,200	957,876	2,611,400	181,264
Total	124,086,300	6,328,666	85,392,300	2,076,814

Product	California		Total	
	Pounds	*Value*	*Pounds*	*Value*
Fish	1,450,642,000	$13,674,149	1,648,155,000	$20,940,489
Shellfish, etc	10,392,000	854,526	22,357,600	1,993,666
Whale products	5,723,600	154,655	5,723,600	154,655
Total	1,466,757,600	14,683,330	1,676,236,200	23,088,810

[13] Data on the operating units and catch of the fisheries of the Pacific Coast States have been taken largely from statistics collected by the various State agencies. Supplementary surveys, compilations, and analyses have been made by agents of this Bureau in order that the figures may be presented in a manner comparable with those of other sections. While statistics of the fisheries of California are for the calendar year, those for Oregon and Washington are for the fiscal year ending Mar. 31, except that statistics of the halibut fishery in these latter States are for the calendar year. For a clearer understanding of the statistics published in this section the reader is referred to the section in the latter part of this document entitled "Statistical survey procedure."

Fisheries of the Pacific Coast States, 1935—Continued

OPERATING UNITS: BY STATES

Item	Washington [1]				Oregon		
	Puget Sound district	Coastal district	Columbia River district	Total	Columbia River district	Coastal district	Total
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	3,376	61	15	3,452	95	18	113
On boats and shore	1,795	4,362	820	6,977	2,249	1,450	3,699
Total	5,171	4,423	835	10,429	2,344	1,468	3,812
Vessels:							
Motor	550	32	5	587	48	10	58
Net tonnage	10,967	255	53	11,275	402	88	490
Sail	3			3			
Net tonnage	1,346			1,346			
Total vessels	553	32	5	590	48	10	58
Total net tonnage	12,313	255	53	12,621	402	88	490
Boats:							
Motor	762	414	516	1,692	1,091	964	2,055
Other	306	184	11	501	78	133	211
Accessory boats	297			297			
Apparatus:							
Purse seines:							
Salmon	218			218			
Length, yards	130,364			130,364			
Sardine [2]	18			18			
Length, yards [2]	6,590			6,590			
Haul seines	[3] 177	[3] 5	2	[3] 184	44	7	51
Length, yards	[3] 12,454	[3] 325	251	[3] 13,030	24,945	1,167	26,112
Gill nets:							
Drift	302	203	411	916	814	486	1,300
Square yards	458,350	370,988	1,142,580	1,971,918	2,578,752	691,092	3,269,844
Set	[4] 6	[4] 110		[4] 116	139	865	1,004
Square yards	1,440	26,950		28,390	38,808	328,700	367,508
Lines:							
Trawl, set, and hand	28,159		468	28,627	559	174	733
Hooks	595,755		11,250	607,005	13,408	5,525	18,933
Troll	1,635	585	112	2,332	874	714	1,588
Hooks	7,357	2,632	398	10,387	3,933	3,213	7,146
Pound nets	[4] 2			[4] 2	51		51
Brush weirs	6			6			
Dip nets	15	55	213	283	264		264
Reef nets	18			18			
Beam trawls	11			11			
Yards at mouth	65			65			
Otter trawls	34			34	1	1	2
Yards at mouth	476			476	15	30	45
Traps:							
Crab	2,970	3,563		6,533		13,144	13,144
Crawfish					1,156		1,156
Octopus	486			486			
Tongs, rakes, and shovels	620	3,914		4,534		208	208
Dredges, oyster		4		4			
Yards at mouth		8		8			

[1] Statistics for stationary gear in Washington are not comparable with those for previous years, since a State law effective in 1935 prohibited the taking of salmon and steelhead trout with pound nets, set nets, and fish wheels, in all districts of the State; and with haul seines in the Columbia River district. However, the law did not affect Indians fishing on their reservations.

[2] Used in the Oregon pilchard fishery by Washington purse seine vessels. See Oregon coast tables for catch statistics.

[3] Includes the seines formerly shown as drag bag nets.

[4] Fished only on Indian reservations.

Fisheries of the Pacific Coast States, 1935—Continued

OPERATING UNITS: BY STATES—Continued

Item	California						Grand total
	Northern district	San Francisco district	Monterey district	San Pedro district	San Diego district	Total	
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	17	496	496	1,765	748	3,522	7,087
On boats and shore	263	905	559	822	271	2,820	13,496
Total	280	1,401	1,055	2,587	1,019	6,342	20,583
Vessels:							
Steam		2				2	2
Net tonnage		41				41	41
Motor	10	50	52	194	83	389	1,034
Net tonnage	79	1,283	1,389	7,217	4,909	14,877	26,642
Sail		2				2	5
Net tonnage		824				824	2,170
Total vessels	10	54	52	194	83	393	1,041
Total net tonnage	79	2,148	1,389	7,217	4,909	15,742	28,853
Boats:							
Motor	189	560	225	423	112	1,509	5,256
Other	1	35	32	71	3	142	854
Accessory boats		105	72	165	50	392	689
Apparatus:							
Purse seines:							
Mackerel				4		4	4
Length, yards				1,560		1,560	1,560
Salmon							218
Length, yards							130,364
Sardine		14	23	72	1	110	128
Length, yards		5,540	7,308	27,169	312	40,419	47,009
Tuna		1	6	70		77	77
Length, yards		600	3,480	40,822		44,902	44,902
Lampara nets:							
Mackerel				58	12	70	70
Length, yards				26,062	3,600	29,662	29,662
Sardine		18	35	53	16	122	122
Length, yards		4,822	9,905	23,646	5,280	43,653	43,653
Other		2	22	4		28	28
Length, yards		800	5,125	1,780		7,705	7,705
Haul seines		1				1	236
Length, yards		135				135	39,277
Gill nets:							
Drift:							
Barracuda				14	7	21	21
Square yards				152,096	41,640	193,736	193,736
Salmon		121				121	2,337
Square yards		417,995				417,995	5,659,757
Shad		163				163	163
Square yards		572,871				572,871	572,871
Set:							
"California halibut"			7			7	7
Square yards			18,527			18,527	18,527
Salmon							1,120
Square yards							395,898
Sea bass				28	17	45	45
Square yards				100,043	93,448	193,491	193,491
Miscellaneous	12	39	73	27	7	158	158
Square yards	9,000	55,957	130,348	23,817	8,872	227,994	227,994
Trammel nets				33	14	47	47
Square yards				163,309	141,787	305,096	305,096
Lines:							
Trawl, set, and hand	268	787	785	1,898	1,084	4,822	34,182
Hooks	27,365	39,464	75,262	283,842	50,832	476,765	1,102,703
Troll	870	1,094	1,446	1,685	485	5,580	9,500
Hooks	3,851	5,003	2,265	1,685	485	13,289	30,822
Pound nets							53
Brush weirs							6
Fyke nets		1,628				1,628	1,628
Dip nets	28	2				30	577
Bag nets, shrimp		10				10	10
Length, yards		7,733				7,733	7,733
Reef nets							18
Paranzella nets		8		3		11	11
Yards at mouth		133		50		183	183
Beam trawls		18				18	29
Yards at mouth		120				120	185

Fisheries of the Pacific Coast States, 1935—Continued

OPERATING UNITS: BY STATES—Continued

Item	California						Grand total
	Northern district	San Francisco district	Monterey district	San Pedro district	San Diego district	Total	
Apparatus—Continued.	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Otter trawls			5			5	41
Yards at mouth			125			125	646
Traps:							
Crab	440	5,442	107			5,989	25,666
Crawfish							1,156
Sea crawfish				5,485	773	6,258	6,258
Octopus			28			28	514
Harpoons:							
Swordfish and turtles				45	12	57	57
Whales		2				2	2
Tongs, rakes, and shovels	16	109	38	73	2	238	4,980
Abalone outfits		1	17	3		21	21
Dredges, oyster							4
Yards at mouth							8

CATCH: BY STATES

Species	Washington		Oregon	
FISH	*Pounds*	*Value*	*Pounds*	*Value*
Carp	124,300	$2,797	7,600	$190
Cod	9,285,400	131,042		
Flounders:				
"Sole"	2,406,000	61,348	45,600	1,163
Other	191,700	4,039	23,500	382
Grayfish	277,500	527		
Halibut	25,948,600	2,070,883	549,400	38,658
Herring	694,500	9,047	42,900	644
"Lingcod"	1,201,600	33,823	108,400	2,732
Perch	95,500	2,999	20,300	305
Pilchard or sardine	12,400	186	52,404,100	236,094
Rockfishes	453,900	15,164	48,800	1,502
Sablefish	3,073,500	114,369	90,800	2,859
Salmon:				
Blueback, red or sockeye	4,811,700	476,812	42,400	4,047
Chinook or king	11,459,400	767,590	12,315,700	856,128
Chum or keta	8,411,700	229,693	1,199,900	15,374
Humpback or pink	26,177,200	602,530		
Silver or coho	16,147,900	750,085	13,227,500	616,586
Shad	65,800	1,842	745,600	22,020
Smelts:				
Eulachon	2,805,900	46,215	163,900	4,215
Other	552,400	21,702	2,500	38
Steelhead trout	514,300	27,505	1,593,700	88,927
Striped bass			27,800	1,890
Sturgeon	20,900	592	59,900	1,736
Tuna and tunalike fishes, albacore			600	60
Total	114,732,100	5,370,790	82,780,900	1,895,550
SHELLFISH, ETC.				
Crabs	1,550,700	107,311	2,360,700	150,226
Crawfish, fresh water			79,300	7,928
Shrimp	124,500	8,417		
Clams:				
Hard	822,600	52,528		
Razor	935,400	144,764	77,700	12,953
Mixed			74,000	4,167
Octopus	69,200	2,436		
Oysters:				
Eastern, market	700	297		
Japanese, market	5,477,200	435,437	9,900	780
Native, market	326,700	201,581	8,900	5,210
Scallops, bay	15,400	3,861		
Squid	19,200	824		
Trepang	12,600	420		
Total	9,354,200	957,876	2,611,400	181,264
Grand total	124,086,300	6,328,666	85,392,300	2,076,814

Fisheries of the Pacific Coast States, 1936—Continued

CATCH: BY STATES—Continued

Species	California [1]		Total	
FISH	*Pounds*	*Value*	*Pounds*	*Value*
Anchovies	179,000	$3,098	179,000	$3,098
Barracuda	2,617,800	111,093	2,617,800	111,093
Cabrilla	121,500	5,314	121,500	5,314
Carp	104,200	1,466	236,100	4,453
Catfish	289,600	32,461	289,600	32,461
Cod [2]	5,101,900	71,510	14,387,300	202,552
Flounders:				
"California halibut"	1,575,900	115,495	1,575,900	115,495
"Sole"	9,164,300	498,682	11,615,900	561,193
Other	1,404,000	62,481	1,619,200	66,902
Flyingfish	37,900	1,351	37,900	1,351
Grayfish	555,100	11,841	832,600	12,868
Groupers	31,400	1,729	31,400	1,729
Hake	74,300	810	74,300	810
Halibut	869,600	61,605	27,367,600	2,171,146
Hardhead	78,000	4,038	78,000	4,038
Herring	928,900	5,065	1,666,300	14,756
Horse mackerel	9,983,900	42,737	9,983,900	42,737
Kingfish	768,700	17,566	768,700	17,566
"Lingcod"	1,011,400	38,539	2,321,400	75,094
Mackerel	146,427,200	1,119,886	146,427,200	1,119,886
Marlin	18,600	923	18,600	923
Mullet	13,700	955	13,700	955
Perch	246,700	11,054	362,500	14,358
Pilchard or sardine	1,115,736,200	4,369,820	1,168,212,700	4,606,100
Pompano	5,800	2,719	5,800	2,719
Rock bass	364,600	21,337	364,600	21,337
Rockfishes	4,827,900	179,676	5,330,600	196,342
Rudderfish	34,800	1,724	34,800	1,724
Sablefish	2,833,900	84,569	5,998,200	201,797
Salmon:				
Blueback, red or sockeye			4,854,100	480,859
Chinook or king	5,657,300	346,769	29,432,400	1,970,487
Chum or keta			9,611,600	245,067
Humpback or pink			26,177,200	602,530
Silver or coho			29,375,400	1,366,671
Sculpin	80,000	5,341	80,000	5,341
Sea bass:				
Black	630,800	33,691	630,800	33,691
White	1,069,800	65,997	1,069,800	65,997
Shad	1,602,300	44,942	2,413,700	68,804
Sheepshead	188,000	6,403	188,000	6,403
Skates	306,500	3,257	306,500	3,257
Smelts:				
Eulachon			2,969,800	50,430
Other	875,500	40,614	1,430,400	62,354
Spanish mackerel	4,600	206	4,600	206
Splittail	37,600	728	37,600	728
Squawfish	1,600	53	1,600	53
Steelhead trout			2,108,000	116,432
Striped bass	502,100	41,300	529,900	43,190
Sturgeon			80,800	2,328
Suckers	44,400	562	44,400	562
Swordfish	669,300	74,051	669,300	74,051
Tomcod	700	11	700	11
Tuna and tunalike fishes:				
Albacore	2,447,500	199,513	2,448,100	199,573
Bluefin	25,173,100	1,145,467	25,173,100	1,145,467
Bonito	7,896,500	229,316	7,896,500	229,316
Skipjack or striped tuna	17,197,200	688,453	17,197,200	688,453
Yellowfin	72,251,600	3,619,585	72,251,600	3,619,585
Whitebait	169,900	8,693	169,900	8,693
Whitefish	57,800	3,481	57,800	3,481
Yellowtail	8,148,700	233,667	8,148,700	233,667
Other fish	222,400	2,505	222,400	2,505
Total	1,450,642,000	13,674,149	1,648,155,000	20,940,489
SHELLFISH, ETC.				
Crabs	3,692,700	376,624	7,604,100	634,161
Crawfish, fresh water			79,300	7,928
Sea crawfish or spiny lobster	1,344,800	213,462	1,344,800	213,462
Shrimp	3,447,500	52,626	3,572,000	61,043
Abalone	774,200	115,319	774,200	115,319
Clams:				
Hard	30,700	8,069	853,300	60,597
Pismo	48,900	10,341	48,900	10,341
Razor			1,013,100	157,717

[1] Includes the catch taken off Latin America.

[2] All of the cod reported for California and most of the Washington catch were taken off Alaska.

Fisheries of the Pacific Coast States, 1935—Continued

CATCH: BY STATES—Continued

Species	California		Total	
SHELLFISH, ETC.—continued				
Clams—Continued.	*Pounds*	*Value*	*Pounds*	*Value*
Soft	47,500	$10,214	47,500	$10,214
Mixed			74,900	4,167
Octopus	81,200	4,946	150,400	7,382
Oysters:				
Eastern, market	64,000	30,848	64,700	31,145
Japanese, market	40,000	7,842	5,527,100	444,059
Native, market	2,800	1,334	338,400	208,125
Scallops, bay			15,400	3,861
Squid	816,000	22,820	835,200	23,644
Turtles	1,700	81	1,700	81
Trepang			12,600	420
Total	10,392,000	854,526	22,357,600	1,993,666
WHALE PRODUCTS				
Whale meat	3,272,000	65,440	3,272,000	65,440
Whale oil	2,451,600	89,215	2,451,600	89,215
Total	5,723,600	154,655	5,723,600	154,655
Grand total	1,466,757,600	14,683,330	1,676,236,200	23,088,810

Industries related to the fisheries of the Pacific Coast States, 1935

OPERATING UNITS, SALARIES, AND WAGES

Item	Washington	Oregon	California	Total
Transporting:	*Number*	*Number*	*Number*	*Number*
Persons engaged, on vessels	156	42		198
Vessels, motor	67	19		86
Net tonnage	1,676	261		1,937
Wholesale and manufacturing:				
Establishments	118	59	160	337
Persons engaged:				
Proprietors	68	48	245	361
Salaried employees	245	123	597	965
Wage earners:				
Average for season	3,668	1,077	8,679	13,424
Average for year	1,211	491	3,502	5,204
Paid to salaried employees	$530,645	$167,802	$177,838	$876,285
Paid to wage earners	$1,183,052	$477,919	$3,994,095	$5,655,066
Total salaries and wages	$1,713,697	$645,721	$4,171,933	$6,531,351
Fishermen manufacturing	120		134	254

Industries related to the fisheries of the Pacific Coast States, 1935—Continued

PRODUCTS MANUFACTURED

Item	Washington		Oregon		California	
By manufacturing firms:	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Barracuda, fresh fillets...pounds					765,000	$97,350
Cabrilla, fresh fillets.....do					45,000	5,775
Cod, salted, boneless, including absolutely boneless...pounds	1,412,190	$175,644			(1)	(1)
Flounders, fresh fillets.....do	385,903	49,275	(1)	(1)	2,539,240	420,874
Grayfish, fresh fillets.....do					150,000	15,000
Halibut:						
Fresh fillets.....do					411,325	75,374
Frozen steaks.....do	240,590	34,684				
"Lingcod", fresh fillets.....do	(1)	(1)	(1)	(1)	160,000	19,875
Mackerel:						
Canned.....standard cases					1,795,724	4,845,119
Meal.....tons					4,391	113,595
Oil.....gallons					267,347	75,520
Pilchard:						
Canned "sardines" standard cases					2,420,055	6,237,262
Meal.....tons			4,792	$108,589	91,054	2,529,793
Oil.....gallons			1,178,257	315,432	20,556,908	6,343,533
Rockfishes, fresh fillets..pounds			(1)	(1)	1,020,000	126,375
Sablefish:						
Fresh fillets.....do					410,000	41,000
Kippered.....do	233,877	37,941	(1)	(1)	(1)	(1)
Salted.....do	362,459	23,856				
Salmon:						
Frozen steaks.....do	20,838	2,898				
Salted:						
Mild cured.....do	3,054,150	594,820	1,294,437	253,085	1,780,154	426,735
Eggs for caviar.....do	287,184	34,129				
Kippered.....do	1,676,406	291,739	(1)	(1)		
Smoked.....do	29,279	6,575	67,147	17,768	242,893	89,688
Canned:						
Blueback, red or sockeye standard cases	60,053	811,510	812	11,722		
Chinook or king.....do	67,349	736,244	153,038	1,832,628		
Silver or coho.....do	88,871	652,841	87,565	750,933		
Humpback or pink.do	376,659	1,600,474				
Chum or keta.....do	25,359	101,414	19,532	70,786		
Steelhead trout.....do	2,514	21,789	12,116	110,789		
Oil.....gallons	(1)	(1)	28,488	24,398		
Eggs for bait, canned standard cases	3,132	58,931	(1)	(1)		
Sea bass:						
Black, fresh fillets...pounds					380,000	46,200
White, fresh fillets.....do					226,600	35,238
Shad:						
Canned.....standard cases	(1)	(1)	3,862	14,137	(1)	(1)
Roe canned.....do	(1)	(1)	1,069	31,030	(1)	(1)
Sheepshead, fresh fillets..pounds					55,000	8,250
Swordfish, fresh fillets and steaks pounds					390,000	93,600
Totuava, fresh fillets.....do					750,000	120,000
Tuna and tunalike fishes:						
Canned:						
Albacore.standard cases					122,222	778,393
Bluefin.....do					409,534	1,965,593
Bonito.....do					145,180	603,798
Striped.....do					285,433	1,313,337
"Tonno".....do					160,848	1,025,954
Yellowfin.....do					1,293,550	6,762,805
Yellowtail.....do					94,061	373,849
Meal.....tons					8,330	219,610
Oil.....gallons					127,660	22,648
Crabs:						
Meat, packaged, fresh cooked pounds	52,200	20,252	269,116	92,078		
Canned.....standard cases			401	7,895		
Sea crawfish meat, packaged, fresh cooked.....pounds					902,113	218,504
Abalone, steaks.....do					740,000	231,844

1 The production of this item has been included under "Unclassified products."

Industries related to the fisheries of the Pacific Coast States, 1935—Continued

PRODUCTS MANUFACTURED—Continued

Item	Washington		Oregon		California	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
By manufacturing firms—Continued.						
Clams, hard:						
Fresh shucked.....gallons..	3,752	$4,525	(1)	(1)		
Canned:						
Whole....standard cases..	16,605	68,280				
Minced.....do....	16,026	74,673				
Chowder.....do....	480	1,686				
Juice and nectar....do....	3,216	6,786				
Shells, ground for poultry feed.....tons..	2,656	26,273				
Clams, razor, canned:						
Whole.....standard cases..	1,152	10,327	51	$408		
Minced.....do....	40,872	344,558	1,012	7,105		
Juice.....do....			70	246		
Oysters:						
Eastern, fresh shucked gallons..					6,857	$33,360
Japanese:						
Fresh shucked.....do....	322,186	410,101	71,186	93,623	4,571	11,209
Canned..standard cases..	88,062	384,423				
Native, fresh shucked gallons..	23,387	146,016	5,734	38,265	274	1,455
Shell products:						
Poultry feed.....tons..	2,720	25,380	(1)	(1)	13,273	73,139
Unclassified products:						
Packaged.....pounds..	[2] 91,400	[2] 17,169	[2] 13,656	[2] 1,775	(4)	(4)
Salted.....do....	[5] 1,110,274	[5] 74,946	(4)	(4)	[6] 1,352,720	[6] 147,396
Smoked.....do....	(4)	(4)	[7] 47,072	[7] 8,025	[8] 366,427	[8] 65,853
Canned:						
Cat and dog food standard cases..					459,917	1,269,129
Other.....do....	[9] 11,813	[9] 75,181	[10] 793	[10] 15,583	[11] 11,924	[11] 77,726
Meal.....tons..	[12] 992	[12] 42,976	(4)	(4)	[12] 2,133	[12] 47,315
Oil.....gallons..	[14] 172,983	[14] 2,278,289	(4)	(4)	(4)	(4)
Miscellaneous.....		[13] 13,068		[16] 13,405		[17] 1,148,897
Total.....		9,265,673		3,819,705		38,157,970
By fishermen:						
Cod, green salted.....pounds..	2,839,818	127,837			1,581,593	71,190
Cod, tongues.....do....	10,526	842			6,400	320
Shrimp:						
Dried.....do....					192,237	28,836
Meal or bran.....do....					389,550	3,896
Total.....	2,850,344	128,679			2,169,780	104,242
Grand total.....		9,394,352		3,819,705		38,262,212

[1] The production of this item has been included under "Unclassified products."
[2] Includes fresh fillets of "lingcod"; frozen fillets of flounders; fresh-packaged shrimp; and fresh-shucked bay scallops.
[3] Includes fresh fillets of flounders, "lingcod", and rockfishes, and fresh-shucked hard clams.
[4] This has been included under "Miscellaneous."
[5] Includes green salt cod in process, partly boned; spiced herring; and salted salmon.
[6] Includes salted barracuda, herring, pilchards, salmon, black and white sea bass, and yellowtail, pickled and spiced herring; boneless salt cod; and green salt cod in process, partly boned.
[7] Includes kippered sablefish, salmon, and sturgeon; and smoked shad, smelt, and sturgeon.
[8] Includes smoked chub, mackerel, and miscellaneous fish; and kippered sablefish.
[9] Includes canned shad and shad roe, sturgeon roe, sea cucumber, and oyster soup.
[10] Includes canned salmon eggs for bait and kippered sturgeon.
[11] Includes canned abalone products; shad and shad roe; and squid.
[12] Includes salmon, salmon egg, oyster, and miscellaneous fish meals.
[13] Includes abalone, shrimp, and miscellaneous fish meals.
[14] Includes salmon and miscellaneous fish and liver oils.
[15] Includes smoked herring bloaters; oyster-shell lime; and kelp products.
[16] Includes salmon and salmon-egg meal; salmon-egg oil; salted sturgeon caviar; marine-shell novelties; and oyster-shell products.
[17] Includes packaged, cooked, and peeled shrimp; dried shrimp; whale, sperm, and miscellaneous liver oils; marine-shell novelties; oyster-shell lime; liquid glue; and kelp products.

NOTE.—The total value of manufactured products in the Pacific Coast States was as follows: By manufacturing establishments, $51,243,348; and by fishermen, $232,921. Some of the above products may have been imported from another State or a foreign country; therefore, they cannot be correlated directly with the catch within the State. All of the persons engaged in the preparation of fishermen's manufactured products have also been included as fishermen.

WASHINGTON

Fisheries of Washington, 1935

CATCH: BY DISTRICTS

Species	Puget Sound district		Coastal district		Columbia River district	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Carp					124,300	$2,797
Cod [1]	9,285,400	$131,042				
Flounders:						
"Sole"	2,402,200	61,254			3,800	94
Other	191,700	4,039				
Grayfish	277,500	527				
Halibut	25,883,000	2,065,099	4,300	$237	61,300	5,547
Herring	694,500	9,047				
"Lingcod"	1,150,500	32,729	40,100	736	11,000	358
Perch	95,500	2,999				
Pilchard or sardine	12,400	186				
Rockfishes	431,100	14,461	5,500	108	17,300	595
Sablefish	2,883,200	107,805			190,300	6,564
Salmon:						
Blueback, red or sockeye	4,310,900	426,996	475,300	47,527	25,500	2,289
Chinook or king	4,969,300	326,706	2,274,200	147,322	4,215,900	293,562
Chum or keta	7,198,200	212,385	855,800	12,837	357,700	4,471
Humpback or pink	26,176,000	602,501	1,200	29		
Silver or coho	11,586,800	528,311	3,411,900	166,900	1,149,200	54,874
Shad					65,800	1,842
Smelt:						
Eulachon			36,300	835	2,769,600	45,380
Surf or silver	453,700	18,057	98,700	3,645		
Steelhead trout			[2] 49,900	[2] 3,298	464,400	24,207
Sturgeon					20,900	592
Total	98,001,900	4,544,144	7,253,200	383,474	9,477,000	443,172
SHELLFISH, ETC.						
Crabs	251,700	12,837	1,299,000	94,474		
Shrimp	124,500	8,417				
Clams:						
Hard:						
Butter	376,700	22,062				
Little neck	445,900	30,466				
Razor			935,400	144,764		
Octopus	69,200	2,436				
Oysters:						
Eastern, market			700	297		
Japanese, market	1,283,700	99,954	4,193,500	335,483		
Native, market	319,900	198,347	6,800	3,234		
Scallops, bay	15,400	3,861				
Squid	19,200	824				
Trepang	12,600	420				
Total	2,918,800	379,624	6,435,400	578,252		
Grand total	100,920,700	4,923,768	13,688,600	961,726	9,477,000	443,172

[1] Nearly all of the cod were taken off Alaska.
[2] Steelhard trout shown for the coastal district of Washington were taken on Indian reservations.

Fisheries of the Puget Sound district of Washington, 1935

OPERATING UNITS: BY GEAR

Item	Purse seines		Haul seines [2]	Gill nets		Lines		Pound nets [3]	Brush weirs
	Salmon	Sardine [1]		Drift	Set [3]	Trawl, set, and hand	Troll		
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	1,704	184	26			1,322	293		
On boats and shore	14		513	311	6	55	276	4	7
Total	1,718	184	539	311	6	1,377	569	4	7
Vessels:									
Motor	215	18	7			169	154		
Net tonnage	4,933	771	73			4,603	1,182		
Sail						3			
Net tonnage						1,346			
Total vessels	215	18	7			172	154		
Total net tonnage	4,933	771	73			5,949	1,182		
Boats:									
Motor	3		112	302	6	42	173	2	2
Other			85			30			3
Accessory boats	218	18				71			
Apparatus:									
Number	218	18	177	302	6	28,159	1,635	2	6
Length, yards	130,364	6,590	12,454						
Square yards				158,350	1,440				
Hooks						595,755	7,357		

Item	Dip nets	Reef nets	Beam trawls	Otter trawls	Traps		Tongs and rakes, oyster	Shovels	Total, exclusive of duplication
					Crab	Octopus [4]			
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels			24	105					3,376
On boats and shore	15	56	2	3	99	27	203	474	1,795
Total	15	56	26	108	99	27	203	474	5,171
Vessels:									
Motor			10	33					550
Net tonnage			88	510					10,967
Sail									3
Net tonnage									1,346
Total vessels			10	33					553
Total net tonnage			88	510					12,313
Boats:									
Motor	11	18	1	1	92	10	48		762
Other	4	36			7	17	134		306
Accessory boats									297
Apparatus:									
Number	15	18	11	34	2,970	486	146	474	
Yards at mouth			65	476					

[1] Operated in the Oregon pilchard fishery. See Oregon coast tables for catch statistics.
[2] Includes the seines formerly shown as drag bag nets.
[3] Fished only on Indian reservations.
[4] Operating units in the octopus fishery were previously included with set lines.

Fisheries of the Puget Sound district of Washington, 1935—Continued

CATCH: BY GEAR

Species	Purse seines		Haul seines [1]		Gill nets			
					Drift		Set [2]	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Cod			100	$2				
Flounders:								
"Sole"			500	13				
Other			6,400	129				
Herring			113,400	2,041				
"Lingcod"	300	$9	3,700	114				
Perch			89,300	2,813				
Pilchard or sardine			12,400	186				
Rockfishes	200	6	7,700	269				
Salmon: [3]								
Blueback, red or sockeye	4,216,000	417,644			54,400	$5,386	1,200	$119
Chinook or king	901,500	39,666	1,400	84	1,222,800	53,803	17,200	757
Chum or keta	6,705,200	197,803			397,200	11,757	79,600	2,348
Humpback or pink	25,427,100	585,238			381,500	8,801		
Silver or coho	7,034,800	289,834	600	30	918,100	37,826	40,500	1,669
Smelt, surf or silver			453,700	18,057				
Total	44,285,100	1,530,200	689,200	23,738	2,974,000	117,573	138,500	4,893
SHELLFISH								
Squid			19,200	824				
Grand total	44,285,100	1,530,200	708,400	24,562	2,974,000	117,573	138,500	4,893

Species	Lines				Pounds net [2]		Brush weirs	
	Trawl, set, and hand [2]		Troll					
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Cod	[4] 9,157,500	$127,837	300	$6				
Flounders:								
"Sole"	1,100	26						
Grayfish	277,500	527						
Halibut	25,846,900	2,062,413	26,500	1,854				
Herring							575,800	$6,909
"Lingcod"	744,400	23,366	45,300	819				
Perch	100	3						
Rockfishes	347,900	12,491	4,900	103				
Sablefish	2,873,700	107,425						
Salmon: [5]								
Blueback, red or sockeye			600	55				
Chinook or king			2,717,400	227,600	91,300	$4,017		
Humpback or pink			28,400	665				
Silver or coho			3,522,100	196,039				
Total	39,249,100	2,334,088	6,345,500	427,141	91,300	4,017	575,800	6,909

[1] Includes the catch of drag bag nets previously shown separately.
[2] Fished only on Indian reservations.
[3] In addition, the vessels of the Pacific coast halibut fleet landed about 670,000 pounds of halibut, sablefish, and "lingcod" livers valued at $270,000 at Seattle.
[4] These cod were taken off Alaska.
[5] Statistics on the catch of salmon, except those taken by troll lines, are reported to the State in number rather than pounds. The factors used in the above table for converting number of salmon to weight in pounds were as follows: Blueback, red or sockeye, 7 pounds; chinook or king, 22 pounds; chum or keta, 10 pounds; humpback or pink, 4.5 pounds; and silver or coho, 8 pounds.

Fisheries of the Puget Sound district of Washington, 1935—Continued

CATCH: BY GEAR—Continued

Species	Dip nets		Reef nets		Beam trawls		Otter trawls	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Cod							127,500	$3,197
Flounders:								
"Sole"							2,400,600	61,215
Other							185,300	3,910
Halibut							9,600	832
Herring	5,300	$97						
"Lingcod"							356,800	8,421
Perch							6,100	188
Rockfishes							70,400	1,529
Sablefish							9,500	380
Salmon: [6]								
Blueback, red or sockeye			38,700	$3,792				
Chinook or king			17,700	779				
Chum or keta			16,200	477				
Humpback or pink			339,000	7,797				
Silver or coho			70,700	2,913				
Total	5,300	97	482,300	15,758			3,165,800	79,730
SHELLFISH								
Shrimp					124,500	$8,417		
Octopus							900	31
Scallops, bay [10]					15,400	3,861		
Trepang					12,600	420		
Total					152,500	12,698	900	31
Grand total	5,300	97	482,300	15,758	152,500	12,698	3,166,700	79,761

Species	Traps				Tongs and rakes		Shovels	
	Crab		Octopus [4]					
SHELLFISH								
Crabs [7]	251,700	$12,837						
Clams, hard: [8]								
Butter							376,700	$22,062
Little neck							445,900	30,466
Octopus			68,300	$2,405				
Oysters: [9]								
Japanese, market					1,283,700	$99,954		
Native, market					319,900	198,347		
Total	251,700	12,837	68,300	2,405	1,603,600	298,301	822,600	52,528

[4] The catch of octopus was previously shown under set lines.

[6] Statistics on the catch of salmon, except those taken by troll lines, are reported to the State in number rather than pounds. The factors used in the above table for converting number of salmon to weight in pounds were as follows: Blueback, red or sockeye, 7 pounds; chinook or king, 22 pounds; chum or keta, 10 pounds; humpback or pink, 4.5 pounds; and silver or coho, 8 pounds.

[7] The weight of crabs shown is based on an average of 20 pounds per dozen.

[8] Statistics on hard clams are based on yields of 28 percent edible meats for butter clams and 24 percent for little neck clams.

[9] Statistics on oysters are based on yields of 18 percent edible meats for native oysters and 14 percent for Japanese oysters.

[10] The weight of bay scallops is based on a yield of 17 percent edible meat.

NOTE.—Statistics of the catch by haul seines, set nets, and pound nets in this table are not comparable with those for previous years since a State initiative effective in 1935 prohibited the use in Puget Sound of these gears for the taking of salmon except by Indians on reservations.

Fisheries of the coastal district of Washington, 1935

OPERATING UNITS: BY GEAR

Item	Haul seines [1]	Gill nets		Lines, troll	Dip nets	Traps, crab	Tongs and rakes, oyster	Dredges, oyster	Shovels	Total, exclusive of duplication
		Drift	Set							
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:										
On vessels				43		10		8		61
On boats and shore	26	254	110	146	55	106	194		3,752	4,362
Total	26	254	110	189	55	116	194	8	3,752	4,423
Vessels, motor				25		5		2		32
Net tonnage				198		44		13		255
Boats:										
Motor		203	67	92	8	62	40			414
Other	5		43				136			184
Apparatus:										
Number	5	203	110	585	55	3,563	162	4	3,752	
Length, yards	325									
Square yards		370,988	26,950							
Yards at mouth								8		
Hooks				2,632						

CATCH: BY GEAR

Species	Haul seines [1]		Gill nets				Lines, troll	
			Drift		Set [2]			
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Halibut							4,300	$237
"Lingcod"							40,100	736
Rockfishes							5,500	108
Salmon: [3]								
Blueback, red or sockeye					451,600	$45,157		
Chinook or king			696,900	$38,328	268,900	14,792	1,308,400	94,202
Chum or keta			600,700	9,010	254,800	3,822	300	5
Humpback or pink					200	5	1,000	24
Silver or coho			500,800	22,534	974,300	43,844	1,936,800	100,522
Smelt, surf or silver	85,100	$3,233						
Steelhead trout [4]					49,900	3,298		
Total	85,100	3,233	1,798,400	69,872	1,999,700	110,918	3,296,400	195,834

Species	Dip nets		Traps		Dredges, tongs, and rakes		Shovels	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Salmon: [3]								
Blueback, red or sockeye	23,700	$2,370						
Smelt:								
Eulachon	36,300	835						
Surf or silver	13,600	412						
Total	73,600	3,617						
SHELLFISH								
Crabs [5]			1,299,000	$94,474				
Clams, razor [6]							935,400	$144,764
Oysters: [7]								
Eastern, market					700	$297		
Japanese, market					4,193,500	335,483		
Native, market					6,800	3,234		
Total			1,299,000	94,474	4,201,000	339,014	935,400	144,764
Grand total	73,600	3,617	1,299,000	94,474	4,201,000	339,014	935,400	144,764

[1] Previously shown as drag bag nets.
[2] Set nets were fished only on Indian reservations.
[3] Statistics on the catch of salmon except those taken by troll lines are reported to the State in number rather than pounds. The factors used in the above table for converting number of salmon to weight in pounds were as follows: Blueback red, or sockeye, 5 pounds; chinook or king, 23 pounds; chum or keta, 10 pounds; humpback or pink, 4 pounds; silver or coho, 10 pounds; and steelhead trout, 9 pounds.
[4] Steelhead trout shown in this table were taken on Indian reservations
[5] The weight of crabs shown in this table is based on an average of 22 pounds per dozen.
[6] The weight of razor clams shown is based on a yield of 42 percent of edible meats.
[7] The statistics on oysters used in this table are based on yields of 14 percent edible meats for Japanese and native oysters, and 13 percent for eastern oysters.

NOTE.—A State law effective in 1935 prohibited the use of certain gear in the salmon fishery, except for Indians fishing on their reservations. This eliminated the Washington coast pound net fishery and restricted set nets to Indian reservations.

Fisheries of the Columbia River district of Washington, 1935

OPERATING UNITS: BY GEAR

Item	Haul seines	Gill nets, drift	Lines		Dip nets	Total, exclusive of duplication
			Trawl and set	Troll		
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels			11	4		15
On boats and shore	5	604	18	41	213	820
Total	5	604	29	45	213	835
Vessels, motor			3	2		5
Net tonnage			34	19		53
Boats:						
Motor	2	411	18	25	102	516
Other	2				9	11
Apparatus:						
Number	2	411	468	112	213	
Length, yards	251					
Square yards		1,142,580				
Hooks			11,250	398		

CATCH: BY GEAR[1]

Species	Haul seines		Gill nets, drift		Lines				Dip nets	
					Trawl and set		Troll			
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Carp	124,300	$2,797								
Flounders, "sole"			1,700	$34	2,100	$60				
Halibut					61,300	5,547				
"Lingcod"					11,000	358				
Rockfishes					17,300	595				
Sablefish					190,300	6,564				
Salmon:										
Blueback, red or sockeye			4,500	399					21,000	$1,890
Chinook or king			3,753,000	269,465			42,100	$3,225	420,800	20,872
Chum or keta			357,700	4,471						
Silver or coho			647,700	29,147			501,500	25,727		
Shad			65,800	1,842						
Smelt			76,200	2,286					2,693,400	43,094
Steelhead trout			362,600	19,218			100	6	101,700	4,983
Sturgeon	600	18	17,300	484	3,000	90				
Total	124,900	2,815	5,286,500	327,346	285,000	13,214	543,700	28,958	3,236,900	70,839

[1] A State law effective in 1935 prohibited the use of stationary gear in the salmon fishery, except by Indians fishing on their reservations. This eliminated the use of set gill nets, pound nets, fish wheels, and haul seines for catching salmon in the Columbia River district of Washington. As a result of these gear restrictions the catch of salmon on the Washington side of the Columbia River showed a considerable decrease as compared with previous years.

OREGON

Fisheries of Oregon, 1935

CATCH: BY DISTRICTS

Species	Columbia River district		Coastal district	
FISH	*Pounds*	*Value*	*Pounds*	*Value*
Carp	7,600	$190		
Flounders:				
"Sole"	34,800	874	10,800	$289
Other			23,500	382
Halibut	456,000	32,304	93,400	6,354
Herring			42,900	644
"Lingcod"	59,000	1,587	49,400	1,145
Perch			20,300	305
Pilchard or sardine			52,464,100	236,094
Rockfishes	37,300	1,141	11,500	361
Sablefish	70,200	2,224	20,600	635
Salmon:				
Blueback, red or sockeye	42,400	4,047		
Chinook or king	11,200,700	783,435	1,115,000	72,693
Chum or Keta	452,700	5,660	747,200	9,714
Silver or coho	4,152,600	203,397	9,074,900	413,189
Shad	354,500	10,287	391,100	11,733
Smelts:				
Eulachon	163,900	4,215		
Other			2,500	38
Steelhead trout	1,283,700	66,297	310,000	22,630
Striped bass			27,800	1,890
Sturgeon	58,700	1,700	1,200	36
Tuna, albacore			600	60
Total	18,374,100	1,117,358	64,406,800	778,192
SHELLFISH				
Crabs			2,360,700	150,226
Crawfish, fresh water	79,300	7,928		
Clams:				
Razor			77,700	12,953
Mixed			74,900	4,167
Oysters:				
Japanese, market			9,900	780
Native, market			8,900	5,210
Total	79,300	7,928	2,532,100	173,336
Grand total	18,453,400	1,125,286	66,938,900	951,528

Fisheries of the Columbia River district of Oregon, 1935

OPERATING UNITS: BY GEAR

Item	Haul seines	Gill nets		Lines		Pound nets	Dip nets	Otter trawls	Traps, crawfish	Total, exclusive of duplication
		Drift	Set	Trawl and set	Troll					
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:										
On vessels				16	79					95
On boats and shore	518	1,186	73	56	146	58	264	3	24	2,249
Total	518	1,186	73	72	225	58	264	3	24	2,344
Vessels, motor				4	44					48
Net tonnage				63	339					402
Boats:										
Motor	25	814	63	50	122	29	8	1	20	1,091
Other	44		10	6		18			4	78
Apparatus:										
Number	44	814	139	559	874	51	264	1	1,156	
Length, yards	24,945									
Square yards		2,578,752	38,808							
Yards at mouth								15		
Hooks				13,408	3,933					

Fisheries of the Columbia River district of Oregon, 1936—Continued

CATCH: BY GEAR

Species	Haul seines		Gill nets				Lines	
			Drift		Set		Trawl and set	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Carp	7,000	$190						
Flounders, "sole"							14,800	$474
Halibut							456,000	32,304
"Lingcod"							57,800	1,551
Rockfishes							37,000	1,132
Sablefish							70,200	2,224
Salmon:								
Blueback, red or sockeye	20,900	2,090	10,700	$949	2,200	$195		
Chinook or king	2,168,500	155,698	7,347,000	527,515	62,500	4,488		
Chum or keta	45,000	563	360,400	4,505	4,100	51		
Silver or coho	258,100	11,615	981,000	44,145	5,600	252		
Shad	180,100	5,403	174,000	4,872	200	6		
Smelt, eulachon			132,700	3,716				
Steelhead trout	500,200	25,230	471,300	24,979	15,600	827		
Sturgeon	700	21	30,700	860	500	15	26,200	786
Total	3,181,100	200,810	9,507,800	611,541	90,700	5,834	662,000	38,471

Species	Lines—Con. Troll		Pound nets		Dip nets		Otter trawls		Traps	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Flounders, "sole"							20,000	$400		
"Lingcod"							1,200	36		
Rockfishes							300	9		
Salmon:										
Blueback, red or sockeye			3,900	$390	4,700	$423				
Chinook or king	233,300	$17,871	403,100	28,943	986,300	48,920				
Chum or keta			43,000	538	200	3				
Silver or coho	2,623,700	134,596	282,800	12,726	1,400	63				
Shad			200	6						
Smelt, eulachon					31,200	499				
Steelhead trout	100	6	181,700	9,630	114,800	5,625				
Sturgeon			600	18						
Total	2,857,100	152,473	915,300	52,251	1,138,600	55,533	21,500	445		
SHELLFISH										
Crawfish, fresh water									79,300	$7,928
Grand total	2,857,100	152,473	915,300	52,251	1,138,600	55,533	21,500	445	79,300	7,928

NOTE.—Strikes by fishermen using gill nets on the lower Columbia River between Aug. 1 and 11, and Aug. 20 and 25 permitted a considerable portion of the fall run of salmon to escape, as the peak of this run was observed between Aug. 20 and 25.

Fisheries of the coastal district of Oregon, 1935

OPERATING UNITS: BY GEAR [1]

Item	Haul seines	Gill nets		Lines		Otter trawls	Traps, crab	Tongs and rakes, oyster	Shovels	Total, exclusive of duplication
		Drift	Set	Trawl and set	Troll					
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:										
On vessels				7	15	3				18
On boats and shore	24	486	380	22	178		253	5	203	1,450
Total	24	486	380	29	193	3	253	5	203	1,468
Vessels, motor				2	9	1				10
Net tonnage				24	72	16				88
Boats:										
Motor	7	366	236	20	132		253	2		964
Other	7		123	2				3		133
Apparatus:										
Number	7	486	865	174	714	1	13,144	5	203	
Length, yards	1,167									
Square yards		691,092	328,700							
Yards at mouth						30				
Hooks				5,525	3,213					

[1] In addition there was a combined fleet of 52 Washington and California purse-seine vessels operating in the Oregon coast pilchard fishery. These vessels were manned by a total of 546 fishermen and had an aggregate tonnage of 2,549 net tons. Of the total vessels, 18 were Washington purse seiners, and 34 were from California. For detailed statistics regarding the operating units in this fishery refer to the gear tables in the Washington and California sections of this report.

CATCH: BY GEAR

Species	Purse seines [1]		Haul seines		Gill nets, drift and set		Lines	
							Trawl and set	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Flounders:								
"Sole"							3,200	$80
Other			10,300	$154	7,200	$108	1,300	26
Halibut							91,200	6,202
Herring			16,700	251	26,200	393		
"Lingcod"							18,800	508
Perch			18,200	273	2,100	32		
Pilchard or sardine	52,464,100	$236,094						
Rockfishes							9,900	297
Sablefish							20,400	632
Salmon:								
Chinook or king					831,100	50,946		
Chum or keta					747,200	9,714		
Silver or coho					5,418,400	238,409		
Shad					391,100	11,733		
Smelt			1,100	17	1,400	21		
Steelhead trout					310,000	22,630		
Striped bass					27,800	1,890		
Sturgeon					1,200	36		
Total	52,464,100	236,094	46,300	695	7,763,700	335,912	144,800	7,745

[1] The Oregon coast pilchard fishery was prosecuted entirely by Washington and California purse-seine vessels.

Fisheries of the coastal district of Oregon, 1935—Continued

CATCH: BY GEAR—Continued

Species	Lines—Contd. Troll		Otter trawls		Traps		Tongs and rakes		Shovels	
FISH										
Flounders:	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
"Sole"			7,600	$209						
Other			4,700	94						
Halibut	1,700	$122	500	30						
"Lingcod"	26,700	481	3,900	156						
Rockfishes			1,600	64						
Sablefish	200	3								
Salmon:										
Chinook or king	283,900	21,747								
Silver or coho	3,656,500	174,780								
Tuna, albacore	600	60								
Total	3,969,600	197,193	18,300	553						
SHELLFISH										
Crabs					2,360,700	$150,226				
Clams:										
Razor [2]									77,700	$12,953
Mixed [3]									74,900	4,167
Oysters:										
Japanese, market							9,900	$780		
Native, market							8,900	5,210		
Total					2,360,700	150,226	18,800	5,990	152,600	17,120
Grand total	3,969,600	197,193	18,300	553	2,360,700	150,226	18,800	5,990	152,600	17,120

[2] The weight of razor clams is that of edible meats, based on a yield of 42 percent of the round weight.
[3] Mixed clams consist principally of Eastern soft-shell clams. The weight shown is that of edible meats, based on a yield of 21 percent of the round weight.

NOTE.—A strike of troll fishermen on the Oregon coast halted operations in this fishery from May 1 to June 23.

CALIFORNIA

Fisheries of California, 1935

CATCH: BY DISTRICTS

Species	Northern district		San Francisco district [1]		Monterey district	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Anchovies			74,600	$1,491	76,400	$1,246
Carp			104,200	1,466		
Catfish			289,600	32,461		
Cod [1]			5,101,900	71,510		
Flounders:						
"California halibut"			18,400	1,659	41,900	3,678
"Sole"	2,632,700	$142,979	5,400,600	308,435	618,900	31,851
Other	297,400	13,563	996,400	42,857	96,900	4,113
Grayfish	5,200	26	145,900	792	9,000	91
Hake	900	9	61,900	619	5,700	70
Halibut	848,200	59,936	19,000	1,335		
Hardhead			78,000	4,038		
Herring	7,600	88	792,100	3,960	47,300	360
Horse mackerel					146,400	3,389
Kingfish			13,100	391	250,400	8,428
"Lingcod"	491,600	16,999	409,100	16,363	106,700	5,014
Mackerel			16,300	335	5,472,000	51,577
Perch	9,700	241	132,300	5,293	39,400	1,491
Pilchard or sardine			433,481,500	1,725,267	376,150,600	1,484,173
Pompano					200	124
Rockfishes	461,300	17,983	538,300	21,531	2,194,200	72,279
Sablefish	1,609,200	50,631	126,500	4,428	560,300	10,222
Salmon	3,495,900	219,648	1,941,700	106,483	219,700	20,638

[1] The catch of cod was taken off Alaska.

Fisheries of California, 1935—Continued

CATCH: BY DISTRICTS—Continued

Species	Northern district		San Francisco district		Monterey district	
FISH—continued	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Sculpin			400	$8	9,900	$102
Sea bass, white			400	41	1,200	126
Shad			1,602,200	44,940	100	2
Skates	4,500	$46	239,600	2,336	32,100	427
Smelt	24,800	894	323,100	19,335	213,000	9,328
Splittail			37,600	728		
Squawfish			1,600	53		
Striped bass			502,100	41,300		
Suckers			44,400	562		
Tomcod	300	3	400	8		
Tuna and tunalike fishes:						
Albacore					683,400	50,205
Bonito					400	21
Whitebait	127,500	5,434	30,700	2,459	11,700	800
Other fish	93,000	1,016	115,600	1,167	8,800	99
Total	10,109,800	529,496	452,639,500	2,463,711	386,906,600	1,759,854
SHELLFISH						
Crabs	157,900	10,041	3,495,300	364,006	26,700	2,115
Shrimp			3,444,800	52,034	2,400	582
Abalone			3,600	627	531,200	90,737
Clams:						
Hard	10,400	928	14,100	5,702		
Pismo					5,800	1,409
Soft			47,500	10,214		
Octopus	1,800	73	24,000	1,440	55,300	3,430
Oysters, market:						
Eastern			64,000	30,348		
Japanese			30,900	4,202	9,100	3,640
Native			2,400	1,214	400	120
Squid					783,100	22,333
Total	170,100	11,042	7,126,600	470,375	1,414,000	124,366
WHALE PRODUCTS						
Whale meat			3,272,000	65,440		
Whale oil			2,451,600	89,215		
Total			5,723,600	154,655		
Grand total	10,279,900	540,538	465,489,700	3,088,741	388,410,600	1,884,220

Species	San Pedro district					
	Off California		Off Latin America		Total	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Anchovies	28,000	$361			28,000	$361
Barracuda	1,922,200	68,155	249,100	$22,531	2,171,300	90,686
Cabrilla			67,400	3,224	67,400	3,224
Flounders:						
"California halibut"	605,000	47,869	240,000	16,954	845,000	64,823
"Sole"	510,800	15,310	100	3	510,900	15,313
Other	13,300	1,948			13,300	1,948
Flyingfish	37,900	1,351			37,900	1,351
Grayfish	331,500	10,382	1,000	41	332,500	10,423
Groupers			21,000	1,285	21,000	1,285
Hake	5,300	92	500	20	5,800	112
Halibut	2,400	334			2,400	334
Herring	400	21			400	21
Horse mackerel	9,836,000	39,333			9,836,000	39,333
Kingfish	501,200	8,622			501,200	8,622
"Lingcod"	1,800	108			1,800	108
Mackerel	131,673,400	997,635			131,673,400	997,635
Marlin	14,200	682			14,200	682
Mullet	500	32			500	32
Perch	61,100	3,908			61,100	3,908
Pilchard or sardine	292,001,800	1,110,565			292,001,800	1,110,565
Pompano	5,600	2,595			5,600	2,595

Fisheries of California, 1935—Continued

CATCH: BY DISTRICTS—Continued

Species	San Pedro district					
	Off California		Off Latin America		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
FISH—continued						
Rock bass	163,800	$9,939	5,000	$325	168,800	$10,264
Rockfishes	1,216,000	48,355	11,500	465	1,227,500	48,820
Rudderfish	34,800	1,724			34,800	1,724
Sablefish	522,700	18,908			522,700	18,908
Sculpin	62,400	4,792			62,400	4,792
Sea bass:						
Black	12,100	515	405,600	22,388	417,700	22,903
White	604,700	36,008	230,600	15,480	835,300	51,488
Sheepshead	184,100	6,264	300	13	184,400	6,277
Skates	12,400	207			12,400	207
Smelt	307,900	10,693	300	9	308,200	10,702
Spanish mackerel			4,400	203	4,400	203
Swordfish	434,500	51,748	13,300	1,418	447,800	53,166
Tuna and tunalike fishes:						
Albacore	1,505,400	128,989	100	8	1,505,500	128,997
Bluefin	17,839,200	812,865	5,872,200	264,584	23,711,400	1,077,449
Bonito	1,298,800	35,261	4,310,900	129,340	5,609,700	164,601
Skipjack or striped tuna	58,800	2,353	3,451,800	138,481	3,510,600	140,834
Yellowfin	42,100	2,077	20,526,800	1,026,888	20,568,900	1,028,965
Whitefish	33,700	2,177	6,800	402	40,500	2,579
Yellowtail	466,300	12,430	1,772,800	56,401	2,239,100	68,831
Other fish	4,200	180	800	43	5,000	223
Total	462,356,300	3,494,788	37,192,300	1,700,506	499,548,600	5,195,294
SHELLFISH						
Crabs	12,800	372			12,800	372
Sea crawfish or spiny lobster	289,000	50,904	125,200	22,787	414,200	73,691
Shrimp	300	10			300	10
Abalone	239,400	23,957			239,400	23,957
Clams:						
Hard	6,200	1,439			6,200	1,439
Pismo	39,600	8,363			39,600	8,363
Octopus	100	3			100	3
Squid	32,900	487			32,900	487
Total	620,300	85,535	125,200	22,787	745,500	108,322
Grand total	462,976,600	3,580,323	37,317,500	1,723,293	500,294,100	5,303,616

Species	San Diego district					
	Off California		Off Latin America		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
FISH						
Barracuda	81,700	$3,913	364,800	$16,494	446,500	$20,407
Cabrilla			54,100	2,090	54,100	2,090
Flounders:						
"California halibut"	145,000	9,625	525,600	35,710	670,600	45,335
"Sole"	1,100	98	100	6	1,200	104
Grayfish	54,000	428	8,500	81	62,500	509
Groupers			10,400	444	10,400	444
Herring	81,500	636			81,500	636
Horse mackerel	1,500	15			1,500	15
Kingfish	3,900	122	100	3	4,000	125
"Lingcod"	1,300	34	900	21	2,200	55
Mackerel	8,104,600	61,538	1,160,900	8,801	9,265,500	70,339
Marlin	4,300	233	100	8	4,400	241
Mullet	13,200	923			13,200	923
Perch	1,200	41	3,000	80	4,200	121
Pilchard or sardine	14,098,400	49,774	3,900	41	14,102,300	49,815
Rock bass	196,300	9,720	29,500	1,353	195,800	11,073
Rockfishes	171,600	7,748	235,000	11,315	406,600	19,063
Sablefish	7,500	193	7,700	187	15,200	380
Sculpin	5,600	361	1,700	78	7,300	439
Sea bass:						
Black	5,100	278	208,000	10,510	213,100	10,788
White	46,000	3,106	186,900	11,236	232,900	14,342
Sheepshead	2,800	99	800	27	3,600	126
Skates	13,700	142	4,200	39	17,900	181
Smelt	4,300	246	2,100	109	6,400	355
Spanish mackerel			200	3	200	3
Swordfish	180,500	17,109	41,000	3,776	221,500	20,885

Fisheries of California, 1935—Continued

CATCH: BY DISTRICTS—Continued

Species	San Diego district					
	Off California		Off Latin America		Total	
FISH—continued						
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Tuna and tunalike fishes:						
Albacore	197,400	$15,469	61,200	$4,842	258,600	$20,311
Bluefin	656,600	31,181	805,100	36,837	1,461,700	68,018
Bonito	964,600	26,449	1,321,800	38,245	2,286,400	64,694
Skipjack or striped tuna	1,849,100	73,969	11,837,500	473,650	13,686,600	547,619
Yellowfin	486,900	24,344	51,195,800	2,566,276	51,682,700	2,590,620
Whitefish	6,400	325	10,900	577	17,300	902
Yellowtail	116,300	3,318	5,793,300	161,518	5,909,600	164,836
Total	27,472,400	341,437	73,875,100	3,384,357	101,347,500	3,725,794
SHELLFISH, ETC.						
Sea crawfish or spiny lobster	82,600	13,638	848,000	126,133	930,600	139,771
Clams, Pismo			3,500	569	3,500	569
Turtles			1,700	81	1,700	81
Total	82,600	13,638	853,200	126,783	935,800	140,421
Grand total	27,555,000	355,075	74,728,300	3,511,140	102,283,300	3,866,215

CATCH: BY WATERS

Species	Off California		Off Latin America	
FISH	*Pounds*	*Value*	*Pounds*	*Value*
Anchovies	179,000	$3,098		
Barracuda	2,003,900	72,068	613,900	$39,025
Cabrilla			121,500	5,314
Carp	104,200	1,466		
Catfish	289,600	32,461		
Cod [1]	5,101,900	71,510		
Flounders:				
"California halibut"	810,300	62,831	765,600	52,664
"Sole"	9,164,100	498,673	200	9
Other	1,404,000	62,481		
Flyingfish	37,900	1,351		
Grayfish	545,600	11,719	9,500	122
Groupers			31,400	1,729
Hake	73,800	790	500	20
Halibut	869,600	61,605		
Hardhead	78,000	4,038		
Herring	928,900	5,065		
Horse mackerel	9,983,900	42,737		
Kingfish	768,600	17,563	100	3
"Lingcod"	1,010,500	38,518	900	21
Mackerel	145,266,300	1,111,085	1,160,900	8,801
Marlin	18,500	915	100	8
Mullet	13,700	955		
Perch	243,700	10,974	3,000	80
Pilchard or sardine	1,115,732,300	4,369,779	3,900	41
Pompano	5,800	2,719		
Rock bass	330,100	19,659	34,500	1,678
Rockfishes	4,581,400	167,896	246,500	11,780
Rudderfish	34,800	1,724		
Sablefish	2,826,200	84,382	7,700	187
Salmon	5,557,300	346,769		
Sculpin	78,300	5,263	1,700	78
Sea bass:				
Black	17,200	793	613,600	32,898
White	652,300	39,281	417,500	26,716
Shad	1,602,300	44,942		
Sheepshead	186,900	6,363	1,100	40
Skates	302,300	3,218	4,200	39
Smelt	873,100	40,496	2,400	118
Spanish mackerel			4,600	206
Splittail	37,600	728		
Squawfish	1,600	53		
Striped bass	502,100	41,300		
Suckers	44,400	562		
Swordfish	615,000	68,857	54,300	5,194
Tomcod	700	11		

[1] The catch of cod was taken off Alaska.

Fisheries of California, 1935—Continued

CATCH: BY WATERS—Continued

Species	Off California		Off Latin America	
FISH—continued				
Tuna and tunalike fishes:	*Pounds*	*Value*	*Pounds*	*Value*
Albacore	2,386,200	$194,663	61,300	$4,850
Bluefin	18,495,800	844,046	6,677,300	301,421
Bonito	2,263,800	61,731	5,632,700	167,585
Skipjack or striped tuna	1,907,900	76,322	15,289,300	612,131
Yellowfin	529,000	26,421	71,722,600	3,593,164
Whitebait	169,900	8,693		
Whitefish	40,100	2,502	17,700	979
Yellowtail	582,600	15,748	7,566,100	217,919
Other fish	221,600	2,462	800	43
Total	1,339,574,600	8,589,286	111,067,400	5,084,863
SHELLFISH, ETC.				
Crabs	3,692,700	376,624		
Sea crawfish or spiny lobster	371,600	64,542	973,200	148,920
Shrimp	3,417,500	52,626		
Abalone	774,200	115,319		
Clams:				
Hard	30,700	8,069		
Pismo	45,400	9,772	3,500	569
Soft	47,500	10,214		
Octopus	81,200	4,946		
Oysters, market:				
Eastern	64,000	30,848		
Japanese	40,000	7,842		
Native	2,800	1,334		
Squid	816,600	22,820		
Turtles			1,700	81
Total	9,413,600	704,956	978,400	149,570
WHALE PRODUCTS				
Whale meat	3,272,000	65,440		
Whale oil	2,151,600	89,215		
Total	5,723,600	154,655		
Grand total	1,354,711,800	9,418,897	112,045,800	5,234,433

Fisheries of the northern district of California, 1935

OPERATING UNITS: BY GEAR

Item	Gill nets	Lines		Dip nets	Traps, crab	Shovels	Total, exclusive of duplication
		Set and hand	Troll				
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels		14	17		1		17
On boats and shore	10	85	190	28	24	16	263
Total	10	99	207	28	25	16	280
Vessels, motor		8	10		1		10
Net tonnage		66	79		9		79
Boats:							
Motor	8	67	167		22		189
Other	1						1
Apparatus:							
Number	12	268	870	28	440	16	
Square yards	9,000						
Hooks		27,365	3,851				

Fisheries of the northern district of California, 1935—Continued

CATCH: BY GEAR

Species	Gill nets		Lines			
			Set and hand		Troll	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Flounders:						
"Sole"			400	$17		
Other	8,600	$353				
Halibut			757,700	53,555	8,400	$521
Herring	7,600	88				
"Lingcod"			243,800	7,769	34,100	682
Perch	9,500	235	100	4		
Rockfishes			155,000	4,472	1,900	39
Sablefish			1,042,500	30,797		
Salmon					3,495,900	219,648
Smelt	15,600	614				
Whitebait	100	5				
Other fish			11,300	198	500	6
Total	41,400	1,295	2,210,800	96,812	3,540,800	220,896
SHELLFISH						
Octopus			1,800	73		
Grand total	41,400	1,295	2,212,600	96,885	3,540,800	220,896

Species	Dip nets		Paranzella nets		Traps		Shovels	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Flounders:								
"Sole"			2,632,300	$142,962				
Other			288,800	13,210				
Grayfish			5,200	26				
Hake			900	9				
Halibut			82,100	5,860				
"Lingcod"			213,700	8,548				
Perch	100	$2						
Rockfishes			304,400	13,472				
Sablefish			566,700	19,834				
Skates			4,500	46				
Smelt	9,200	280						
Tomcod			300	3				
Whitebait	127,400	5,429						
Other fish			81,200	812				
Total	136,700	5,711	4,180,100	204,782				
SHELLFISH								
Crabs			1,900	116	156,000	$9,925		
Clams, hard							10,400	$928
Total			1,900	116	156,000	9,925	10,400	928
Grand total	136,700	5,711	4,182,000	204,898	156,000	9,925	10,400	928

NOTE.—The catch by paranzella nets was made entirely by fishermen from the San Francisco district.

Fisheries of the San Francisco district of California, 1935

OPERATING UNITS: BY GEAR

Item	Purse seines		Lampara and ring nets		Haul seines	Gill nets	
	Sardine	Tuna	Sardine	Other		Drift, salmon	Drift, shad
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	156	11	137	23			
On boats and shore			37		5	215	292
Total	156	11	174	23	5	215	292
Vessels:							
Motor	14	1	13	2			
Net tonnage	855	55	151	21			
Boats:							
Motor			5		1	113	158
Other					1	8	5
Accessory boats	14	1	18	2			
Apparatus:							
Number	14	1	18	2	1	121	163
Length, yards	5,540	600	4,822	800	135		
Square yards						417,995	572,871

Fisheries of the San Francisco district of California, 1935—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Gill nets—Con.	Lines		Fyke nets	Dip nets	Bag nets, shrimp	Paranselia nets
	Other	Set and hand	Troll				
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels		100	74			23	80
On boats and shore	55	39	174	75	2	20	
Total	55	139	248	75	2	43	80
Vessels:							
Motor		4	16			5	16
Net tonnage		42	234			31	230
Sail		2					
Net tonnage		824					
Total vessels		6	16			5	16
Total net tonnage		866	234			31	230
Boats:							
Motor	31	19	166	40	1	5	
Other				14	1		
Accessory boats		72					
Apparatus:							
Number	39	787	1,094	1,628	2	10	8
Length, yards						7,733	
Square yards	55,957						
Yards at mouth							133
Hooks		39,464	5,003				

Item	Beam trawls	Traps, crab	Harpoons, whaling	Rakes and tongs, oyster	Shovels	Abalone outfits	Total, exclusive of duplication
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels		2	16				496
On boats and shore	18	280		25	84	2	905
Total	18	282	16	25	84	2	1,401
Vessels:							
Steam			2				2
Net tonnage			41				41
Motor		1					50
Net tonnage		16					1,283
Sail							2
Net tonnage							824
Total vessels		1	2				54
Total net tonnage		16	41				2,148
Boats:							
Motor	18	277		10	11	1	560
Other				14	1		35
Accessory boats							105
Apparatus:							
Number	18	5,442	2	25	84	1	
Yards at mouth	120						

Fisheries of the San Francisco district of California, 1935—Continued

CATCH: BY GEAR

Species	Purse seines		Lampara and ring nets		Haul seines		Gill nets	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Anchovies			74,400	$1,487			200	$4
Carp					73,900	$935		
Flounders, other			200	10			200	8
Hardhead					65,400	2,983		
Herring			136,700	683			655,400	3,277
Kingfish			3,500	104				
"Lingcod"			300	11				
Mackerel			16,300	335				
Perch			26,100	1,044			106,200	4,249
Pilchard or sardine	397,897,700	$1,571,845	35,564,200	153,226			19,600	196
Salmon							888,900	42,063
Sea bass, white			100	11			300	30
Shad							1,602,200	44,940
Smelt			24,400	1,461			296,300	17,731
Splittail					27,200	272		
Squawfish							700	22
Striped bass							502,100	41,300
Suckers					40,700	407		
Whitebait			10,600	848			1,400	111
Other fish							100	6
Total	397,897,700	1,571,845	35,856,800	159,220	207,200	4,597	4,073,600	153,927

Species	Lines				Fyke nets		Dip nets	
	Set and hand		Troll					
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Carp					30,300	$531		
Catfish	24,500	$2,458			265,100	30,003		
Cod	5,101,900	71,510						
Flounders:								
"California halibut"	700	63	500	$43				
"Sole"	7,200	436						
Other	1,400	27						
Grayfish	15,600	140	100	1				
Halibut	18,900	1,321						
Hardhead					12,600	1,055		
"Lingcod"	233,900	9,356	700	30				
Rockfishes	310,900	12,437	100	4				
Sablefish	46,400	1,623						
Salmon			1,052,800	64,430				
Sculpin	400	8						
Smelt							2,400	$143
Splittail					10,400	456		
Squawfish					900	31		
Suckers					3,700	155		
Whitebait							18,700	1,500
Other fish	4,900	50			100	6		
Total	5,766,700	99,429	1,054,200	64,508	323,100	32,237	21,100	1,643
SHELLFISH								
Octopus	22,700	1,365						
Grand total	5,789,400	100,794	1,054,200	64,508	323,100	32,237	21,100	1,643

Fisheries of the San Francisco district of California, 1935—Continued

CATCH: BY GEAR—Continued

Species	Bag nets		Paranzella nets		Beam trawls		Traps	
FISH								
Flounders:	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
"California halibut"			17,200	$1,553				
"Sole"			5,393,400	307,999				
Other			994,600	42,812				
Grayfish			130,200	651				
Hake			61,900	619				
Halibut			100	14				
Kingfish			9,600	287				
"Lingcod"			174,200	6,966				
Rockfishes			227,300	9,090				
Sablefish			80,100	2,805				
Skates			239,600	2,396				
Tomcod			400	8				
Other fish			110,500	1,105				
Total			7,469,100	376,305				
SHELLFISH								
Crabs			45,400	4,725			3,449,900	$359,371
Shrimp	2,245,400	$33,917			1,199,400	$18,117		
Octopus			1,300	75				
Total	2,245,400	33,917	46,700	4,800	1,199,400	18,117	3,449,900	359,371
Grand total	2,245,400	33,917	7,485,800	381,105	1,199,400	18,117	3,449,900	359,371

Species	Harpoons		Rakes and tongs		Shovels		Abalone outfits	
SHELLFISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Abalone							3,600	$625
Clams:								
Hard					14,100	$5,702		
Soft					47,500	10,214		
Oysters, market:								
Eastern			64,000	$30,848				
Japanese			30,900	4,202				
Native			2,400	1,214				
Total			97,300	36,264	61,600	15,916	3,600	625
WHALE PRODUCTS								
Whale meat	3,272,000	$65,440						
Whale oil	2,451,600	89,215						
Total	5,723,600	154,655						
Grand total	5,723,600	154,655	97,300	36,264	61,600	15,916	3,600	625

Fisheries of the Monterey district of California, 1935

OPERATING UNITS: BY GEAR

Item	Purse seines		Lampara and ring nets		Gill nets			
	Sardine	Tuna	Sardine	Other	Set, "California halibut"	Set, crab	Drift, sea bass	Other
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	257	70	169	68				
On boats and shore			223	89	10	32	1	34
Total	257	70	392	157	10	32	1	34
Vessels, motor	23	6	15	8				
Net tonnage	1,123	397	161	116				
Boats:								
Motor			20	14	6	26	1	23
Other					1			5
Accessory boats	23	6	35	22				
Apparatus:								
Number	23	6	35	22	7	26	1	46
Length, yards	7,398	3,480	9,905	5,125				
Square yards					18,527	91,042	3,200	36,106

Fisheries of the Monterey district of California, 1935—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Lines		Otter trawls	Traps		Rakes and tongs, oyster	Shovels	Abalone outfits	Total, exclusive of duplication
	Set and hand	Troll		Crab	Octopus				
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Fishermen:									
On vessels	3	7	22					74	496
On boats and shore	178	204	7	8	2	6	32	11	559
Total	181	211	29	8	2	6	32	85	1,055
Vessels, motor	2	5	4					15	52
Net tonnage	19	80	104					113	1,389
Boats:									
Motor	141	185	1	7	2	1	5	2	225
Other	16					3	13		32
Accessory boats									72
Apparatus:									
Number	785	1,446	5	107	28	6	32	17	
Yards at mouth			125						
Hooks	75,262	2,265							

CATCH: BY GEAR

Species	Purse seines		Lampara and ring nets		Gill nets	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Anchovies			75,000	$1,224	1,400	$22
Flounders:						
"California halibut"	100	$6	800	69	29,400	2,584
"Sole"					3,600	119
Other			300	14	10,300	308
Herring	19,000	142	19,700	148	8,600	70
Horse mackerel	28,900	660	115,800	2,645	500	27
Kingfish	200	6	102,800	3,459	115,800	3,899
"Lingcod"					1,300	63
Mackerel	280,100	2,101	4,672,400	35,043	2,800	84
Perch			8,640	345	26,600	988
Pilchard or sardine	284,396,400	1,119,860	91,752,800	364,299	1,400	14
Pompano					200	124
Rockfishes			100	2	700	28
Sculpin					1,500	15
Sea bass, white	100	6	100	14	1,000	106
Shad					100	2
Skates					5,100	70
Smelt			39,700	1,736	119,600	5,241
Tuna and tunalike fishes, bonito	400	21				
Whitebait			10,900	744	800	56
Total	284,725,200	1,122,802	96,799,000	409,742	330,700	13,820
SHELLFISH						
Crabs					26,000	2,062
Octopus					100	6
Squid	1,900	55	780,000	22,243	1,200	35
Total	1,900	55	780,000	22,243	27,300	2,103
Grand total	284,727,100	1,122,857	97,579,000	431,985	358,000	15,923

Fisheries of the Monterey district of California, 1935—Continued

CATCH: BY GEAR—Continued

Species	Lines				Paranzella nets [1]	
	Set and hand		Troll			
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Flounders:						
"California halibut"	2,700	$232	200	$19	8,700	$768
"Sole"	29,500	973			585,800	30,759
Other	37,900	1,761			48,400	2,030
Grayfish					9,000	91
Hake					5,700	70
Horse mackerel	1,200	57				
Kingfish	27,600	929			4,000	135
"Lingcod"	97,800	4,600	1,700	82	5,900	269
Mackerel	516,300	14,338	400	11		
Perch	3,400	127			800	31
Rockfishes	2,146,100	70,584	800	24	46,500	1,641
Sablefish	553,900	10,095			6,400	127
Salmon			219,700	20,638		
Sculpin	8,400	87				
Skates	9,000	123			18,000	234
Smelt	53,500	2,342			200	9
Tuna and tunalike fishes, albacore			683,400	50,205		
Other fish	400	14			8,400	85
Total	3,487,700	106,262	906,200	70,979	747,800	36,249
SHELLFISH						
Crabs					100	5
Octopus	10,500	653				
Total	10,500	653			100	5
Grand total	3,498,200	106,915	906,200	70,979	747,900	36,254

Species	Traps		Rakes and tongs		Shovels		Abalone outfits	
SHELLFISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Crabs	600	$48						
Shrimp	2,400	582						
Abalone							531,200	$90,737
Clams, Pismo					5,800	$1,409		
Octopus	44,700	2,771						
Oysters, market:								
Japanese			9,100	$3,640				
Native			400	120				
Total	47,700	3,401	9,500	3,760	5,800	1,409	531,200	90,737

[1] Includes the catch by otter trawls.

Fisheries of the San Pedro district of California, 1935

OPERATING UNITS: BY GEAR

Item	Purse seines			Lampara and ring nets			Gill nets		
	Mackerel	Sardine	Tuna	Mackerel	Sardine	Other	Drift, barracuda	Set, sea bass	Other
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	39	768	748	574	516	12	9	4	2
On boats and shore				38	48	15	23	51	28
Total	39	768	748	612	564	27	32	55	30
Vessels, motor	4	72	70	54	48	1	3	2	1
Net tonnage	123	3,143	3,109	1,008	949	18	20	14	8
Boats:									
Motor				4	5	3	11	23	13
Other								3	6
Accessory boats	4	72	70	58	53	4			
Apparatus:									
Number	4	72	70	58	53	4	14	28	27
Length, yards	1,560	27,169	40,822	26,062	23,646	1,780			
Square yards							152,096	100,043	23,817

Fisheries of the San Pedro district of California, 1935—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Trammel nets	Lines		Paranzella nets	Traps, sea crawfish	Harpoons, swordfish	Shovels	Abalone outfits	Total, exclusive of duplication
		Set and hand	Troll						
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	14	469	32	6	14	48	5	5	1,765
On boats and shore	60	448	329	12	202	72	68	7	822
Total	74	917	361	18	216	120	73	12	2,587
Vessels, motor	5	69	13	2	7	11	1	1	194
Net tonnage	49	2,991	109	26	55	133	9	9	7,217
Boats:									
Motor	28	275	248	4	115	34	6	2	423
Other		47			15		14		71
Accessory boats		37						1	165
Apparatus:									
Number	33	1,898	1,685	3	5,485	45	73	3	
Square yards	163,309								
Yards at mouth				50					
Hooks		283,842	1,685						

CATCH OFF CALIFORNIA: BY GEAR

Species	Purse seines		Lampara and ring nets		Gill nets		Trammel nets	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Anchovies			28,000	$361				
Barracuda	227,300	$8,049	1,470,200	51,001	159,000	$6,832	100	$4
Flounders:								
"California halibut"	200	14	700	65	600	52	379,900	32,068
"Sole"			200	12			1,800	101
Other			200	13			100	11
Flyingfish	200	8	3,500	126	34,200	1,217		
Grayfish	2,600	80	7,200	226	43,300	1,229	51,600	1,532
Herring					400	21		
Horse mackerel	1,182,300	4,727	8,653,200	34,597	500	9		
Kingfish	200	3	402,600	6,927	1,200	21	100	2
"Lingcod"							100	6
Mackerel	19,115,400	144,730	109,119,900	826,203	40,500	820		
Marlin							8,600	416
Mullet					500	32		
Perch			52,000	3,436	4,200	164		
Pilchard or sardine	180,711,300	687,287	111,289,100	423,258	1,400	20		
Pompano			5,600	2,595				
Rock bass	1,800	111	20,200	1,254	3,300	174	1,800	109
Rockfishes			300	13			100	5
Rudderfish	200	9	32,100	1,588	1,900	94		
Sablefish			200	7				
Sculpin			100	6			200	11
Sea bass:								
Black	400	19	1,800	79	1,600	63	1,600	68
White	205,400	11,902	249,000	14,303	144,300	9,422	400	23
Sheepshead			1,100	38	200	8	3,000	100
Skates							5,800	121
Smelt	600	19	273,000	9,381	29,800	1,133		
Swordfish	600	71						
Tuna and tunalike fishes:								
Albacore	20,700	1,771	5,600	476	200	18		
Bluefin	15,671,400	713,426	2,145,900	97,689	200	14		
Bonito	432,300	11,735	488,100	13,250	5,900	165	2,400	66
Yellowfin			100	5				
Whitefish			400	25			100	5
Yellowtail	150,700	4,018	284,700	7,590	2,300	62		
Other fish			600	24	300	19	300	16
Total	217,723,600	1,587,979	234,535,600	1,494,548	475,800	21,589	458,000	34,664
SHELLFISH								
Sea crawfish or spiny lobster							3,700	673
Squid	5,000	93	27,700	391	200	3		
Total	5,000	93	27,700	391	200	3	3,700	673
Grand total	217,728,600	1,588,072	234,563,300	1,494,939	476,000	21,592	461,700	35,337

Fisheries of the San Pedro district of California, 1935—Continued

CATCH OFF CALIFORNIA: BY GEAR—Continued

Species	Lines				Paranzella nets	
	Set and hand		Troll			
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Barracuda	36,800	$1,276	28,800	$993		
Flounders:						
"California halibut"	32,300	2,780			191,300	$12,890
"Sole"	5,900	331			502,900	14,866
Other	13,000	1,924				
Grayfish	221,800	7,148	3,300	105	1,700	62
Hake	5,300	92				
Halibut	2,400	334				
Kingfish	96,800	1,664				
"Lingcod"	1,700	102				
Mackerel	3,397,600	25,882				
Perch	3,400	208				
Rock bass	84,700	5,181				
Rockfishes	1,215,200	48,323				
Rudderfish	600	33				
Sablefish	521,400	18,879			1,100	22
Sculpin	59,000	4,538				
Sea bass:						
Black	6,700	286				
White	5,000	313			600	45
Sheepshead	60,400	2,103			100	3
Skates	3,200	66			3,400	20
Smelt	4,500	160				
Swordfish	400	43				
Tuna and tunalike fishes:						
Albacore	555,200	47,576	923,700	79,148		
Bluefin	14,700	1,174	7,000	562		
Bonito	180,700	4,905	189,400	5,140		
Skipjack or striped tuna	58,700	2,348	100	5		
Yellowfin	14,100	698	27,900	1,374		
Whitefish	31,600	2,041				
Yellowtail	19,600	521	9,000	239		
Other fish	2,900	116	100	5		
Total	6,655,600	181,045	1,189,300	87,571	701,100	27,908
SHELLFISH						
Octopus	100	3				
Grand total	6,655,700	181,048	1,189,300	87,571	701,100	27,908

Species	Traps		Harpoons		Shovels		Abalone outfits	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Kingfish	300	$5						
Marlin			5,600	$266				
Perch	1,500	100						
Rock bass	52,000	3,110						
Rockfishes	400	14						
Sculpin	3,100	237						
Sheepshead	119,300	4,012						
Swordfish			433,500	51,634				
Whitefish	1,600	106						
Total	178,200	7,584	439,100	51,900				
SHELLFISH								
Crabs	12,800	372						
Sea crawfish or spiny lobster	285,300	50,231						
Shrimp	300	10						
Abalone							239,400	$23,957
Clams:								
Hard					6,200	$1,439		
Pismo					39,600	8,363		
Total	298,400	50,613			45,800	9,802	239,400	23,957
Grand total	476,600	58,197	439,100	51,900	45,800	9,802	239,400	23,957

Fisheries of the San Pedro district of California, 1935—Continued

CATCH OFF LATIN AMERICA: BY GEAR

Species	Purse seines		Gill nets		Trammel nets	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Barracuda	222,900	$20,157	8,100	$730		
Cabrilla	100	3				
Flounders:						
"California halibut"	600	41			239,400	$16,913
"Sole"					100	3
Grayfish					300	10
Rock bass	300	20	800	54		
Sea bass:						
Black	10,100	556	300	18	1,000	54
White	124,000	8,325	71,500	4,803	100	8
Smelt			300	9		
Spanish mackerel	100	5				
Swordfish	100	15				
Tuna and tunalike fishes:						
Bluefin	5,872,200	264,584				
Bonito	4,271,600	128,150	100	4	700	20
Skipjack or striped tuna	281,900	11,275				
Yellowfin	2,255,600	112,781				
Yellowtail	1,077,300	26,932	3,300	144		
Other fish	200	7	100	4		
Total	14,117,000	572,851	84,500	5,766	241,000	17,008

Species	Lines				Traps		Harpoons	
	Set and hand		Troll					
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Barracuda	10,600	$962	7,500	$682				
Cabrilla	67,300	3,221						
Grayfish	700	31						
Grouper	21,000	1,285						
Marlin							500	$20
Rock bass	3,900	251						
Rockfishes	11,500	465						
Sea bass:								
Black	394,200	21,760						
White	35,000	2,344						
Sheepshead	300	13						
Spanish mackerel	4,300	198						
Swordfish							13,200	1,403
Tuna and tunalike fishes:								
Albacore	100	8						
Bonito	38,500	1,166						
Skipjack or striped tuna	3,169,900	127,206						
Yellowfin	18,271,200	914,107						
Whitefish	6,800	402						
Yellowtail	692,100	29,321	100	4				
Other fish	500	32						
Total	22,727,900	1,102,772	7,600	686			13,700	1,423
SHELLFISH								
Sea crawfish or spiny lobster					125,200	$22,787		
Grand total	22,727,900	1,102,772	7,600	686	125,200	22,787	13,700	1,423

Fisheries of the San Diego district of California, 1935—Continued

OPERATING UNITS: BY GEAR

Item	Purse seines, sardine	Lampara and ring nets		Gill nets			Trammel nets
		Mackerel	Sardine	Drift, barracuda	Set, sea bass	Other	
Fisbermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	10	110	129	4	4	4	4
On boats and shore		10	29	18	42	9	38
Total	10	120	158	22	46	13	42
Vessels, motor	1	11	13	1	1	1	1
Net tonnage	36	86	99	5	5	5	5
Boats:							
Motor		1	3	6	16	5	13
Other						1	
Accessory boats	1	11	13				
Apparatus:							
Number	1	12	16	7	17	7	14
Length, yards	312	3,600	5,280				
Square yards				41,640	93,448	8,872	141,787

Item	Lines		Traps, sea crawfish	Harpoons, swordfish	Shovels	Total, exclusive of duplication
	Set and hand	Troll				
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On vessels	668	28	4	24	2	748
On boats and shore	174	98	38	18		271
Total	842	126	42	42	2	1,019
Vessels, motor	77	8	2	8		83
Net tonnage	4,860	63	14	57		4,909
Boats:						
Motor	67	71	22	6		112
Other	1		2			3
Accessory boats	37				1	50
Apparatus:						
Number	1,084	485	773	12	2	
Hooks	50,832	485				

CATCH OFF CALIFORNIA: BY GEAR

Species	Purse seines		Lampara and ring nets		Gill nets		Trammel nets	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Barracuda	3,900	$186	27,300	$1,307	19,100	$915		
Flounders, "California halibut"							142,600	$9,466
Grayfish					32,200	256	20,200	160
Herring			400	4	81,100	632		
Horse mackerel			1,500	15				
Kingfish					500	18		
Mackerel	478,800	3,501	7,132,200	53,491	3,100	61	500	11
Mullet					13,200	923		
Perch			300	9	800	29		
Pilchard or sardine	1,382,700	4,892	12,715,400	44,889	300	3		
Rock bass			1,600	94	1,000	57	100	4
Rockfishes			500	23				
Sea bass:								
Black					700	40	300	14
White			400	26	42,100	2,854		
Skates					1,300	14	11,900	123
Smelt			100	6	4,200	240		
Tuna and tunalike fishes:								
Bluefin	257,400	12,226	384,900	18,279				
Bonito			283,800	7,780	2,100	56	100	4
Skipjack or striped tuna	8,000	317						
Yellowtail	2,400	69	49,900	1,425	100	3	100	3
Total	2,133,200	21,271	20,598,300	127,348	201,800	6,101	175,800	9,785
SHELLFISH								
Sea crawfish or spiny lobster							100	14
Grand total	2,133,200	21,271	20,598,300	127,348	201,800	6,101	175,900	9,799

Fisheries of the San Diego district of California, 1935—Continued

CATCH OFF CALIFORNIA: BY GEAR—Continued

Species	Lines				Traps		Harpoons	
	Set and hand		Troll					
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Barracuda	24,000	$1,148	7,400	$357				
Flounders:								
"California halibut"	2,400	159						
"Sole"	1,100	98						
Grayfish	1,600	12						
Kingfish	1,300	39			2,100	$65		
"Lingcod"	1,300	34						
Mackerel	490,000	4,384						
Marlin	600	31					3,700	$202
Perch	100	3						
Rock bass	32,000	1,871	400	26	131,200	7,668		
Rockfishes	170,800	7,712			300	13		
Sablefish	7,500	193						
Sculpin	4,500	292			1,100	69		
Sea bass:								
Black	4,100	224						
White	3,200	211	300	15				
Sheepshead	500	16			2,300	83		
Skates	500	5						
Swordfish							180,500	17,109
Tuna and tunalike fishes:								
Albacore	45,600	3,573	151,800	11,896				
Bluefin	10,300	487	4,000	189				
Bonito	132,200	3,626	546,400	14,983				
Skipjack or striped tuna	1,840,000	73,607	1,100	45				
Yellowfin	449,800	22,490	37,100	1,854				
Whitefish	6,400	325						
Yellowtail	40,100	1,143	23,700	675				
Total	3,269,900	121,683	772,200	30,040	137,000	7,898	184,200	17,311
SHELLFISH								
Sea crawfish or spiny lobster					82,500	13,624		
Grand total	3,269,900	121,683	772,200	30,040	219,500	21,522	184,200	17,311

CATCH OFF LATIN AMERICA: BY GEAR

Species	Purse seines		Lampara and ring nets		Gill nets	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Barracuda			136,300	$6,165	18,300	$828
Grayfish					3,500	35
Mackerel			957,900	7,185		
Perch			3,000	80		
Pilchard or sardine			3,900	41		
Rock bass			3,000	135		
Sea bass:						
Black					2,500	125
White			5,900	352	162,600	9,773
Smelt			500	27	1,600	82
Tuna and tunalike fishes:						
Bluefin	29,700	$1,337	617,000	27,763		
Bonito	114,000	3,297	104,500	3,024	1,800	53
Skipjack or striped tuna	13,300	532				
Yellowfin	622,700	31,215				
Whitefish			100	7		
Yellowtail	1,200	32	52,200	1,456	1,200	32
Total	780,900	36,413	1,884,300	46,235	191,500	10,928

Fisheries of the San Diego district of California, 1935—Continued

CATCH OFF LATIN AMERICA: BY GEAR—Continued

Species	Trammel nets		Lines			
			Set and hand		Troll	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Barracuda			185,300	$8,377	24,900	$1,124
Cabrilla			54,100	2,090		
Flounders:						
"California halibut"	516,700	$35,107	8,900	603		
"Sole"			100	6		
Grayfish	2,500	25	1,000	8	1,500	13
Grouper			10,400	444		
Kingfish			100	3		
"Lingcod"			500	21		
Mackerel			203,000	1,616		
Rock bass	100	6	26,400	1,212		
Rockfishes			235,000	11,315		
Sablefish			7,700	187		
Sculpin			1,700	78		
Sea bass:						
Black	4,000	203	201,500	10,182		
White	600	39	16,800	1,012	1,000	60
Sheepshead			800	27		
Skates	3,600	34	600	5		
Spanish mackerel			200	3		
Tuna and tunalike fishes:						
Albacore			54,800	4,336	6,400	506
Bluefin			157,300	7,684	1,100	53
Bonito	1,000	29	1,004,400	29,060	96,100	2,782
Skipjack or striped tuna			11,824,200	473,118		
Yellowfin			50,589,100	2,534,860	4,000	201
Whitefish			10,800	570		
Yellowtail	600	18	5,645,700	157,403	92,400	2,577
Total	529,100	35,461	70,220,800	3,244,220	227,400	7,316

Species	Traps		Harpoons		Shovels	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Marlin			100	$8		
Swordfish			41,000	3,776		
Total			41,100	3,784		
SHELLFISH, ETC.						
Sea crawfish or spiny lobster	848,000	$126,133				
Clams, Pismo					3,500	$569
Turtles			1,700	81		
Total	848,000	126,133	1,700	81	3,500	569
Grand total	848,000	126,133	42,800	3,865	3,500	569

HALIBUT FISHERY OF THE PACIFIC COAST

The halibut fishery of the Pacific coast, which is prosecuted by United States (including Alaska) and Canadian vessels, ranks as one of the foremost fisheries of that section. During 1935, the total catch of halibut by vessels of both nationalities amounted to 45,772,000 pounds, valued at $3,252,000. This is a decrease of 1 percent in volume but an increase of 10 percent in value as compared with the catch and its value in 1934. Of the total catch in 1935, 78 percent was taken by United States craft and 22 percent by Canadian craft. Considered according to ports of landing, 49 percent was landed at Seattle, Wash.; 37 percent at Canadian ports; and 14 percent at ports in Alaska.

NOTE.—These statistics are compiled from data collected by the International Fisheries Commission for Washington and British Columbia, and by Bureau agents for Alaska. The weights of the above species represent the fish after evisceration and removal of heads.

Halibut fishery of the Pacific Coast, 1935

UNITED STATES OPERATING UNITS: BY FLEET CLASSIFICATION

Item	Washington Fleet	Alaska Fleet	Total
Regular halibut vessels:			
Number	141	78	219
Net tonnage	4,055	1,072	5,127
Crew	1,039	336	1,375
Dories	5		5
Skates of lines	4,087	1,480	5,567
Vessels in other fisheries but landing one or more fares of halibut:			
Number	25	40	65
Net tonnages	526	570	1,096
Crew	144	132	276
Skates of lines	560	549	1,109
Regular halibut boats:			
Number	1	29	30
Crew	3	68	71
Skates of lines	12	406	418
Boats in other fisheries but landing one or more fares of halibut:			
Number		67	67
Crew		117	117
Skates of lines		368	368

CATCH OF ALL SPECIES:[1] BY UNITED STATES VESSELS AND BOATS

Fleet classification	Landed in—						Total	
	Seattle, Washington		British Columbia		Alaska			
WASHINGTON FLEET								
Regular vessels:	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Halibut	21,341,441	$1,747,599	2,657,775	$188,786	991,718	$65,564	24,990,934	$2,001,949
Sablefish	2,762,331	103,496	16,067	396	36,191	854	2,814,589	104,746
"Lingcod"	604,405	19,344					604,405	19,344
Rockfishes	256,445	9,655					256,445	9,655
Total	24,964,622	1,880,094	2,673,842	189,182	1,027,909	66,418	28,666,373	2,135,694
Other vessels and boats:								
Halibut	669,597	47,969	71,001	4,682	28,315	1,714	768,913	54,365
Sablefish	48,370	2,293					48,370	2,293
"Lingcod"	64,411	1,701					64,411	1,701
Rockfishes	6,431	200					6,431	200
Total	788,809	52,163	71,001	4,682	28,315	1,714	888,125	58,559
ALASKA FLEET								
Regular vessels:								
Halibut	250,807	21,692	4,003,594	266,687	3,856,824	227,285	8,111,225	515,664
Sablefish	2,205	180	99,735	2,954	585,098	13,170	687,038	16,304
"Lingcod"	5,825	150			843	16	6,668	166
Rockfishes	323	10			3,363	72	3,686	82
Total	259,160	22,032	4,103,329	269,641	4,446,128	240,543	8,808,617	532,216
Other vessels and boats:								
Halibut			194,631	10,121	1,499,824	82,060	1,694,455	92,181
Sablefish					233	5	233	5
Total			194,631	10,121	1,500,057	82,065	1,694,688	92,186
COMBINED FLEETS								
Regular vessels:								
Halibut	21,592,248	1,769,291	6,661,369	455,473	4,848,542	292,849	33,102,159	2,517,613
Sablefish	2,764,536	103,676	115,802	3,350	621,289	14,024	3,501,627	121,050
"Lingcod"	610,230	19,494			843	16	611,073	19,510
Rockfishes	256,768	9,665			3,363	72	260,131	9,737
Total	25,223,782	1,902,126	6,777,171	458,823	5,474,037	306,961	37,474,990	2,667,910

[1] Includes 856,059 pounds of halibut valued at $84,521 landed at Seattle, and 5,500 pounds valued at $427 landed in British Columbia after January 1, 1936, which were part of the 1935 quota.

Halibut fishery of the Pacific Coast, 1935—Continued

CATCH OF ALL SPECIES: BY UNITED STATES VESSELS AND BOATS—Continued

Fleet classification	Landed in—						Total	
	Seattle, Washington		British Columbia		Alaska			
COMBINED FLEETS—contd.								
Other vessels and boats:	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Halibut	669, 597	$47, 969	265, 632	$14, 803	1, 528, 139	$83, 774	2, 463, 368	$146, 546
Sablefish	48, 370	2, 293			233	5	48, 603	2, 298
"Lingcod"	64, 411	1, 701					64, 411	1, 701
Rockfishes	6, 431	200					6, 431	200
Total	788, 809	52, 163	265, 632	14, 803	1, 528, 372	83, 779	2, 582, 813	150, 745
All vessels and boats:								
Halibut	22, 261, 845	1, 817, 260	6, 927, 001	470, 276	6, 376, 681	376, 623	35, 565, 527	2, 664, 159
Sablefish	2, 812, 906	105, 969	115, 802	3, 350	621, 522	14, 029	3, 550, 230	123, 348
"Lingcod"	674, 641	21, 195			843	16	675, 484	21, 211
Rockfishes	263, 199	9, 865			3, 363	72	266, 562	9, 937
Grand total	26, 012, 591	1, 954, 289	7, 042, 803	473, 626	7, 002, 409	390, 740	40, 057, 803	2, 818, 655

CATCH OF HALIBUT: BY UNITED STATES AND CANADIAN VESSELS AND BOATS

[Expressed in thousands of pounds and thousands of dollars; that is, 000 omitted]

Fleet classification	Landed in—						Total	
	Seattle, Washington		British Columbia		Alaska			
WASHINGTON FLEET	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Regular halibut vessels	21, 341	1, 748	2, 658	188	992	66	24, 991	2, 002
Other vessels and boats	670	47	71	5	28	2	769	54
Total	22, 011	1, 795	2, 729	193	1, 020	68	25, 760	2, 056
ALASKA FLEET								
Regular halibut vessels	251	22	4, 003	267	3, 857	227	8, 111	516
Other vessels and boats			195	10	1, 500	82	1, 695	92
Total	251	22	4, 198	277	5, 357	309	9, 806	608
COMBINED FLEETS								
Regular halibut vessels	21, 592	1, 770	6, 661	455	4, 849	293	33, 102	2, 518
Other vessels and boats	670	47	266	15	1, 528	84	2, 464	146
Total	22, 262	1, 817	6, 927	470	6, 377	377	35, 566	2, 664
British Columbia fleet			10, 200	587	6	1	10, 206	588
Grand total	22, 262	1, 817	17, 127	1, 057	6, 383	378	45, 772	3, 252

NOTE.—In addition to the above, it is estimated that about 1,094,000 pounds of halibut, sablefish, "lingcod", and rockfish livers, valued at about $444,000, were landed at Pacific coast ports during 1935.

VESSEL FISHERIES AT SEATTLE, WASH.

A total of 48,290,785 pounds of fishery products, valued at $3,008,581, were handled by Seattle wholesale dealers during 1935, exclusive of quantities received by transporting vessels or by rail from Alaska or Canada. This represents an increase of 9 percent in both volume and value as compared with the volume and value of the products handled during the preceding year. Of the total quantity handled, 25,156,522 pounds, valued at $1,869,768, were landed by fishing vessels—an increase of 5 percent in volume and 13 percent in value as compared with the previous year. Receipts by wholesale dealers from sources other than Alaska or Canada or from vessels in the halibut fleet, amounted to 23,134,263 pounds, valued at $1,138,813, which is an increase of 13 percent in volume and 3 percent in value.

Fishery products landed by United States vessels at Seattle, Wash., 1935 [1]

BY FISHING GROUNDS

Fishing grounds	Trips	Halibut				Sablefish		"Lingcod"		Rockfishes		Total	
		No. 1		No. 2									
	Number	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
West of Cape Spencer	491	9,405,019	$797,004	6,186,756	$485,028	156,295	$5,916	8,204	¢167	32,798	$978	15,789,072	$1,289,093
South of Cape Spencer	698	3,401,468	278,512	2,412,533	172,195	2,656,611	100,053	666,437	21,028	230,401	8,887	9,367,450	580,675
Total	1,189	12,806,487	1,075,516	8,599,289	657,223	2,812,906	105,969	674,641	21,195	263,199	9,865	25,156,522	1,869,768

BY MONTHS

Months	Trips	Halibut				Sablefish		"Lingcod"		Rockfishes		Total	
		No. 1		No. 2									
	Number	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
January	22					1,666	$129	99,516	$4,708	57,827	$2,932	159,009	$7,769
February	8							18,821	1,386	19,407	1,310	38,228	2,696
April	71	804,172	$65,433	340,544	$25,167	2,754	84	40,946	1,349	4,748	166	1,193,064	92,199
May	196	2,175,312	144,320	1,318,852	79,959	23,433	1,682	131,713	3,218	14,167	392	3,663,477	229,571
June	139	1,390,099	101,642	1,185,993	78,011	150,808	7,913	91,059	2,086	21,826	621	2,839,785	190,273
July	140	1,459,121	107,358	1,188,190	78,671	154,546	6,504	54,077	1,067	23,675	510	2,879,609	194,110
August	132	1,508,549	119,447	1,052,401	75,584	248,229	9,201	43,907	886	18,393	466	2,871,479	205,584
September	141	1,209,153	115,968	852,289	74,273	856,935	30,763	35,507	749	34,270	883	2,988,154	222,636
October	146	1,418,717	156,978	883,451	89,459	907,812	32,148	33,250	1,315	32,145	1,160	3,275,375	281,060
November	123	1,818,568	163,455	1,004,320	84,638	374,943	13,901	93,342	3,077	25,082	926	3,316,255	265,997
December	71	1,022,796	100,915	773,249	71,461	91,780	3,644	32,603	1,354	11,659	499	1,932,087	177,873
Total	1,189	12,806,487	1,075,516	8,599,289	657,223	2,812,906	105,969	674,641	21,195	263,199	9,865	25,156,522	1,869,768

[1] Halibut fleet.

NOTE.—No fish were landed by the fleet during March because of a fishermen's strike.
The above tabulation does not include 856,069 pounds of halibut valued at $84,521, and 70,365 pounds of sablefish, "lingcod", and rockfishes, valued at $3,435, landed after January 1, 1936 but caught before the close of the halibut season on Dec. 26, 1935.

Fishery products received by Seattle wholesale dealers, 1935; by months [1]

Species	January		February		March		April		May		June	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Flounders:												
"Sole"	113,141	$3,595	139,076	$4,642	81,042	$2,869	214,063	$7,525	240,979	$8,380	187,304	$3,918
Other	26,528	532	28,516	572	8,041	170	5,112	113	141	2	618	6
Halibut					2,583	387	14,242	1,803	16,223	974	32,183	1,931
"Lingcod"	10,700	574	25,853	1,437	64,245	3,739	72,377	2,973	23,067	566	79,303	1,628
Perch	4,779	151	9,041	272	16,915	670	7,926	206	3,190	82	1,685	51
Rockfishes	18,690	389	25,887	796	6,355	211	30,947	814	12,103	637	5,072	130
Salmon:												
Chinook or king	1,160	174	35,646	4,582	101,480	14,281	189,809	20,555	294,509	19,297	706,278	50,119
Humpback or pink											157	2
Silver or coho							294	17	31,433	2,208	207,895	10,339
Smelt	15,563	821	13,910	163	18,050	171	1,470	147	13,580	796	31,092	1,567
Crabs	57,921	4,312	66,645	5,263	60,811	5,011	71,760	6,507	65,420	3,566	45,600	2,850
Octopus	6,780	202	5,002	150	1,314	28	2,884	112	4,771	142	3,152	95
Total	255,262	10,750	349,576	17,877	360,836	27,537	610,884	40,772	705,416	36,650	1,300,339	72,636

Species	July		August		September		October		November		December		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Flounders:														
"Sole"	313,975	$6,519	334,974	$6,762	195,894	$3,918	118,380	$2,812	59,982	$1,692	83,789	$2,514	2,082,599	$55,146
Other	545	5	565	7	170	2	985	16	1,135	22	6,059	127	78,415	1,574
Halibut	33,548	2,068	39,735	2,524	4,000	306	240	22					142,754	10,015
Herring							740	15					740	15
"Lingcod"	113,544	2,155	62,764	1,159	31,198	613	16,020	466	10,558	305	12,167	413	521,796	16,028
Perch	1,407	42	4,790	118	4,127	125	6,868	206	5,265	154	3,638	114	69,631	2,191
Rockfishes	6,358	137	7,167	133	8,089	263	12,378	311	14,417	398	26,269	823	173,732	5,042
Sablefish	2,075	72	11,182	427	3,827	131	3,188	95					20,272	725
Salmon:														
Blueback, red or sockeye	426	35	128,151	16,326	14,563	2,042	112	14					143,252	18,417
Chinook or king	1,120,655	81,993	1,388,624	100,600	552,123	39,572	290,196	17,879	68,275	4,128	724	50	4,749,479	353,230
Chum or keta	80	4	590	11	31,167	841	2,235,214	70,813	3,123,280	97,202	2,050	52	5,392,381	168,923
Humpback or pink	2,176	43	1,071,596	24,071	508,004	12,614	26,638	671	2,315	64			1,610,886	37,465
Silver or coho	389,335	18,112	1,502,330	78,622	1,253,533	70,268	2,445,686	157,383	831,439	43,089	286,700	18,263	6,948,645	398,301
Smelt	46,563	1,455	78,518	2,698	87,506	3,145	61,823	2,536	24,982	1,203	43,889	1,988	436,946	16,690
Crabs	15,300	1,441	7,620	952	7,080	708	72,282	4,838	130,312	9,747	110,886	8,093	[2] 711,637	53,288
Octopus	959	38	1,965	79	3,686	148	4,257	171	9,350	280	6,978	318	51,098	1,763
Total	2,046,946	114,119	4,640,571	234,489	2,704,967	134,696	5,295,007	258,218	4,281,310	158,284	583,149	32,755	23,134,263	1,138,813

[1] This tabulation does not include fish received from Alaska or Canada or vessels in the halibut fleet.
[2] 34,300 dozen.

LAKE FISHERIES [14]

The most recent complete fishery statistics for the Great Lakes including the international lakes of northern Minnesota, are those collected for the year 1934. In that year the catch in these waters by United States craft only, amounted to 96,411,200 pounds, valued at $5,123,735 to the fishermen, representing an increase of 29 percent in volume and 26 percent in value as compared with the catch in the previous year. Detailed statistics of these fisheries for 1934 appear in "Fishery industries of the United States, 1935", Appendix II to the Report of the United States Commissioner of Fisheries for the fiscal year 1936.

Lake fisheries, 1934

OPERATING UNITS: BY STATES

Item	New York	Pennsylvania	Ohio	Michigan
	Number	*Number*	*Number*	*Number*
Fishermen:				
On vessels	78	111	97	794
On boats and shore:				
Regular	113	41	567	1,849
Casual	91	56	347	974
Total	282	208	1,011	3,617
Vessels:				
Steam	4	12	6	34
Net tonnage	94	307	201	578
Motor	14	9	13	188
Net tonnage	117	80	130	1,961
Total vessels	18	21	19	222
Total net tonnage	211	387	331	2,539
Boats:				
Motor	69	26	216	909
Other	68	41	100	549
Accessory boats				16
Apparatus:				
Haul seines	3	11	78	114
Length, yards	260	1,210	43,672	40,140
Gill nets:				
"Shoal", 2¼ to 3⅞ inches	3,506	5,762	6,934	9,711
Square yards	449,710	646,633	1,013,154	2,042,359
"Shoal", 4 to 6 inches	2,721	3,542	760	27,912
Square yards	652,540	903,620	120,000	7,481,234
Trammel nets			116	
Square yards			4,640	
Lines:				
Troll				31
Hooks				31
Trot	65	32		1,278
Hooks	32,360	4,800		488,070
Pound nets		28	6	880
Trap nets	192	67	3,798	3,608
Fyke nets	113		243	989
Crowfoot bars				605
Picks				142
Diving outfits				16

[14] The statistics of the catch presented herewith were obtained principally from records of the various State fishery agencies. The data for the operating units (fishermen, vessels, boats, and gear) of the United States were obtained largely by Bureau agents in a special canvass; although State records in several instances were very helpful in this work. In all cases the statistics collected are for the calendar year, except for Lake of the Woods, Rainy Lake, and Lake Namakan in Minnesota, which are for 2 seasons. For Lake of the Woods, the seasons are from June 1 to Nov. 1 and Dec. 1 to Apr 1 and for Rainy and Namakan Lakes from May 15 to Nov. 1 and Dec. 1 to Apr. 1. The catches for these 2 seasons, in the order named, have been combined to constitute a year. The quantity of fish taken in these lakes between Jan. 1 and Apr. 1 is estimated at less than 3 percent of the total catch.

Lake fisheries, 1934—Continued

OPERATING UNITS: BY STATES—Continued

Item	Indiana	Illinois	Wisconsin	Minnesota	Total
	Number	*Number*	*Number*	*Number*	*Number*
Fishermen:					
On vessels	18	72	533	----------	1,703
On boats and shore:					
Regular	23	9	529	398	3,529
Casual	61	----------	654	164	2,347
Total	102	81	1,716	562	7,579
Vessels:					
Steam	1	----------	19	----------	76
Net tonnage	22	----------	514	----------	1,716
Motor	4	18	168	----------	414
Net tonnage	57	251	1,985	----------	4,581
Total vessels	5	18	187	----------	490
Total net tonnage	79	251	2,499	----------	6,297
Boats:					
Motor	56	4	297	143	1,720
Other	1	1	257	333	1,350
Accessory boats	----------	----------	2	----------	18
Apparatus:					
Haul seines	----------	----------	48	----------	254
Length, yards	----------	----------	13,066	----------	98,348
Gill nets:					
"Shoal", 2¼ to 3⅞ inches	848	2,034	14,893	3,366	47,054
Square yards	200,968	488,920	3,250,555	938,480	9,030,779
"Shoal", 4 to 6 inches	687	1,014	12,638	1,684	50,958
Square yards	206,240	260,860	3,415,100	653,940	13,693,534
Trammel nets	----------	----------	7	----------	123
Square yards	----------	----------	660	----------	5,300
Lines:					
Troll	----------	----------	----------	----------	31
Hooks	----------	----------	----------	----------	31
Trot	----------	----------	571	363	2,309
Hooks	----------	----------	187,205	14,520	726,955
Pound nets	5	----------	354	70	1,343
Trap nets	----------	----------	----------	----------	7,665
Fyke nets	----------	----------	1,383	93	2,821
Crawfish pots	----------	----------	2,710	----------	2,710
Crowfoot bars	42	----------	38	----------	685
Picks	----------	----------	----------	----------	142
Diving outfits	----------	----------	----------	----------	16

CATCH: BY STATES

Species	New York		Pennsylvania		Ohio	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Blue pike	612,100	$38,285	2,131,600	$101,215	5,765,100	$305,548
Bowfin	500	5	----------	----------	5,400	108
Burbot	10,400	234	200	4	247,600	5,945
Carp	35,100	1,191	1,900	57	1,061,800	20,175
Catfish and bullheads	74,600	5,918	3,700	197	497,200	30,686
Cisco	10,100	1,000	70,000	7,000	30,100	1,204
Eels	64,900	1,970	400	8	----------	----------
Goldfish	----------	----------	----------	----------	60,100	450
Lake herring	126,300	11,360	----------	----------	----------	----------
Lake trout	13,700	1,760	300	30	----------	----------
Mooneye	200	3	----------	----------	24,400	244
Pike or pickerel (jacks)	14,900	1,045	----------	----------	----------	----------
Rock bass	6,100	144	----------	----------	----------	----------
Sauger	----------	----------	----------	----------	737,900	32,467
Sheepshead	----------	----------	10,500	210	2,157,700	36,681
Sturgeon	23,500	6,489	1,000	330	10,400	2,081
Sucker "mullet"	91,900	2,965	23,700	590	853,300	17,066
Sunfish	17,900	364	----------	----------	----------	----------
White bass	2,400	78	55,700	2,230	616,400	22,185
Whitefish:						
Common	118,200	14,880	462,900	64,440	278,900	36,546
Menominee	200	12	----------	----------	----------	----------
Yellow perch	170,100	7,577	798,300	30,580	13,252,500	542,638
Yellow pike	38,400	3,642	12,100	1,210	1,167,200	88,713
Mussel shells [1]	----------	----------	----------	----------	904,000	13,560
Pearls and slugs [1]	----------	----------	----------	----------	----------	457
Total	1,431,500	98,922	3,572,300	208,101	27,670,000	1,156,754

[1] From tributary streams.

Lake fisheries, 1934—Continued

CATCH: BY STATES—Continued

Species	Michigan		Indiana		Illinois	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	3,100	$31				
Buffalofish			1,000	$45		
Burbot	13,800	250				
Carp	1,425,500	27,994	2,400	72		
Catfish and bullheads	118,800	6,006				
Chubs	1,561,100	150,249	352,300	33,500	827,700	$65,300
Cisco	800	34				
Goldfish	7,700	58				
Lake herring	7,502,400	150,334	50,000	1,700	50,700	1,000
Lake trout	6,312,900	768,477	88,400	9,300	225,200	21,800
Mooneye	600	9				
Pike or pickerel (jacks)	24,400	1,951				
Rock bass	17,100	1,230				
Sauger	154,000	13,919				
Sheepshead	63,600	1,256				
Smelt	15,600	780				
Steelhead trout			1,600	250		
Sucker "mullet"	3,664,600	85,359	600	18		
White bass	13,400	482				
Whitefish:						
Common	4,890,800	628,245	3,900	470	700	84
Menominee	166,500	8,927				
Yellow perch	859,200	58,949	50,100	4,028	102,400	3,600
Yellow pike	1,832,700	217,715	1,300	140		
Mussel shells [1]	1,744,100	32,254	150,000	2,250		
Pearls and slugs [1]		1,420				
Total	80,392,700	2,143,729	701,600	51,773	1,206,700	91,784

Species	Wisconsin		Minnesota		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Blue pike					8,508,800	$445,048
Bowfin					9,000	144
Buffalofish					1,000	45
Burbot	32,200	$322	91,300	$230	395,500	6,985
Carp	1,308,500	16,358	11,300	113	3,846,500	65,960
Catfish and bullheads	48,900	3,185	46,000	1,839	789,200	47,831
Chubs	4,366,800	390,400	40,900	4,125	1,148,800	643,574
Cisco					111,000	9,238
Crappie			1,000	73	1,000	73
Eels					65,300	1,978
Goldfish					67,800	508
Lake herring	8,194,700	136,076	8,016,600	139,729	23,940,700	440,199
Lake trout	3,201,500	367,854	269,700	30,545	10,111,700	1,199,766
Mooneye			500	6	25,700	262
Pike or pickerel (jacks)	69,100	5,481	450,400	9,698	558,800	18,175
Rock bass					23,200	1,374
Sauger			282,500	11,299	1,174,400	57,685
Sheepshead					2,231,800	38,147
Smelt	1,013,700	15,300			1,029,300	16,080
Steelhead trout					1,600	250
Sturgeon			1,600	371	36,500	9,271
Sucker "mullet"	855,200	28,056	127,200	1,653	5,616,500	135,707
Sunfish					17,900	364
Tullibees			155,500	389	155,500	389
White bass					687,900	24,975
Whitefish:						
Common	336,800	43,473	183,800	15,430	6,276,000	803,568
Menominee	60,500	3,391	1,800	127	229,000	12,457
Yellow perch	818,500	45,031	48,300	1,978	16,099,400	694,381
Yellow pike	22,700	2,300	1,007,000	79,180	4,081,400	392,900
Crawfish	35,600	3,200			35,600	3,200
Mussel shells [1]	336,300	3,260			3,134,400	51,824
Pearls and slugs [1]						1,877
Total	20,701,000	1,063,687	10,735,400	296,785	96,411,200	5,123,735

[1] From tributary streams.

Industries related to the fisheries of the Lake States

OPERATING UNITS, SALARIES, AND WAGES, 1934

Items	New York	Pennsylvania	Ohio	Michigan	Indiana and Illinois [1]	Wisconsin	Minnesota	Total
Transporting:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Persons engaged			12	3				15
Vessels, motor			7	1				8
Net tonnage			93	21				114
Wholesale and manufacturing:								
Establishments	15	7	48	58	56	43	11	238
Persons engaged:								
Proprietors	13	9	45	45	26	20	6	173
Salaried employees	26	7	72	81	227	74	34	521
Wage earners:								
Average for season	109	73	442	434	458	568	89	2, 173
Average for year	64	28	239	190	383	201	47	1, 152
Paid to salaried employees	$36, 186	$18, 752	$175, 880	$136, 311	$561, 706	$83, 855	$38, 466	$1, 061, 156
Paid to wage earners	$74, 940	$31, 187	$302, 250	$196, 739	$535, 691	$201, 532	$49, 384	$1, 391, 723
Total salaries and wages	$111, 126	$49, 939	$478, 130	$333, 050	$1, 097, 397	$285, 387	$87, 850	$2, 442, 879
Fishermen manufacturing				72		121	342	535

[1] One firm in Indiana has been included with Illinois.

PRODUCTS MANUFACTURED

Item	New York		Pennsylvania		Ohio		Michigan	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
By manufacturing establishments:								
Carp, smoked pounds					4, 600	$950	(1)	(1)
Chubs, smoked do	(1)	(1)			115, 400	21, 750	500, 600	$132, 364
Cisco, smoked do					(1)	(1)		
Herring, lake:								
Fresh fillets [2] do							(1)	(1)
Salted do							1, 462, 900	54, 103
Smoked do	(1)	(1)					(1)	(1)
Lake trout, smoked do					3, 500	1, 175	62, 230	13, 545
Pike:								
Fresh fillets [2] do	219, 542	$51, 257	268, 745	$45, 470	1, 311, 328	277, 617		
Frozen fillets [2] do	(1)	(1)	(1)	(1)	309, 843	64, 603		
Salmon, smoked do	(1)	(1)			23, 800	5, 860	(1)	(1)
Sturgeon, smoked do	(1)	(1)			12, 160	8, 605		
Tullibee, smoked do	(1)	(1)			249, 400	43, 860	(1)	(1)
Whitefish, smoked do	(1)	(1)			57, 100	11, 975	50, 530	10, 720
Yellow perch:								
Fresh fillets [2] do	(1)	(1)	30, 743	5, 399	430, 361	87, 185		
Frozen fillets [2] do			(1)	(1)	86, 640	16, 896		
Unclassified products:								
Fillets, fresh and frozen [2] pounds	[3] 14, 004	[3] 3, 260	[4] 31, 440	[4] 5, 245	(5)	(5)	(5)	(5)
Smoked do	[6] 216, 600	[6] 47, 940					(5)	(5)
Miscellaneous [11] do					[12] 31, 269	[12] 6, 275	[13] 220, 540	[13] 50, 756
Total	450, 146	102, 457	330, 928	56, 114	2, 635, 401	546, 751	2, 208, 800	261, 448
By fishermen:								
Lake herring, salted pounds							251, 300	8, 795
Lake trout, salted do							25, 000	1, 240
Total do							276, 300	10, 035
Grand total	450, 146	102, 457	330, 928	56, 114	2, 635, 401	546, 751	2, 573, 100	271, 523

See footnotes at end of table.

Industries related to the fisheries of the Lake States—Continued

PRODUCTS MANUFACTURED—Continued

Item	Illinois		Wisconsin		Minnesota	
By manufacturing establishments:	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Alewives:						
Pickled.....pounds	202,500	$28,750			(1)	(1)
Spiced.....do			383,500	$54,925		
Carp, smoked.....do	(1)	(1)	(1)	(1)		
Chubs, smoked.....do	1,653,290	379,319	901,297	176,692	23,600	$4,160
Cisco, smoked.....do	17,545	4,564				
Herring, lake:						
Fresh fillets [2].....do			99,000	8,440		
Salted.....do			2,393,180	78,652		
Smoked.....do	(1)	(1)	675,000	44,250	(1)	(1)
Lake trout:						
Fresh fillets [2].....do	(1)	(1)	8,000	1,750		
Smoked.....do	78,256	19,128	177,120	35,574	(1)	(1)
Pike:						
Fresh fillets [2].....do	1,124,496	246,130	52,000	11,200		
Frozen fillets [2].....do			(1)	(1)		
Salmon:						
Kippered.....do	24,454	7,850			(1)	(1)
Smoked.....do	628,400	219,625	77,977	12,850	(1)	(1)
Sturgeon, smoked.....do	3,157	2,479				
Tullibee, smoked.....do	91,444	17,423	(1)	(1)	(1)	(1)
Whitefish, smoked.....do	(1)	(1)	(1)	(1)	(1)	(1)
Yellow perch, fresh fillets [3].....do	557,872	128,000	89,500	20,350		
Unclassified products:						
Fillets, fresh and frozen [2].....do	[4] 45,116	[4] 6,525	[5] 26,200	[5] 4,760		
Smoked.....do	[6] 30,886	[6] 6,623	[10] 45,264	[10] 7,157	(8)	(8)
Miscellaneous [11]				[14] 67,507		[16] 37,565
Total	4,457,416	1,066,416		524,107		41,725
By fishermen:						
Chubs, smoked.....pounds			26,000	4,940		
Lake herring, salted.....do			892,540	31,425	600,000	21,000
Lake trout, smoked.....do			2,500	450		
Total.....do			921,040	36,815	600,000	21,000
Grand total	4,457,416	1,066,416		560,922		62,725

[1] This item has been included under "Unclassified products."
[2] Data are for 1935.
[3] Includes fresh fillets of yellow perch and frozen fillets of pike.
[4] Includes fresh fillets of sheepshead and whitefish; and frozen fillets of pike and yellow perch.
[5] The production of this item is included under "Miscellaneous."
[6] Includes fresh fillets of lake trout, suckers, white bass, and whitefish.
[7] Includes fresh fillets of sauger and whitefish; and frozen fillets of pike.
[8] Includes smoked butterfish, chubs, eels, lake herring, salmon, sturgeon, tullibee, and whitefish.
[9] Includes smoked buffalofish, carp, sea herring, sablefish, shad, and whitefish.
[10] Includes smoked carp, tullibee, and whitefish, and Bismark herring.
[11] Both 1934 and 1935 data are included in this item.
[12] Includes fresh fillets of white bass; and smoked cisco and sablefish.
[13] Includes fresh fillets of lake herring; and smoked carp, lake herring, mackerel, menominee, salmon, and tullibee.
[14] Includes spiced chubs and sea herring; canned whitefish caviar; and burbot-liver oil.
[15] Includes smoked lake herring, lake trout, salmon, tullibee, and whitefish; kippered salmon; pickled alewives; and burbot-liver oil.

NOTE.—Unless otherwise indicated the data are for 1934. The total value of the manufactured products for the Lake States was as follows: By manufacturing establishments, $2,599,058; and by fishermen, $67,850. Some of the above products may have been manufactured from products imported from another State or country; therefore, they cannot be correlated directly with the catch within the State. Of the total number of persons engaged in the preparation of fishermen's manufactured products, 224 have also been included as fishermen and 6 of the persons shown on transporting craft have also been included as fishermen. This should be considered when computing the total number of persons in the fishery industries, exclusive of duplication.

FISHERIES OF THE MISSISSIPPI RIVER AND TRIBUTARIES [15]

The most recent complete catch statistics of the fisheries for the States of the Mississippi River and tributaries are those collected for the year 1931. The yield of fishery products in that year amounted to 82,382,523 pounds, valued at $2,897,357, which was a decrease of 22 percent in quantity and 36 percent in value as compared with the quantity and value of the catch in 1922 when the most recent preceding survey was made. Detailed statistics of the fisheries of the Mississippi River and tributaries for 1931 appear in "Fishery Industries of the United States, 1932" by R. H. Fiedler, appendix III to the Report of the Commissioner of Fisheries for the fiscal year 1933. A summary of these fisheries in 1931 as well as certain data for 1935 appear in the following tables.

Fisheries of the Mississippi River and tributaries, 1931

OPERATING UNITS: BY STATES

Item	Alabama	Arkansas	Illinois	Indiana	Iowa	Kansas	Kentucky	Louisiana	Minnesota
Fishermen:									
On boats and shore:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Regular	104	1,463	708	20	245	35	89	1,402	160
Casual	131	1,524	1,318	1,735	648	88	440	3,108	578
Total	235	2,987	2,026	1,755	893	123	529	4,510	738
Boats:									
Motor	32	907	676	544	309	18	92	1,225	65
Other	190	2,359	957	1,189	457	123	420	2,369	446
Apparatus:									
Haul seines		16	127	50	133		24	377	113
Length, yards		7,308	33,975	5,170	36,339		2,057	85,166	49,968
Anchor gill nets		4						74	9
Square yards		2,800						17,400	9,999
Trammel nets		31	28	3		90		78	
Square yards		3,899	4,890	360		9,026		19,696	
Lines:									
Trot	449	5,327	1,312	320	1,158	17	627	5,757	186
Hooks	35,980	455,000	124,715	16,767	186,250	360	37,395	1,392,200	41,800
Pounds nets					2				27
Fyke nets	610	5,346	9,852	335	1,981	189	1,231	5,908	74
Dip nets			22		10			159	
Traps:									
Crawfish								18	
Shrimp								88	
Baskets			3,769						
Mussel dredges		426	14						
Yards at mouth		286	10						
Crowfoot bars	168	1,038	840	1,092	464		256	10	192
Tongs		159		72				5	
Rakes		70							
Forks		102	33	1,278		29		5	
Grabs								2,232	

[15] For a clearer understanding of the statistics published in this section, the reader is referred to the section in the latter part of the document entitled "Statistical survey procedure."

Fisheries of the Mississippi River and tributaries, 1931—Continued

OPERATING UNITS: BY STATES—Continued

Item	Mississippi	Missouri	Nebraska	Ohio	Oklahoma	South Dakota	Tennessee	Texas	Wisconsin	Total
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
On boats and shore:										
Regular	211	177	------	------	5	------	327	5	202	5,153
Casual	198	170	299	49	19	67	206	41	112	10,731
Total	409	347	299	49	24	67	533	46	314	15,884
Boats:										
Motor	138	84	30	------	------	2	138	6	160	4,426
Other	329	304	187	49	18	34	467	42	180	10,120
Apparatus:										
Haul seines	16	47	12	2	2	11	------	------	83	1,013
Length, yards	6,885	5,688	906	180	60	1,948	------	------	20,149	255,779
Anchor gill nets	4	1	------	------	3	------	------	------	6	101
Square yards	800	160	------	------	990	------	------	------	13,488	45,637
Trammel nets	17	104	115	------	------	------	52	------	------	518
Square yards	2,867	14,668	4,833	------	------	------	3,560	------	------	63,799
Lines:										
Hand	------	------	------	------	------	------	67	------	------	67
Hooks	------	------	------	------	------	------	67	------	------	67
Trot	847	516	------	19	29	18	464	80	3	17,129
Hooks	72,155	34,600	------	900	1,075	3,600	41,690	14,500	125	2,459,112
Pound nets	------	------	------	------	------	------	------	------	345	374
Fyke nets	2,591	1,872	296	76	85	68	1,735	70	222	32,541
Dip nets	------	------	------	------	------	------	------	------	------	191
Traps:										
Crawfish	------	------	------	------	------	------	------	------	------	18
Shrimp	350	------	------	------	------	------	------	------	------	438
Baskets	------	------	------	------	------	------	------	------	------	3,769
Spears	------	------	------	------	------	------	12	------	------	12
Mussel dredges	------	------	------	------	------	------	------	------	------	440
Yards at mouth	------	------	------	------	------	------	------	------	------	296
Crowfoot bars	------	------	------	------	------	------	230	------	190	4,480
Tongs	------	9	------	------	------	------	------	------	------	245
Rakes	------	------	------	------	------	------	------	------	------	70
Forks	------	------	------	------	------	------	------	------	------	1,447
Grabs	------	------	------	------	------	------	------	------	------	2,232

CATCH: BY STATES

Species	Alabama		Arkansas		Illinois		Indiana	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	------	------	700	$28	8,308	$241	------	------
Buffalofish	21,330	$2,342	2,182,446	131,474	911,609	51,893	85,045	$8,156
Carp	11,000	1,118	808,206	27,268	4,878,744	128,221	157,641	10,162
Catfish and bullheads	81,200	8,850	1,077,343	93,150	647,696	68,890	35,370	5,302
Crappie	9,772	1,004	11,325	227	------	------	------	------
Eels	------	------	------	------	4,985	322	------	------
Mooneye	------	------	------	------	1,000	20	------	------
Paddlefish or spoonbill cat	3,958	338	93,200	2,159	104,846	5,480	16,492	1,724
Quillback or "American carp"	7,657	875	6,830	676	17,532	608	30,312	1,436
Sheepshead	45,909	4,972	676,358	29,877	177,709	11,321	38,740	3,711
Sturgeon, shovelnose	575	70	------	------	39,766	3,448	3,013	292
Sucker "mullet"	5,752	609	3,309	235	25,130	1,087	16,797	1,156
White bass	------	------	------	------	1,200	92	------	------
Yellow pike	------	------	------	------	------	------	4,550	693
Total	187,153	20,178	4,859,717	285,094	6,818,525	271,623	387,960	32,632
SHELLFISH, ETC.								
Mussel shells	1,635,000	10,132	10,872,790	108,819	7,429,528	82,394	7,328,736	105,632
Pearls	------	------	------	3,137	------	190	------	125
Slugs	------	2,444	------	14,401	------	11,835	------	18,788
Turtles:								
Snapper	------	------	------	------	14,577	696	500	25
Soft shell	------	------	------	------	------	------	400	20
Total	1,635,000	12,576	10,872,790	126,357	7,444,105	95,615	7,329,636	124,590
Grand total	1,822,153	32,754	15,732,507	411,451	14,262,630	367,238	7,717,596	157,222

Fisheries of the Mississippi River and tributaries, 1931—Continued

CATCH: BY STATES—Continued

Species	Iowa		Kansas		Kentucky		Louisiana [1]	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	91,825	$3,759					5,715	$114
Buffalofish	746,615	59,705	24,325	$2,222	164,558	$14,429	8,784,314	263,261
Carp	1,594,244	80,134	117,489	10,956	113,461	8,124	204,743	4,127
Catfish and bullheads	467,340	48,593	770	111	131,777	17,043	6,602,987	528,579
Eels	325	15					200	6
Garfish							72,450	791
Mooneye	1,100	26			990	105		
Paddlefish or spoonbill cat	9,400	638			18,322	1,617	495,544	21,508
Pike or pickerel	4,700	470						
Quillback or "American carp"	60,450	1,339	100	11	11,355	984	20,700	431
Sauger					2,365	451		
Sheepshead	343,449	17,619			52,560	6,762	1,976,600	39,577
Sturgeon, shovelnose	17,650	1,663	175	24	2,967	380		
Sucker "mullet"	36,550	822			10,294	1,331		
Yellow pike					70	18		
Total	3,373,648	214,785	142,859	13,324	508,719	51,244	18,163,253	858,394
SHELLFISH, ETC.								
Crawfish							29,248	292
Shrimp							38,503	2,423
Mussel shells	4,366,219	65,685	312,562	2,713	1,113,032	8,786	50,000	375
Pearls		7,244						
Slugs		13,924		636		852		
Frogs							872,651	130,612
Terrapin	19,100	377						
Turtles:								
Snapper	2,000	40					58,013	2,244
Soft shell	17,000	340					1,700	34
Total	4,404,319	87,610	312,562	3,349	1,113,032	9,638	1,050,115	135,980
Grand total	7,777,967	302,395	455,421	16,673	1,621,751	60,882	19,213,368	994,374

Species	Minnesota		Mississippi		Missouri		Nebraska	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	16,598	$282			17,000	$520		
Buffalofish	257,431	15,092	1,511,126	$63,824	178,991	16,414	18,104	$1,813
Carp	2,151,119	97,756	225,276	6,730	433,117	33,356	93,032	9,305
Catfish and bullheads	53,804	4,841	635,049	42,384	91,430	15,487	34,174	5,135
Eels			250	20	1,055	53		
Minnows					525	209		
Paddlefish or spoonbill cat			158,821	5,879	40,103	2,917		
Quillback or "American carp"	17,246	519	2,157	42	13,672	946		
Sheepshead	152,545	7,938	106,841	2,576	38,186	3,773		
Sturgeon, shovelnose	1,634	115	100	3	17,282	1,703		
Sucker "mullet"	65,273	1,955			2,275	292		
Total	2,715,650	128,498	2,639,623	121,458	833,636	75,670	145,310	16,253
SHELLFISH, ETC.								
Shrimp			10,000	1,500				
Mussel shells	782,630	7,827			94,000	1,193		
Pearls		157						
Slugs		1,174				118		
Turtles, snapper			100	3				
Total	782,630	9,158	10,100	1,503	94,000	1,311		
Grand total	3,498,280	137,656	2,649,723	122,961	927,636	76,981	145,310	16,253

[1] According to statistics compiled by the Department of Conservation of the State of Louisiana and published in the Twelfth Biennial Report of that Department, the catch of commercial fresh-water fish taken in Louisiana during 1935 was as follows: Catfish, 4,364,180 pounds, valued at $349,134; gaspergou, 1,658,940 pounds, valued at $82,947; spoonbill cat, 622,030 pounds, valued at $43,541; buffalofish, 9,673,935 pounds, valued at $483,696; terrapins, 8,370 dozens, valued at $167,420; fresh-water turtles, 849,000 pounds, valued at $127,735; frogs, 2,529,095 pounds, valued at $632,274; fresh-water shrimp, 21,938,610 pounds, valued at $264,475; crayfish, 1,250,690 pounds, valued at $87,548; "baby" green turtles, 6,129,235 in number, valued at $61,292; and miscellaneous products, 30,450 pounds, valued at $1,827.

Fisheries of the Mississippi River and tributaries, 1931—Continued

CATCH: BY STATES—Continued

Species	Ohio		Oklahoma		South Dakota		Tennessee	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Black bass							14,000	$1,680
Buffalofish	6,433	$662	21,605	$2,142	38,926	$3,894	478,592	34,247
Carp	14,370	1,543	4,268	425	52,836	2,642	247,841	9,594
Catfish and bullheads	4,380	811	4,935	695	13,500	3,528	271,753	24,750
Crappie					1,392	70	18,652	1,658
Eels							163	25
Paddlefish or spoonbill cat			5,332	533	400	40	5,034	301
Quillback or "American carp"	1,195	119	1,950	195	4,364	220	6,065	843
Sheepshead	1,318	224	1,550	155	697	70	197,670	10,465
Sturgeon, shovelnose	558	72					3,706	393
Sucker "mullet"	2,902	268			2,246	112	8,323	1,119
Sunfish							21,850	1,094
White bass							2,100	106
Yellow pike	325	60						
Total	31,481	3,759	39,640	4,145	114,361	10,576	1,275,749	86,275
SHELLFISH, ETC.								
Mussel shells	154,000	3,005					2,157,000	15,604
Pearls								28
Slugs		380						1,724
Frogs							2,250	270
Terrapin							70	14
Total	154,000	3,313					2,159,320	17,640
Grand total	185,481	7,072	39,640	4,145	114,361	10,576	3,435,069	103,915

Species	Texas		Wisconsin		Total	
FISH	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Black bass					14,000	$1,680
Bowfin			288,170	$4,355	428,316	9,299
Buffalofish	73,000	$2,190	268,001	13,528	15,772,451	687,288
Carp	6,900	138	777,474	23,800	11,891,761	455,399
Catfish and bullheads	47,800	3,824	65,539	5,825	10,266,847	877,798
Crappie					41,141	2,959
Eels					6,978	441
Garfish					72,450	791
Minnows					525	209
Mooneye					3,090	153
Paddlefish or spoonbill cat					951,452	43,134
Pike or pickerel					4,700	470
Quillback or "American carp"	500	10	66,353	2,032	268,438	11,286
Sauger					2,365	451
Sheepshead	10,300	206	84,409	3,692	3,904,844	142,938
Sturgeon, shovelnose					87,426	8,163
Sucker "mullet"			135,984	3,696	314,835	12,682
Sunfish					21,850	1,094
White bass					3,300	198
Yellow pike					4,945	771
Total	138,500	6,368	1,685,930	56,928	44,061,714	2,257,204
SHELLFISH, ETC.						
Crawfish					29,248	292
Shrimp					48,503	3,923
Mussel shells			959,200	8,946	37,254,697	421,611
Pearls				555		11,436
Slugs				2,012		68,216
Frogs					874,901	130,882
Terrapin					19,170	391
Turtles:						
Snapper					75,190	3,008
Soft shell					19,100	394
Total			959,200	11,513	38,320,809	640,153
Grand total	138,500	6,368	2,645,130	68,441	82,382,523	2,897,357

Industries related to the fisheries of the Mississippi River and tributaries

OPERATING UNITS, SALARIES, AND WAGES, 1931

Item	Arkansas	Illinois	Indiana	Iowa	Kentucky	Louisiana
	Number	*Number*	*Number*	*Number*	*Number*	*Number*
Transporting:						
Persons engaged	13				11	5
Vessels, motor	4				2	2
Net tonnage	69				15	20
Wholesale and manufacturing:						
Establishments	6	38	4	61	11	22
Persons engaged:						
Proprietors	3	42	1	52	8	24
Salaried employees	9	3	5	79	20	14
Wage earners:						
Average for season	152	331	140	2,500	261	70
Average for year	72	235	93	2,179	159	68
Paid to salaried employees	$11,417	$9,520	$6,820	$141,346	$33,159	$12,400
Paid to wage earners	$53,503	$145,683	$51,444	$1,417,678	$81,643	$37,700
Total salaries and wages	$64,920	$155,203	$58,264	$1,559,024	$114,802	$50,100
Fishermen manufacturing		4	2			200

Item	Minnesota and North Dakota	Mississippi	Missouri and Oklahoma	Nebraska and Kansas	Ohio and Pennsylvania	Tennessee	Wisconsin	Total
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Transporting:								
Persons engaged								29
Vessels, motor								8
Net tonnage								104
Wholesale and manufacturing:								
Establishments	13	6	21	3	13	11	8	217
Persons engaged:								
Proprietors	11	7	24	3	17	9	3	204
Salaried employees	27	3	125	8	37	15	10	355
Wage earners:								
Average for season	112	26	328	52	175	90	38	4,275
Average for year	112	26	261	52	145	52	29	3,483
Paid to salaried employees	$55,200	$16,000	$291,874	$17,400	$95,878	$34,884	$12,998	$738,896
Paid to wage earners	$81,500	$22,382	$202,944	$45,580	$138,817	$38,177	$24,483	$2,341,534
Total salaries and wages	$136,700	$38,382	$494,818	$62,980	$234,695	$73,061	$37,481	$3,080,430
Fishermen manufacturing		7	3					216

PRODUCTS MANUFACTURED

Item	Indiana		Iowa, Illinois, and Missouri		Louisiana	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
By manufacturing establishments:						
Salmon, smoked.....pounds			240,000	$48,800		
Sturgeon, smoked.....do			162,000	39,140		
Mussel-shell products:						
Buttons [1].....gross			10,376,669	2,991,761		
Poultry feed [1].....tons			6,281	35,112		
Lime [1].....do			1,714	2,971		
Unclassified [1]				[2] 72,214		
Unclassified, smoked.....pounds			[3] 83,000	[3] 14,440		
Total				3,204,438		
By fishermen:						
Alligator hides.....pounds					88,356	$7,363
Carp, smoked.....do			667	67		
Paddlefish roe, salted.....do	450	$180	900	540		
Sheepshead, smoked.....do			617	77		
Sturgeon:						
Smoked.....do			1,333	400		
Roe, salted.....do			35	32		
Total	450	180	3,552	1,116	88,356	7,363
Grand total	450	180		3,205,554	88,356	7,363

[1] Data are for 1935.
[2] Includes mussel-shell stucco and novelties.
[3] Includes smoked buffalofish and tullibees.

Industries related to the fisheries of the Mississippi River and tributaries—Contd.

PRODUCTS MANUFACTURED—Continued

Item	Minnesota and Nebraska		Mississippi		Ohio, Tennessee, and Pennsylvania	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
By manufacturing establishments:						
Chubs, smoked.....pounds					106,600	$26,650
Salmon, smoked.....do	(1)	(1)			(1)	(1)
Sturgeon, smoked.....do	(1)	(1)				
Whitefish, smoked.....do	255,000	$47,200			(1)	(1)
Unclassified, smoked.....do	[2] 66,600	[2] 19,793			[3] 184,900	[3] 50,555
Total	321,600	66,993			291,500	77,205
By fishermen:						
Paddlefish roe, salted.....pounds			245	$92		
Total			245	92		
Grand total	321,600	66,993	245	92	291,500	77,205

[1] The production of this item is included under "unclassified products."
[2] Includes smoked eels, salmon, and sturgeon.
[3] Includes smoked buffalofish, butterfish, carp, lake trout, paddlefish, sablefish, salmon, tullibees, and whitefish.

NOTE.—Unless otherwise indicated the data are for 1931. The total value of the manufactured products for the States of the Mississippi River and tributaries was as follows: By manufacturing establishments, $3,348,636; and by fishermen, $8,751. Some of the products may have been manufactured from fishery products imported from another State or a foreign country; therefore, they cannot be correlated directly with the catch within the State.

LAKE PEPIN

Fisheries of Lake Pepin, 1935

OPERATING UNITS: BY GEAR

Item	Haul seines	Anchor gill nets	Trammel nets	Trot lines	Pound nets	Fyke nets	Total, exclusive of duplication
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Regular	6	30	2		8	2	46
Casual	12	40	8	36	8	6	79
Total	18	70	10	36	16	8	125
Boats:							
Motor	5	42	10	32	8	10	72
Other	5	12		4	8	2	31
Apparatus:							
Number	5	66	14	66	8	340	
Length, yards	2,032						
Square yards		212,888	1,966				
Hooks				6,600			

CATCH: BY GEAR

Species	Haul seines		Anchor gill nets		Trammel nets		Trot lines	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	500	$10	2,000	$40				
Buffalofish	8,200	328	18,500	740	2,000	$80		
Carp	92,000	2,760	596,000	17,880	7,000	210	4,800	$144
Catfish and bullheads	4,700	470	1,800	180	1,000	100	10,100	1,010
Mooneye	2,000	40						
Sheepshead	5,800	290	25,500	1,275	500	25	2,500	125
Sucker "mullet"	3,000	60	10,500	210				
Turtles, snapper	1,000	20	200	4				
Total	117,200	3,978	654,500	20,329	10,500	415	17,400	1,279

Fisheries of Lake Pepin, 1935—Continued

CATCH: BY GEAR—Continued

Species	Pound nets		Fyke nets		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	500	$10			3,000	$60
Buffalofish	2,000	80	1,000	$40	31,700	1,268
Carp	100,000	3,000	4,000	120	803,800	24,114
Catfish and bullheads	100	10	7,000	700	24,700	2,470
Mooneye					2,000	40
Sheepshead	7,000	350	3,000	150	44,300	2,215
Sucker "mullet"	20,000	400			33,500	670
Turtles, snapper			500	10	1,700	34
Total	129,600	3,850	15,500	1,020	944,700	30,871

OPERATING UNITS: BY STATES

Item	Illinois	Minnesota	Wisconsin	Total for lake
Fishermen:	*Number*	*Number*	*Number*	*Number*
Regular	2		44	46
Casual	17	4	58	79
Total	19	4	102	125
Boats:				
Motor	17	3	52	72
Other	6	1	24	31
Apparatus:				
Haul seines		1	4	5
Length, yards		535	1,497	2,032
Gill nets, anchor			66	66
Square yards			212,888	212,888
Trammel nets	14			14
Square yards	1,966			1,966
Lines, trot	40	9	17	66
Hooks	4,000	900	1,700	6,600
Pound nets			8	8
Fyke nets	340			340

CATCH: BY STATES

Species	Illinois		Minnesota		Wisconsin		Total for lake	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin					3,000	$60	3,000	$60
Buffalofish	3,000	$120	500	$20	28,200	1,128	31,700	1,268
Carp	12,000	360	6,500	195	785,300	23,559	803,800	24,114
Catfish and bullheads	12,000	1,200	2,800	280	9,900	990	24,700	2,470
Mooneye					2,000	40	2,000	40
Sheepshead	4,000	200	1,600	80	38,700	1,935	44,300	2,215
Sucker "mullet"			1,000	20	32,500	650	33,500	670
Turtles, snapper	500	10			1,200	24	1,700	34
Total	31,500	1,890	12,400	595	900,800	28,386	944,700	30,871

LAKE KEOKUK

Fisheries of Lake Keokuk, 1935

OPERATING UNITS: BY GEAR

Item	Haul seines	Trammel nets	Trot lines	Fyke nets	Total, exclusive of duplication
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*
Regular	10	2	2	13	19
Casual	44	30	42	76	111
Total	54	32	44	89	130
Boats:					
Motor	17	19	26	59	72
Other	17	3	17	36	53
Apparatus:					
Number	18	33	102	1,180	
Length, yards	2,169				
Square yards		7,799			
Hooks			9,825		

Fisheries of Lake Keokuk, 1936—Continued

CATCH: BY GEAR

Species	Haul seines		Trammel nets		Trot lines		Fyke nets		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	3,500	$70					500	$10	4,000	$80
Buffalofish	49,000	1,960	9,500	$380			44,000	1,765	120,500	4,105
Carp	200,300	6,009	57,000	1,710	9,700	$291	119,200	3,576	386,200	11,586
Catfish and bullheads	10,500	1,050	6,300	630	19,500	1,950	84,000	8,400	120,300	12,030
Eels							100	5	100	5
Paddlefish or spoonbill cat	8,700	870	2,000	200					10,700	1,070
Sheepshead	62,400	3,120	22,500	1,125	4,200	210	30,500	1,525	119,600	5,980
Sturgeon, shovelnose	225	22							225	22
Sucker "mullet"	1,000	20							1,000	20
Turtles, snapper	4,400	88			1,500	30			5,900	118
Total	340,025	13,209	97,300	4,045	34,900	2,481	278,300	15,281	750,525	35,016

OPERATING UNITS: BY STATES

Item	Illinois	Iowa	Total for lake
Fishermen:	*Number*	*Number*	*Number*
Regular	7	12	19
Casual	47	64	111
Total	54	76	130
Boats:			
Motor	31	41	72
Other	26	27	53
Apparatus:			
Haul seines	2	16	18
Length, yards	335	1,834	2,169
Trammel nets	15	18	33
Square yards	2,000	5,799	7,799
Trot lines	77	5	102
Hooks	9,700	125	9,825
Fyke nets	585	595	1,180

Species	Illinois		Iowa		Total for lake	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	900	$18	3,100	$62	4,000	$80
Buffalofish	29,500	1,185	73,000	2,920	102,500	4,105
Carp	116,000	3,480	270,200	8,106	386,200	11,586
Catfish and bullheads	67,500	6,750	52,800	5,280	120,300	12,030
Eels			100	5	100	5
Paddlefish or spoonbill cat	8,000	800	2,700	270	10,700	1,070
Sheepshead	46,200	2,310	73,400	3,670	119,600	5,980
Sturgeon, shovelnose			225	22	225	22
Sucker "mullet"	500	10	500	10	1,000	20
Turtles, snapper	2,000	40	3,900	78	5,900	118
Total	270,600	14,593	479,925	20,423	750,525	35,016

MISSISSIPPI RIVER BETWEEN LAKE PEPIN AND LAKE KEOKUK

Fisheries of the Mississippi River between Lake Pepin and Lake Keokuk, 1935

OPERATING UNITS: BY GEAR

Item	Haul seines	Anchor gill nets	Trammel nets	Trot-lines	Fyke nets	Dip nets	Total, exclusive of duplication
Fishermen:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Regular	110	8	17	----------	123	----------	198
Casual	280	8	49	163	385	19	581
Total	390	16	66	163	508	19	779
Boats:							
Motor	114	9	60	130	397	----------	474
Other	109	2	2	40	90	----------	208
Apparatus:							
Number	108	9	58	167	7,742	19	----------
Length, yards	19,883	----------	----------	----------	----------	----------	----------
Square yards	----------	19,402	7,322	----------	----------	----------	----------
Hooks	----------	----------	----------	17,800	----------	----------	----------

CATCH: BY GEAR

Species	Haul seines		Anchor gill nets		Trammel nets		Trot lines	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	140,490	$2,880	3,600	$72	3,100	$62	----------	----------
Buffalofish	576,100	23,714	27,500	1,180	63,000	2,520	----------	----------
Carp	1,644,500	49,335	68,700	2,061	124,200	3,726	24,000	$720
Catfish and bullheads	67,800	6,780	1,800	180	8,550	855	43,500	4,350
Eels	----------	----------	----------	----------	100	10	----------	----------
Mooneye	38,900	778	1,000	20	----------	----------	----------	----------
Paddlefish or spoonbill cat	5,750	575	----------	----------	100	10	----------	----------
Pike or pickerel	5,450	272	----------	----------	100	5	----------	----------
Sheepshead	372,700	18,635	10,600	530	25,900	1,345	13,300	661
Sturgeon, shovelnose	6,600	660	----------	----------	24,400	2,440	100	10
Sucker "mullet"	71,300	1,426	3,500	70	5,300	106	----------	----------
Turtles:								
Snapper	19,600	392	----------	----------	----------	----------	700	14
Soft shell	10,000	200	----------	----------	----------	----------	100	2
Total	2,959,190	105,647	116,700	4,113	254,750	11,079	81,700	5,757

Species	Fyke nets		Dip nets		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	1,200	$24	----------	----------	148,390	$3,038
Buffalofish	320,900	12,926	7,500	$300	995,000	40,640
Carp	575,000	17,220	7,500	225	2,443,900	73,267
Catfish and bullheads	510,350	51,035	----------	----------	632,000	63,200
Eels	1,050	110	----------	----------	1,150	120
Mooneye	----------	----------	----------	----------	39,900	798
Paddlefish or spoonbill cat	150	15	----------	----------	6,000	600
Pike or pickerel	----------	----------	----------	----------	5,550	277
Sheepshead	138,000	6,900	4,200	210	564,700	28,281
Sturgeon, shovelnose	----------	----------	----------	----------	31,100	3,110
Sucker "mullet"	20,100	402	----------	----------	100,200	2,004
Turtles:						
Snapper	1,000	20	----------	----------	21,300	426
Soft shell	650	13	----------	----------	10,750	215
Total	1,568,400	88,665	19,200	735	4,999,940	215,996

Fisheries of the Mississippi River between Lake Pepin and Lake Keokuk, 1935—Con.

OPERATING UNITS: BY STATES

Item	Illinois	Iowa	Minnesota	Wisconsin	Total
	Number	*Number*	*Number*	*Number*	*Number*
Fishermen:					
Regular	29	98	8	63	198
Casual	157	216	45	163	581
Total	186	314	53	226	779
Boats:					
Motor	122	217	22	113	474
Other	54	82	17	55	208
Apparatus:					
Haul seines	22	32	7	47	108
Length, yards	3,300	5,265	1,351	9,967	19,883
Gill nets, anchor	----	----	3	6	9
Square yards	----	----	4,665	14,737	19,402
Trammel nets	6	52	----	----	58
Square yards	796	6,526	----	----	7,322
Lines, trot	84	47	23	13	167
Hooks	9,500	4,700	2,300	1,300	17,800
Fyke nets	2,425	4,189	----	1,128	7,742
Dip nets	----	19	----	----	19

CATCH: BY STATES

Species	Illinois		Iowa		Minnesota		Wisconsin		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Bowfin	7,600	$152	55,700	$1,114	2,500	$50	82,590	$1,722	148,390	$3,038
Buffalofish	191,000	7,850	412,400	16,496	43,000	1,950	348,600	14,344	995,000	40,640
Carp	373,000	11,160	889,100	26,673	135,800	4,074	1,046,000	31,380	2,443,900	73,287
Catfish and bullheads	155,800	15,580	310,800	31,080	9,900	990	155,500	15,550	632,000	63,200
Eels	200	20	800	80	----	----	150	20	1,150	120
Mooneye	500	10	3,000	60	1,500	30	34,900	698	39,900	798
Paddlefish or spoonbill cat	2,250	225	3,650	365	----	----	100	10	6,000	600
Pike or pickerel	----	----	5,550	277	----	----	----	----	5,550	277
Sheepshead	129,900	6,491	216,900	10,895	50,800	2,540	167,100	8,355	564,700	28,281
Sturgeon, shovelnose	----	----	31,100	3,110	----	----	----	----	31,100	3,110
Sucker "mullet"	10,300	206	35,000	700	10,500	210	44,400	888	100,200	2,004
Turtles:										
Snapper	1,400	28	7,200	144	800	16	11,900	238	21,300	426
Soft shell	1,000	20	4,950	99	----	----	4,800	96	10,750	215
Total	872,950	41,742	1,976,150	91,093	254,800	9,860	1,896,040	73,301	4,999,940	215,996

FISHERIES OF ALASKA [16]

The commercial catch of fishery products in Alaska during 1935, exclusive of whales, amounted to 638,335,513 pounds, valued at $8,702,783, which is a decrease of 21 percent in volume and 26 percent in value as compared with the catch in 1934. Of the total catch in 1935, 434,003,732 pounds, valued at $6,969,791, consisted of salmon; 201,789,468 pounds, valued at $1,586,032, other fish; and 2,542,313 pounds, valued at $146,960, shellfish. In addition, 394 whales were taken. These fisheries gave employment to 9,208 fishermen, 1,551 persons on transporting craft, and 11,861 persons in fisheries wholesale and manufacturing industries—a total of 22,620 persons, which is a decrease of 14 percent as compared with the number employed in 1934.

[16] Statistics for the fisheries of Alaska are collected and compiled by the Alaska Division of this Bureau. A summary of these statistics appears in this section. For detailed figures the reader is referred to Alaska Fishery and Fur-Seal Industries in 1935, by Ward T. Bower, Appendix 1 to the Report of the Commissioner of Fisheries for the fiscal year 1936.

SUMMARY: BY DISTRICTS

Item	Southeast Alaska		Central Alaska		Western Alaska		Total	
PERSONS ENGAGED	*Number*	*Value*	*Number*	*Value*	*Number*	*Value*	*Number*	*Value*
In fishing	4,995		2,807		1,406		9,208	
In transporting	810		649		92		1,551	
In wholesale and manufacturing industries	6,474		4,151		1,236		11,861	
Total	12,279		7,607		2,734		22,620	
CRAFT EMPLOYED								
Vessels fishing	743		90		12		845	
Boats fishing	2,301		1,250		438		3,989	
Vessels transporting	194		138		24		356	
Scows, houseboats, pile drivers, etc	289		241		44		574	
Total	3,527		1,719		518		5,764	
CATCH								
Fish:	*Pounds*		*Pounds*		*Pounds*		*Pounds*	
Salmon	237,146,123	$3,886,902	161,451,305	$2,417,484	35,406,304	$665,405	434,003,732	$6,969,791
Other	116,312,703	1,158,322	78,017,180	390,413	7,459,585	37,297	201,789,468	1,586,032
Shellfish	1,502,451	92,320	1,039,862	54,640			2,542,313	146,960
Total	354,961,277	5,137,544	240,508,347	2,862,537	42,865,889	702,702	638,335,513	8,702,783
	Number		*Number*		*Number*		*Number*	
Whales			137		257		394	
WHOLESALE AND MANUFACTURING								
Establishments	99		100		29		228	
PRODUCTS AS PREPARED FOR MARKET	*Pounds*		*Pounds*		*Pounds*		*Pounds*	
Salmon	159,627,985	15,242,757	87,248,107	9,480,330	15,373,519	2,609,433	262,249,611	27,332,520
Herring	42,780,662	1,050,748	33,428,511	1,135,848	4,938,520	187,496	81,147,693	2,374,092
Halibut	9,805,680	607,845					9,805,680	607,845
Cod			121,139	5,675	26,598	1,138	147,737	6,813
Trout	32,882	2,405					32,882	2,405
Sablefish	565,446	22,839					565,446	22,839
Flounders	250,000	3,750					250,000	3,750

Rockfishes	5,344	189					5,344	189
Clams	16,680	3,934	428,871	193,647			445,551	197,581
Shrimp	382,435	128,414	1,432	486			383,867	128,900
Crabs	407,498	131,699	92,040	31,629			499,538	163,328
Whales			3,979,167	147,958	6,394,950	242,426	10,374,117	390,384
Total	213,874,612	17,194,580	125,299,267	10,995,573	26,733,587	3,040,493	365,907,466	31,230,646

OPERATING UNITS: BY DISTRICTS

Item	Southeast Alaska	Central Alaska	Western Alaska	Total	Item	Southeast Alaska	Central Alaska	Western Alaska	Total
	Number	*Number*	*Number*	*Number*	Apparatus—Continued.	*Number*	*Number*	*Number*	*Number*
Fishermen	4,995	2,807	1,406	9,208	Gill nets	359	993	1,078	2,430
Vessels fishing:					Yards	56,850	135,352	91,544	283,746
Steam		3	4	7	Beam trawls	11	1		12
Net tonnage		207	340	547	Wheels			297	297
Motor	743	87	8	838	Lines:				
Net tonnage	9,191	1,893	214	11,298	Hand lines (cod fishery)		26	2	28
Boats fishing:					Troll lines (salmon fishery)	3,523	2		3,525
Motor	945	280	32	1,257	Skates of lines (halibut fishery)	1,886			1,886
Other	1,356	970	406	2,732	Crab pots	3,490	295		3,785
Apparatus:					Herring pounds	5	6		11
Traps	280	167		447	Herring pound seines	11	1		12
Purse seines	617	235	8	860					
Yards	195,494	55,920	3,800	255,214					
Haul seines	6	190		196					
Yards	1,200	35,884		37,084					

Fisheries of Alaska, 1935—Continued

CATCH: BY DISTRICTS

[Estimated round weight and value to the fishermen]

Item	Southeast Alaska		Central Alaska		Western Alaska		Total	
FISH								
Salmon:	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
Blueback, red or sockeye	13,249,852	$398,095	34,821,640	$925,171	25,443,992	$616,695	73,515,484	$1,939,961
Chinook or king	12,829,140	310,456	1,945,560	51,551	1,235,200	7,669	16,009,900	369,676
Chum or keta	45,751,869	527,980	30,492,045	298,673	8,654,544	39,309	84,898,458	865,962
Humpback or pink	151,238,030	2,368,327	89,871,844	1,061,667	448	4	241,110,322	3,429,998
Silver or coho	14,077,232	282,044	4,320,216	80,422	72,120	1,728	18,469,568	364,194
Herring	104,258,864	521,294	77,657,102	388,286	7,370,925	36,854	189,286,891	946,434
Halibut	10,895,200	607,845					10,895,200	607,845
Cod			360,078	2,127	88,660	443	448,738	2,570
Trout:								
Dolly Varden	29,206	1,585					29,206	1,585
Steelhead	11,896	820					11,896	820
Sablefish	831,538	22,839					831,538	22,839
Flounders	277,777	3,750					277,777	3,750
Rockfishes	8,222	189					8,222	189
Total	353,458,826	5,045,224	239,468,485	2,807,897	42,865,889	702,702	635,793,200	8,555,823
SHELLFISH								
Crabs:								
King	1,920	140					1,920	140
Dungeness	781,634	65,710	178,260	15,814			959,894	81,524
Shrimp	687,337	25,683	3,860	97			691,197	25,780
Clams:								
Butter	31,560	787					31,560	787
Razor			857,742	38,729			857,742	38,729
Total	1,502,451	92,320	1,039,862	54,640			2,542,313	146,960
Grand total	354,961,277	5,137,544	240,508,347	2,862,537	42,865,889	702,702	638,335,513	8,702,783

NOTE.—In addition to the above, 394 whales were taken in Alaska waters. The round weight and value to fishermen cannot be determined, but the products amounted to 10,374,117 pounds, valued at $390,384.

TRANSPORTING

Item	Southeast Alaska	Central Alaska	Western Alaska	Total
	Number	*Number*	*Number*	*Number*
Persons engaged	810	649	92	1,551
Vessels transporting:				
Steam			1	1
Net tonnage			3,474	3,474
Vessels transporting—Continued.				
Motor	194	138	23	355
Net tonnage	5,658	4,840	597	11,095
Scows, houseboats, pile drivers, etc.	289	241	44	574

WHOLESALE AND MANUFACTURING

Item	Southeast Alaska	Central Alaska	Western Alaska	Total
	Number	*Number*	*Number*	*Number*
Persons engaged	6,474	4,151	1,236	11,861
Establishments:				
Handling fresh and frozen fish	52	2		54
Curing fish	39	55	21	115
Canning fish	53	53	9	115
Manufacturing by-products	9	11	1	21
Total (exclusive of duplication)	99	100	29	228

Industries related to the fisheries of Alaska, 1935—Continued

PRODUCTS AS PREPARED FOR MARKET

Item	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Pounds	*Value*	*Pounds*	*Value*	*Pounds*	*Value*	*Pounds*	*Value*
FRESH								
Salmon (for food)	2,943,017	$167,784	8,619	$643			2,951,636	$168,427
Salmon (for fox feed)			8,400	42			8,400	42
Herring (for bait)	2,059,055	22,059	273,750	2,665			2,332,805	24,724
Halibut	5,936,134	363,525					5,936,134	363,525
Trout	16,470	1,135					16,470	1,135
Sablefish	80,516	4,428					80,516	4,428
Flounders	250,000	3,750					250,000	3,750
Crabs:								
Meat	93,998	35,904	43,908	17,703			137,906	53,607
Whole in shell	31,442	2,582	5,820	307			37,262	2,889
Shrimp:								
Meat	371,029	126,355	856	294			371,885	126,649
Whole in shell	9,777	1,407					9,777	1,407
Total	11,791,438	728,929	341,353	21,654			12,132,791	750,583
FROZEN								
Salmon (for food)	4,266,834	270,178					4,266,834	270,178
Salmon (for bait)	240,930	1,205					240,930	1,205
Herring (for bait)	3,626,670	25,788					3,626,670	25,788
Herring (for food)			40,000	1,200			40,000	1,200
Halibut	3,869,546	244,320					3,869,546	244,320
Trout	16,412	1,270					16,412	1,270
Sablefish	478,769	18,093					478,769	18,093
Rockfishes	5,344	189					5,344	189
Shrimp	1,629	652					1,629	652
Total	12,506,134	561,695	40,000	1,200			12,546,134	562,895
CURED								
Salmon:								
Mild cured	4,308,000	857,603	20,000	2,370	114,400	$13,720	4,442,400	873,693
Pickled	49,200	4,908	312,800	35,832	534,175	54,418	896,175	95,158
Dry salted	38,100	4,471	21,800	1,962			59,900	6,433
Dried					1,436,000	114,960	1,436,000	114,960
Caviar	17,000	2,100					17,000	2,100
Herring:								
Pickled (for food):								
Scotch cure	2,187,000	116,612	9,343,325	543,055	3,412,425	148,397	14,942,750	808,064
Norwegian cure			4,000	360			4,000	360
Roused			108,150	3,245	1,211,320	31,548	1,319,470	34,793
Spiced	1,000	160					1,000	160
Dry salted					314,775	7,551	314,775	7,551

Cod:								
Dry salted			80,210	3,417	26,598	1,138	106,808	4,555
Pickled			32,789	1,130			32,789	1,130
Stockfish			8,140	1,128			8,140	1,128
Sablefish, pickled	6,161	318					6,161	318
Total	6,606,461	986,172	9,931,214	592,499	7,049,693	371,732	23,587,368	1,950,403
CANNED								
Salmon:								
Blueback, red or sockeye	7,652,592	1,557,285	18,440,784	3,607,639	12,764,832	2,379,726	38,858,208	7,544,650
Chinook or king	533,184	113,502	1,174,176	196,746	40,080	6,471	1,747,440	316,719
Chum or keta	25,965,504	2,059,941	14,501,904	1,170,418	473,136	38,712	40,940,544	3,269,071
Humpback or pink	105,602,880	9,263,266	50,112,096	4,157,181	192	15	155,715,168	13,420,462
Silver or coho	6,839,664	916,789	2,278,128	299,034	10,704	1,411	9,128,496	1,217,234
Miscellaneous fish	1,080	225					1,080	225
Clams	16,680	3,934	428,871	193,647			445,551	197,581
Crabs	282,058	93,213	42,312	13,619			324,370	106,832
Shrimp			576	192			576	192
Total	146,893,642	14,008,155	86,978,847	9,638,476	13,288,944	2,426,335	247,161,433	26,072,966
BYPRODUCTS								
Fertilizer:								
Salmon	900,000	13,500	271,900	3,263			1,171,900	16,763
Whale			1,070,000	12,950	1,608,000	18,590	2,678,000	31,540
Meal, herring	18,108,962	216,744	12,014,194	140,984			30,123,156	357,728
Oil:								
Salmon	270,000	10,000	97,500	5,200			367,500	15,200
Herring	16,797,975	669,385	11,645,092	444,339			28,443,067	1,113,724
Whale			2,324,542	116,300	3,925,200	196,260	6,249,742	312,560
Sperm			584,625	18,708	861,750	27,576	1,446,375	46,284
Total	36,076,937	909,629	28,007,853	741,744	6,394,950	242,426	70,479,740	1,893,799
Grand total	213,874,612	17,194,580	125,299,267	10,995,573	26,733,587	3,040,493	365,907,466	31,230,646

NOTE.—Halibut products include all taken by the Alaska fleet, some of which were landed at other than Alaska ports. The total landings in Alaska in 1935 amounted to 6,382,681 pounds, valued at $377,123 (including 6,000 pounds, valued at $500, landed by Canadian vessels).

Supplementary table showing the pack of canned products in "standard cases" [1]

Item	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Cases	*Value*	*Cases*	*Value*	*Cases*	*Value*	*Cases*	*Value*
Salmon:								
Blueback, red or sockeye	159,429	$1,557,285	384,183	$3,607,639	265,934	$2,379,726	809,546	$7,544,650
Chinook or king	11,108	113,502	24,462	196,746	835	6,471	36,405	316,719
Chum or keta	540,948	2,059,941	302,123	1,170,418	9,857	38,712	852,928	3,269,071
Humpback or pink	2,200,060	9,263,266	1,044,002	4,157,181	4	15	3,244,066	13,420,462
Silver or coho	142,493	916,789	47,461	299,034	223	1,411	190,177	1,217,234
Miscellaneous fish	22	225					22	225
Clams	1,052	3,934	28,591	193,647			29,643	197,581
Crabs	5,876	93,213	882	13,619			6,758	106,832
Shrimp			33	192			33	192
Total	3,060,988	14,008,155	1,831,737	9,638,476	276,853	2,426,335	5,169,578	26,072,966

[1] The pack of salmon, miscellaneous fish, and crabs has been converted to "standard cases" of 48 1-pound cans, clams to "standard cases" of 48 No. 1 5-ounce cans, and shrimp to "standard cases" of 48 5¾-ounce cans.

Supplementary table showing the output of byproducts in tons and gallons

Item	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Quantity	*Value*	*Quantity*	*Value*	*Quantity*	*Value*	*Quantity*	*Value*
Fertilizer:								
Salmon, tons	450	$13,500	136	$3,263			586	$16,763
Whale, do			535	12,950	804	$18,590	1,339	31,540
Meal, herring, do	9,054	216,744	6,007	140,984			15,016	357,728
Oil:								
Salmon, gallons	36,000	10,000	13,000	5,200			49,000	15,200
Herring, do	2,239,730	669,385	1,552,679	444,339			3,792,409	1,113,724
Whale, do			309,939	116,300	523,360	196,260	833,299	312,560
Sperm, do			77,950	18,708	114,900	27,576	192,850	46,284
Total		909,629		741,744		242,426		1,893,799

STATISTICAL SURVEY PROCEDURE

In order that those who use the statistical data contained in this report and previous reports of the Division of Fishery Industries may be informed as to the source of the figures and methods for their collection, it has been deemed advisable to outline in considerable detail the statistical survey procedure followed by the Division. This procedure has been developed over a period of years, and changes in method have been made at times where such changes have appeared to work toward general improvement. While the surveys in the several sections are not made in the same manner owing to varying facilities and records in different States, an attempt has been made to make the data collected by various methods in the producing areas comparable with respect to the same year as well as over a period of years. Throughout the entire plan it has been the intention to coordinate State and Federal fishery statistical work so that there will be as little duplication of effort as possible. The procedure will be discussed under two main heads—"Sectional surveys" and "Local and special surveys."

SECTIONAL SURVEYS

Statistical surveys of the fisheries and fishery industries of the various sections of the United States occupy by far the greatest part of the time of the statistical personnel of the Division. It is in the course of these surveys that the statistical and marketing agents visit the individual fishing localities of the various States to collect statistics of the volume of the catch of fish and its value, employment in fishing, quantity of fishing gear, number and classification of fishing and transporting craft, employment in wholesale and manufacturing establishments, and the volume and value of manufactured fishery products and byproducts. The various phases of these surveys are discussed in detail in the sections following.

History.—The first comprehensive statistical survey of the fisheries and fishery industries of the United States was made for the year 1880 by George Brown Goode, Assistant Director of the U. S. National Museum and associates, with the cooperation of the Commissioner of Fisheries and the Superintendent of the Tenth Census. Data for specific fisheries or restricted sections for years prior to 1880 were also collected in this early survey and recorded in Mr. Goode's reports. The survey for 1880, however, did not include the Mississippi River and tributaries. Periodic general surveys of a limited number of States or limited areas of the United States were made for various of the intervening years between 1880 and 1908 and from 1909 to 1928. In 1908 a survey of the entire United States was made. The next general survey of the entire United States was not made until 1931 although complete data for all sections excluding the Mississippi River and tributaries were collected for 1929 and 1930 and complete data on the catch and operating units of the fisheries were collected for 1932. In the latter survey, however, lack of sufficient funds prohibited collection of data on wholesale and manufacturing firms except those data collected as a part of the canned fishery products and byproducts surveys. Complete general canvasses were made of the New England, Middle Atlantic, Chesapeake, and Pacific States for 1933 and 1935, and complete data on the

catch of the fisheries of the Lakes States were collected for 1933. Complete general surveys also were made of the Chesapeake, South Atlantic, Gulf, Pacific, and Lakes States for 1934.

Following is a summary indicating the years for which statistics were collected on the fisheries and fishery industries in the various sections. Figures for the more recent years are available for free distribution from the Bureau in bulletin form, but figures for the earlier years are available only in the various printed reports of the Bureau. These reports are available for reference in the Bureau's library and at many public libraries.

In the New England States statistics on the catch of the marine fisheries and those conducted in the coastal rivers and bays of these States were collected for the years 1880, 1887, 1888, 1889, 1898, 1902, 1905, 1908, 1919, 1924, 1928, 1929, 1930, 1931, 1932, 1933, and 1935. For most of these years data on operating units and wholesale and manufacturing trade also were collected. In addition to the above, a partial statistical survey was made for the entire section in 1892; a partial survey of the fisheries in Maine, New Hampshire, and Massachusetts for the fiscal year 1897; the lobster fishery for 1900 and 1913; the oyster fishery for 1910; the shad and alewife fisheries for 1896; the menhaden industry for 1912; the fisheries of Massachusetts for 1879; and the fisheries of Connecticut for 1925 and 1926.

Statistics on the catch of the marine fisheries and those conducted in the coastal rivers and bays of the Middle Atlantic States were collected for the years 1880, 1887, 1888, 1889, 1890, 1891, 1897, 1898, 1901, 1904, 1908, 1921, 1926, 1929, 1930, 1931, 1932, 1933, and 1935. Data on operating units and wholesale and manufacturing trade also were collected for most of these years. In addition to these a statistical survey was made of the coastal fisheries of these States in 1915; catch in all States except New York, in 1892; the shad and alewife fisheries in 1896; the shad fisheries of the Delaware River in 1910; the shad fisheries of the Chesapeake Bay and tributaries in 1909; the menhaden industry in 1912; the lobster fisheries in 1900 and 1913; and the oyster fishery in 1911. The years for which statistics are available on the shad fishery of the Hudson River are given in the section entitled "Shad and alewife fisheries."

In the Chesapeake Bay States statistics on the catch of the marine fisheries and those conducted in coastal rivers and bays of these States were collected for the years 1880, 1887, 1888, 1890, 1891, 1897, 1901, 1904, 1908, 1920, 1925, 1929, 1930, 1931, 1932, 1933, 1934, and 1935. Data on operating units and wholesale and manufacturing trade also were collected for most of these years. In addition to the above, a statistical survey was made of the crab fishery for 1915; the oyster fishery and menhaden industry for 1912; and the shad and alewife fisheries for 1896, 1909, and 1915. The years for which statistics of the shad and alewife fisheries of the Potomac River are available are given in the section entitled "Shad and alewife fisheries."

In the South Atlantic and Gulf States statistics on the catch of the marine fisheries and those conducted in the coastal rivers and bays of these States were collected for the years 1880, 1888, 1889, 1890, 1897, 1902, 1908, 1918, 1923, 1927, 1928, 1929, 1930, 1931, 1932, and 1934. Data on operating units and wholesale and manufacturing trade also were collected for most of these years. In addition to the above, a statistical survey was made of the fisheries of these States, excluding

Florida and Alabama, for 1887; the shad fishery of the South Atlantic States for 1910; the shad and alewife fisheries of the South Atlantic States for 1896; the sturgeon fishery of Florida for 1900; the menhaden industry of the South Atlantic States for 1912; the shrimp fishery for 1916; the oyster fishery of the South Atlantic States for 1910; and the oyster fishery of the Gulf States for 1911.

In the Pacific Coast States statistics on the catch of the marine fisheries and those conducted in the coastal rivers and bays of these States were collected for the years 1880, 1888, 1892, 1895, 1899, 1904, 1908, 1915, and for all the years from 1922 to 1935, inclusive. These surveys have usually included data on operating units and wholesale and manufacturing trade. In addition to the above, statistics were obtained on the fisheries of California from 1918 to 1921, inclusive, and for the oyster fishery in 1912.

Statistics on the catch of the fisheries of the Great Lakes were collected for the years 1880, 1885, 1890, 1893, 1899, 1903, 1908, and for all the years from 1913 to 1934, inclusive. Statistics of the operating units and of the wholesale and manufacturing trade were collected for most of the years when canvasses were made from 1880 to 1908 and in 1917 and 1922 as well as in most of the years from 1926 to 1934, inclusive. In addition to the above a survey was made of the fisheries of Lake Ontario and of certain fisheries in other lakes for the year 1897.

Statistics of the catch of the fisheries of the Mississippi River and its tributaries were collected for the years 1894, 1899, 1903, 1908, 1922, and 1931. In addition, figures have been obtained of the fisheries of Lakes Pepin and Keokuk for the years 1914 and 1917 and the years from 1927 to 1935, inclusive, and of the fisheries of the Mississippi River between Lakes Pepin and Keokuk for the years 1929 to 1935, inclusive.

Statistics also were collected on the fisheries of certain interior waters, other than the fisheries of the Great Lakes and the Mississippi River and its tributaries, for the years 1894, 1895, 1900, and 1902.

Statistical agents.—The statistics contained in this volume have been collected by a corps of trained statistical and marketing agents which comprises a part of the permanent staff of the Division of Fishery Industries of the Bureau. Most of these men have been with the Bureau for a period of 5 years or more. In the main they are college graduates and were recruited through civil-service examination. While in college, most of the men pursued biological or technical courses largely in fishery work which has especially suited them for coping with the many biological and technical aspects encountered in canvassing the fisheries. This training has been especially helpful in identification of the species which, because of the many local names applied to a particular species, causes considerable confusion.

Period covered.—In conducting the fishery statistical surveys, agents are dispatched to the districts to be surveyed as early in the calendar year as they can be spared from the tabulation and preparation for publication of their previous season's work. They collect statistics of fishery operations for the year preceding that in which they are working; and, since their field work occupies the greater part of the year, it is usually at least a year from the end of the calendar year for which they are collecting data until the figures are published. Most of the figures are collected for the calendar year. Where there are variations from this general practice, explanatory notes appear in the tables.

Prior to 1930, statistics on the catch of oysters in the Atlantic and Gulf States were collected for the oyster season; that is, from September to April, inclusive. Beginning with 1930 and down to the present, they have been collected on the basis of the calendar year.

Scope.—The scope of the coastal statistical surveys includes canvasses of the commercial fisheries of the oceans and bays and of the coastal rivers as far inland as commercial fishing is important. This usually coincides with the range of commercial fishing for anadromous species. Statistics of the fisheries of the Mississippi River cover canvasses of the fisheries of the Mississippi River proper as well as all of its tributaries wherein commercial fishing for either fish, crustaceans, or mollusks is prosecuted. Statistics of the fisheries of the Great Lakes cover canvasses of the fisheries prosecuted in the Lakes proper, adjacent bays, and the international lakes of northern Minnesota, as well as rivers which sustain a commercial fishery having outlets into these waters. Surveys for statistics of the wholesale and manufacturing fishery industries cover such plants located in the coastal, river, and lake areas adjacent to the waters mentioned above.

Methods of collection.—Several methods for the collection of fishery statistics are employed, each of which has been carefully studied to obtain the best results with the available personnel and funds. In most instances the agents obtain lists of the names of fishing vessels, names or numbers of motor boats, and names of owners of these craft from local customs officials. Also it often is possible to obtain the names of licensed commercial fishermen and occasionally some statistics on the catch from several of the State fishery agencies; from other State, county, or city agencies; or from private organizations.

With such preliminary records as are available for their guidance the agents then visit each fishing community in their field unless their preliminary records are so complete that personal visits in some areas may be eliminated. While it is impossible for the few agents available for this work to interview each fisherman in a given locality, the more important ones are visited, and a sufficient number of those of lesser importance are interviewed to obtain reliable information on their production. In practice virtually all wholesale firms are visited, as well as captains of fishing vessels (those of 5 net tons or over), and also most of the more important inshore fishermen.

In the Great Lakes and Pacific Coast States such exceptional cooperation has been obtained in recent years from the State fishery agencies in the collection of statistics that only fragmentary surveys need be made by the Bureau's agents to obtain the necessary data. Also the State fishery agencies in Maryland and Virginia recently have developed very complete statistical systems which greatly facilitate the Bureau's canvasses in these States.

As regards the fisheries of the Great Lakes and international lakes of northern Minnesota the Bureau obtains most of the catch statistics and usually the value of the catch direct from the records of the State fishery agency. To obtain data on the number of fishermen, boats, vessels, and gear the Bureau conducts such personal surveys among the fishermen as may be necessary to supplement the State records.

Bureau agents are stationed at Seattle, Wash., and Terminal Island, Calif., who survey the fisheries of the Pacific Coast States. As a rule they obtain figures on the volume of the catch from the records

of the several State fishery agencies. In most cases the value of the catch is derived from dealers' records and sometimes from estimates of prices. In Washington and Oregon the offshore fisheries are surveyed separately by the Bureau's agent to obtain the number of operating units, catch, and value of the catch. Statistics of the wholesale fishery industry for this section are obtained largely by personal interviews of the agents.

In the administration of the Alaska fisheries the Bureau obtains sworn statements concerning their activities from those prosecuting the fisheries in this area. These statements are compiled by the Alaska Division of this Bureau.

Statistics of the volume of the catch of fish of the Pacific Coast and Great Lakes States are usually shown in weights as landed, which may be in the round or dressed condition. Statistics on the volume of the catch of fish taken in the remainder of the United States are shown in round weight.

The figures in the tables for shellfish represent the weight of the meats in the case of univalve and bivalve mollusks and gastropods, and the round weight of crustaceans and such mollusks as squid and octopus.

Shore and vessel fisheries.—In general, statistics of the shore fisheries as collected by the agents include data on the number of casual and regular fishermen; number and tonnage of motor and other fishing boats and accessory boats; kind and quantity of gear used, and the volume, value, and method of capture of each species caught by boats (for our purpose craft of less than 5 net tons' capacity are called "boats") for each locality or group of localities. This method is not followed in some sections where the availability of data collected by the State fishery agencies obviates the necessity of detailed locality surveys.

Statistics of the vessel fisheries include data on the number of the crew, rig of vessel, net tonnage, kind and quantity of gear used, accessory boats carried, and volume, value, and method of capture of each species caught by each vessel (for our purpose craft of 5 net tons' capacity or more are called "vessels"). As in the shore fisheries, the availability of figures collected by State fishery agencies may eliminate the necessity of our agents collecting these data for each vessel.

All persons engaged in commercial fishing operations are included as fishermen. For our purpose these have been divided into "regular" and "casual" fishermen. Regular fishermen are those who receive more than one-half of their annual income from fishing; and casual fishermen are those whose principal business is something other than fishing, and who receive less than one-half of their annual compensation from fishing.

The catch of fish is credited to the principal port of arrival and departure of the craft rather than its point of ownership, registration, documentation, or its port of landing. This accounts for catches of fish being shown in areas where they are not common since fishing vessels frequently fish in areas far from their principal fishing port.

Wholesale and manufacturing trade.—All persons or firms engaged in the wholesale buying and selling of fishery products or who produce manufactured fishery products are surveyed under this title. Where the business of fishing and wholesaling or manufacturing is combined,

that part of the business devoted to either of the latter two phases is included in the wholesale and manufacturing survey and the part devoted to fishing is included in the shore or vessel fisheries. If a wholesale business is conducted with no manufacturing and the business is so small that the full time of one man over the whole year or season is not required, it is then disregarded as a wholesale business. If commodities other than fishery products are handled, the persons engaged, and salaries and wages paid, are prorated; and only that part concerned with fishery products is included. If such a firm requires less than the full time of one man over the whole year or season and if it does not manufacture, it is not included in the canvass. Retail firms that manufacture or whose wholesale business exceeds the retail part are included. Persons or firms engaged in the motor trucking of fishery products are included as wholesalers if they are engaged in wholesale buying and selling.

Buyers for a central firm are not canvassed as wholesale dealers unless they ship direct to the firm's customers from the buying point.

Fishermen or fishing concerns, except manufacturers, who do not buy fishery products are not included under this heading except that oyster-shucking firms are included provided shuckers are employed and irrespective of whether all or part of the oysters used are taken from the firms' privately owned beds.

Manufacturing concerns include those which prepare packaged fishery products; salted, spiced, smoked, dried, or otherwise cured fishery products; canned fishery products; or fishery byproducts.

Fishermen who manufacture are surveyed to obtain the number of persons so employed and the volume and value of the products prepared.

In collecting statistics of manufacturing firms, the agents obtain data on the production for each plant in producing areas of products as marketed by the plant. Such products are usually "final" and in form for consumption; however, the products may be "intermediate" and require further processing before reaching the consumer markets. An outstanding example of an intermediate product is green-salted ground fish which almost invariably is further processed before final marketing. In reviewing the statistics of manufactured products it should be observed that intermediate products are not shown where they are prepared to the final stage in the original plant. An exception to this rule, however, is in the case of the production of mild-cured salmon, which on account of its importance is shown in its entirety, whether further processed in the producing plant or not. In this connection it should also be stated that several of the byproducts for which statistics are shown may be intermediate, and the plants producing the final products are not surveyed by this Bureau. Outstanding among such products are marine-animal oils, scrap, and meal.

Statistics of persons engaged in wholesale and manufacturing establishments are reported in three groups: Proprietors, salaried employees, and wage earners.

Proprietors represent those persons who devote their time to the conduct of the enterprise and receive their compensation in the form of profits. Managers of branch houses are not classified as proprietors.

Salaried employees usually include those persons paid by the week or month, while wage earners usually consist of those paid on a per

diem or piece-work basis. This, however, is not true in all cases, since the distinction between these two classes depends primarily on the character of the work done rather than the unit of time employed for calculating rates of pay. In general, office employees are classified as salaried employees. Other employees, including plant workmen, are classed as wage earners. Plant foremen or superintendents are classified as salaried employees unless they are principally engaged in manual labor, in which case they are classified as wage earners. Active officers of corporations are classified as salaried employees. Statistics of wage earners are shown in two forms: The average number employed during the operating season; and the average number employed during the year (the monthly average for the year).

Transporting trade.—Statistics are obtained on the number of the crew and number of boats and vessels engaged in transporting fishery products from the fishing grounds to port or from port to port. However, if a craft is engaged in catching fish at any time of the year it is included as a fishing craft rather than as a transporter.

Publication of data.—Statistics of employment in the fisheries, craft and gear engaged, catch and value of catch, and certain data on industries related to the fisheries are summarized and published in bulletin form as soon as possible after completion of each survey. Later the figures in more detail are included in the annual reports of the Division.

LOCAL AND SPECIAL SURVEYS

Landings at certain important United States ports.—Statistics of the landings of aquatic products at the principal New England ports (Boston and Gloucester, Mass., and Portland, Maine) are obtained in a similar manner. An agent is permanently stationed at Boston, Mass., and another is assigned to the ports of Gloucester, Mass., and Portland, Maine. Their duties include the obtaining of figures daily on the quantity of fish landed by each fishing vessel, the value of such fish landed, information concerning the date of departure and arrival of the vessel, and they also indicate the grounds from which the fish were taken and gear used in their capture. These data are forwarded to the Bureau, where compilations are made. Products of American fisheries received duty free at Boston and Gloucester, Mass., and Portland, Maine, from the treaty coasts of Newfoundland, Magdalen Islands, and Labrador are included in the landings at these ports; however, they are not included in the catch in sectional fishery surveys of the New England States unless they represent a catch by United States vessels. Statistics of these landings are released monthly and annually in bulletin form and detailed data are published in the annual reports of this Division. Data on the landings at Boston, and Gloucester, Mass., have been collected annually since 1893, and those for Portland, Maine, since June 1915. Some data are available for Boston and Gloucester prior to 1893.

Statistics of the landings of fish at Seattle, Wash., are collected by the Bureau's agent in that city. Landings are classified as those made by American fishing vessels and those received by Seattle wholesale dealers. The landings credited to United States fishing vessels are made by vessels operating distinctly as primary fishing units, usually in the offshore fisheries, while those credited as received by wholesale dealers are usually products of the shore fisheries collected mainly from points in Puget Sound and do not include fish

received from Alaska or Canada, or landings made by the halibut fleet. Statistics of these landings at Seattle are released monthly and annually in bulletin form and detailed data are published in the annual reports of this Division. Statistics of the landings by fishing vessels at Seattle have been collected since June 1915 and certain data on products received by Seattle wholesale dealers since December 1915.

Statistics of the fishery products handled at the municipal wharf, Washington, D. C., are reported to the Bureau by agents of the Health Department in Washington. They are not published in bulletin form, but a summary of the year's activities is published in the annual reports of the Division. Data on products handled at the municipal wharf are available since 1921.

Atlantic mackerel fishery.—Statistics on the catch by the Atlantic mackerel fleet are obtained by combining the figures of mackerel landed at Boston and Gloucester, Mass., and Portland, Maine, with those obtained by Bureau agents, who in recent years have been stationed at other Atlantic ports where mackerel are landed. These agents obtain data on the volume of mackerel landed in a manner similar to that used to obtain figures on the landings by fishing vessels at the three New England ports. The figures include only the catches made by purse seine and drift gill net craft and are not complete for craft of under 5 net tons' capacity using this type of gear. Statistics of this fishery appear only in the annual reports of this Division, although the landings at the principal New England ports appear in the monthly and annual bulletins published for those ports. Statistics of this fishery are available from 1905 to 1935, inclusive.

Shad and alewife fisheries.—Owing to the importance of the Hudson and Potomac Rivers in the production of shad, surveys for statistics of the catch, value of the catch, and operating units are made annually. On the Potomac River similar statistics also are obtained for the alewife fishery. Much of the data required for these surveys are available from the State fishery agencies.

Statistics of the shad and alewife fisheries are not published separately in bulletin form, but a summary of the year's activities is published in the annual reports of the Division.

Statistics of the shad fishery of the Hudson River are available for 1896, 1897, 1898, 1901, 1904, 1910, and from 1915 to 1935, inclusive, while data for the shad fishery of the Potomac River are available for 1896, 1901, 1904, 1909, 1915, and from 1919 to 1935, inclusive. Statistics of the alewife fishery of the Potomac River are available for 1896, 1909, 1915, and from 1919 to 1935, inclusive.

Pacific halibut fishery.—Statistics of the Pacific halibut fishery are obtained by the Bureau's agent in Seattle, aided by Bureau representatives in Alaska and the International Fisheries Commission. The fleet classification has been arbitrarily applied by including in the "Washington fleet" all United States and Alaska vessels that land more than half of their catch in that State. All other United States and Alaska vessels of the halibut fleet are included in the "Alaska fleet." Monthly and annual statistical bulletins are available on this fishery, being published along with the statistics of the landings of fishery products at Seattle, Wash., and detailed statistics are published in the annual reports of the Division. Statistics of the landings of halibut at Pacific coast ports have been collected since 1925.

Canned fishery products and byproducts.—Beginning in 1921, the Bureau has made annual surveys for statistics of the canned fishery

products and byproducts industries of every section. These are begun the first week in January of each year for statistics of the production in the preceding year. The surveys usually occupy 6 to 9 weeks' time. During this period the Bureau obtains by mail, so far as possible, the production of canned fishery products or byproducts from each plant in the United States engaged in this business. Where it is impossible to obtain reports by mail the report is obtained by personal visit by the Bureau's agents. They obtain statistics of the production and value of the production for each commodity. Statistics of the canned fishery products and byproducts produced in Alaska are received on the same statements obtained by the Bureau that include statistics of their general fishery operations.

An annual statistical bulletin is issued on this trade, and detailed statistics of the output are published in the annual reports of the Division. In addition to the data obtained on the output of these products annually since 1921, data also usually were obtained prior to 1921 for the years the various sections were surveyed.

The value shown for canned products constitutes the gross amount received by the packer at the production point, no deductions being made for commission or expenses.

Packaged-fish trade.—Complete statistics of the annual production and value of fish packaged in the United States are obtained as a part of the survey for the statistics of the canned fishery products and byproducts industries. These statistics are released in bulletin form annually and detailed statistics are published in the annual reports of the Division. Statistics of the production of packaged fish are available for 1926 and the years from 1928 to 1935, inclusive.

Cold-storage holdings of fish.—An arrangement has been made with the Bureau of Agricultural Economics, Department of Agriculture, whereby statistics of the cold-storage holdings of the various species of fish, by sections of the United States, are furnished to this Bureau monthly. Included with statistics of the holdings are statements of the quantity of the various species of fish frozen and also the holdings of certain cured fish. Bulletins showing these statistics are issued monthly as well as annually, and detailed statistics are published in the annual reports of this Division. Statistics of cold-storage holdings of fishery products have been published since 1917 and data on quantities of fish frozen, for the years from 1920 to 1925, inclusive, and from 1928 to 1935, inclusive.

Sponge market, Tarpon Springs.—A large proportion of the total output of sponges in Florida is handled through the sponge exchange at Tarpon Springs. In view of this, the Bureau has obtained from a representative of the exchange annual statistics of the quantity and value of the sponges, by variety classification, handled through it annually. Statistics of the quantity of sponges handled through the exchange are not published in bulletin form, but a summary of the year's activities is published in the annual reports of this Division. Statistics of the transactions on the sponge exchange are available for 1913, 1914, and for the years from 1917 to 1935, inclusive.

Foreign fishery trade.—Statistics of the foreign fishery trade are obtained from compilations made by the Bureau of Foreign and Domestic Commerce, Department of Commerce. Statistics of all known fishery products imported or exported have been assembled in one table and published annually in the reports of the Division in recent years. For earlier years they are available in the reports of

the Bureau of Foreign and Domestic Commerce, the Bureau of Statistics, the Department of Commerce and Labor, and the Treasury Department.

PRACTICES AND TERMS

Certain practices and terms of importance used in the compilation of fishery statistics are explained below.

Days absent.—In computing "days absent" for vessels landing fares at the various ports, the day of departure and the day of arrival are included; thus a vessel leaving port on the 8th of the month and returning on the 15th of the month will be shown as being absent 8 days.

Operating units.—Operating units as referred to in this document include persons engaged in the fisheries, and fishing craft and gear employed.

Vessel.—The term "vessel" refers to a craft having a capacity of 5 net tons or more.

Boat.—The term "boat" refers to a craft having a capacity of less than 5 net tons.

Incidental catch.—The term "incidental catch" refers to the catch of certain species by a type of gear which ordinarily does not capture such species.

Percentages.—Percentages are usually shown as whole numbers. Fractions of percents are dropped if less than five-tenths, and the percentage is raised to the next higher integer if the fraction is greater than five-tenths. If the fraction is exactly five-tenths, the integer is raised or lowered to make it an even number.

Converting.—Many of the figures shown in the statistical tables published herewith have been converted to thousands of pounds or dollars. In making these conversions the largest number from which a group of items is computed is raised or lowered to the nearest thousands place. If the number ends in an even 500, the thousands integer is raised or lowered to make it an even number. The individual items are changed to conform to the total thus obtained.

Confidential data.—The statistical data collected by the Division are confidential and are not released except by approval of the Washington office. Statistics of production of wholesale and manufacturing firms are published only for commodities or geographical areas where the production of three or more concerns may be grouped. Every effort is made to publish only those figures which will not reveal individual enterprise.

CONVERSION FACTORS

It is the policy of the Bureau to show the detailed catch figures of all products in pounds for the sake of uniformity and for purposes of comparison. Following such a policy presents certain problems. In the case of fish there is little difficulty since in very rare instances are such products reported in units of measure other than pounds. For shellfish, however, the units of measure may be bushels, sacks, barrels, or thousands of shellfish, gallons of meats, etc. These many units make standardization difficult, but when coupled with the wide variation in the requirements or definition of some of these units in the various States the problem becomes even more complex.

All bivalve mollusks are reported in pounds of meats in the detailed catch tables presented in this report. In addition, there are included supplementary tables for most of the sections, which give data on the

production in bushels. These supplementary tables also give the production of certain other shellfish, such as crabs, in number.

Oysters.—Probably the greatest problem in presentation of fishery statistics in uniform units of measure is in the case of oysters. Usually the production of oysters on the Atlantic and Gulf coasts is reported to Bureau agents in bushels; and prior to the data obtained for the year 1930 conversion from bushels to pounds of meats was effected on the basis of a uniform yield of 7 pounds of meats to the bushel. However, more recent investigations have shown considerable variation from this figure. There follows a table which gives the results of these studies of the measures used for oysters in the various States and of the average yields per bushel. This table presents the factors that have been used in the oyster statistics given in this report.

Measures and yields of oysters [1]

State	Capacity of State bushel	Variation from United States standard bushel		Market oysters	
				Yield per State bushel	Yield per standard bushel
	Cubic inches	*Cubic inches*	*Percent*	*Pounds of meats*	*Pounds of meats*
Massachusetts	2,150.4			6.57	6.57
Rhode Island	2,150.4			7.31	7.31
Connecticut	2,150.4			8.00	8.00
New York	2,150.4			7.00	7.00
New Jersey	2,257.3	+106.9	+5.0	8.91	8.49
Delaware	2,257.3	+106.9	+5.0	7.00	6.67
Maryland	2,801.5	+650.1	+30.2	6.29	4.83
Virginia	3,003.4	+853.0	+39.7	6.44	4.61
North Carolina	2,801.9	+651.5	+30.3	5.58	4.28
South Carolina	4,071.5	+1,921.1	+89.3	4.74	2.50
Georgia	2,753.4	+603.0	+28.0	5.88	4.59
Florida	3,214.1	+1,063.7	+49.4	3.57	2.39
Alabama	2,826.2	+675.8	+31.4	3.29	2.50
Mississippi	2,826.2	+675.8	+31.4	2.22	1.69
Louisiana	2,148.4	−2.0	−0.1	4.32	4.32
Texas	2,700.0	+549.6	+25.6	4.41	3.51

[1] Data on yield for the New England, Middle Atlantic, and Chesapeake States are for 1935. Other data on yield are for 1934.

Other mollusks.—The following table shows the conversion factors for various mollusks, other than oysters, used in this report.

Average yields of certain mollusks in pounds of meats per bushel [1]

State	Clams, hard		Clams, soft		Clams, surf	Clams, razor	Mussels, sea	Periwinkles and cockles	Scallops, bay	Scallops, sea	Conchs
	Public	Private	Public	Private							
Maine	11		15				12	15		6	
New Hampshire			15								
Massachusetts	11.01	11	13.64		17	31.68		18	6.13	6	
Rhode Island	16	16	20					18	7	7	
Connecticut	10	10	14.94						5.75		
New York	8	8	16	16	12		10		5	6	18
New Jersey	9.76	9.76	20		12.5		13			5.88	
Delaware	10	10					13				
Maryland	8										
Virginia	8	8					12				
North Carolina	8								6		
South Carolina	8										
Florida	8								5.3	6	5

[1] Data for the New England, Middle Atlantic, and Chesapeake States are for 1935. Other data are for 1934.

Other conversion factors.—The principal other conversion factors that have been used in this report are as follows:

Alewives	To convert number of fish to weight in pounds, multiply by 0.4.
Cod, large, salted	To convert to fresh-gutted weight, multiply by 1.90.
Cod, market, salted	To convert to fresh-gutted weight, multiply by 1.94.
Cod, scrod, salted	To convert to fresh-gutted weight, multiply by 1.98.
Crustaceans:	
Crabs, soft and peelers (New York, Maryland, and Virginia).	To convert number of crabs to weight in pounds, divide by 4.
Crabs, soft and peelers (Louisiana).	To convert number of crabs to weight in pounds, divide by 2.53.
Crabs, soft and peelers (other States).	To convert number of crabs to weight in pounds, divide by 3.
Crabs, hard (Georgia)	To convert number of crabs to weight in pounds, divide by 2.
Crabs, hard (Florida)	To convert number of crabs to weight in pounds, divide by 1.91.
Crabs, hard (Alabama)	To convert number of crabs to weight in pounds, divide by 1.71.
Crabs, hard (Mississippi)	To convert number of crabs to weight in pounds, divide by 1.97.
Crabs, hard (Louisiana)	To convert number of crabs to weight in pounds, divide by 2.21.
Crabs, hard (Texas)	To convert number of crabs to weight in pounds, divide by 2.18.
Crabs, hard (other States)	To convert number of crabs to weight in pounds, divide by 3.
Crabs, stone	To convert number of crabs to weight in pounds multiply by 1.25.
Cusk, salted	To convert to fresh-gutted weight, multiply by 1.90.
Haddock, large, salted	To convert to fresh-gutted weight, multiply by 2.06.
Haddock, scrod, salted	To convert to fresh-gutted weight, multiply by 2.10.
Hake, large, salted	To convert to fresh-gutted weight, multiply by 1.90.
Hake, small, salted	To convert to fresh-gutted weight, multiply by 1.98.
Halibut, salted	To convert to fresh-gutted weight, multiply by 2.
Herring, salted	To convert to round weight, multiply by 1.50.
Mackerel, salted	To convert to round weight, multiply by 1.35.
Menhaden	To convert number of fish to weight in pounds, multiply by 0.6.
Pollock, salted	To convert to fresh-gutted weight, multiply by 1.90.
Sponges, dried (Florida):	
Large wool	To convert number of bunches to weight in pounds, multiply by 3.5.
Medium wool	To convert number of bunches to weight in pounds, multiply by 1.75.
Small wool	To convert number of bunches to weight in pounds, multiply by 1.
Wool rags	To convert number of bunches to weight in pounds, multiply by 2.25.
Grass	To convert number of bunches to weight in pounds, multiply by 1.
Wire	To convert number of bunches to weight in pounds, multiply by 1.5.
Yellow	To convert number of bunches to weight in pounds, multiply by 1.25.

COMMON AND SCIENTIFIC NAMES OF FISHERY PRODUCTS

In order to prevent misunderstanding in the use of common names employed in the tables and discussions, the following list of common and scientific names is given:

Common and scientific names of the commercial fishery products caught in the United States and Alaska

Common name as shown in Bureau reports	Other common names	Scientific names
Albacore	See tuna	
Alewives	Branch herring, wall-eyed or big-eyed herring.	*Pomolobus pseudoharengus.*
	Blueback, glut herring	*Pomolobus aestivalis.*
Amberjack		Seriola species.
Anchovies		*Engraulis mordax.*
		Anchoviella delicatissima.
		Anchoviella compressa.
Anglefish		*Pomacanthus arcuatus.*
		Angelichtys isabelita.
Barracuda		*Sphyraena argentea* (Pacific coast).
		Sphyraena barracuda (Atlantic coast).
Black bass	Smallmouth bass	*Micropterus dolomieu.*
	Largemouth bass	*Micropterus salmoides.*
Bluefish	Tailor	*Pomatomus saltatrix.*
Blue pike	Pike perch, blue pickerel (Canada)	*Stizostedion glaucum.*
Blue runner or hardtail	Runner	*Caranx crysos.*
Bonito		*Sarda sarda.*
		Sarda chiliensis.
Bowfin		*Amia calva.*
Buffalofish		Ictiobus species.
Bullhead		Ameiurus species.
Butterfish	Dollarfish	*Poronotus triacanthus.*
Burbot	Lawyer, ling	*Lota maculosa.*
Cabio	Coalfish, crab eater, cobia	*Rachycentron canadus.*
Cabrilla	Rock bass	*Epinephelus analogus* (Pacific coast).
Carp	German carp	*Cyprinus carpio.*
Catfish		Siluridae species.
Cero		*Scomberomorus regalis.*
Chubs	Tullibee in Canada; longjaw, bluefin, blackfin in United States.	All *Leucichthys* except *artedi* (in Great Lakes).
Cigarfish	Scad	Decapterus species.
Cisco	Herring in Canada	*Leucichthys artedi* (Lake Erie only).
Cod	Codfish	*Gadus macrocephalus* (Pacific coast).
		Gadus callarias (Atlantic coast).
Corbina	Orange mouth corbina	*Cynoscion xanthulum.*
Crappie	White crappie	*Pomoxis annularis.*
	Black crappie, strawberry bass, calico bass.	*Pomoxis sparoides.*
Crevalle		*Caranx hippos.*
Croaker	Crocus, hardhead	*Micropogon undulatus.*
Cunner	Chogset, blue perch, bergall	*Tautogolabrus adspersus.*
Cusk		*Brosmius brosme.*
Cutlassfish	Ribbonfish	*Trichiurus lepturus.*
Dolly Varden trout	Salmon trout, bull trout	*Salvelinus parkei.*
Dolphin		*Coryphaena hippurus.*
Drum:		
Black		*Pogonias cromis.*
Red	Channel bass, redfish, spotted bass	*Sciaenops ocellatus.*
Eels:		
Common		*Anguilla rostrata.*
Conger		*Leptocephalus conger.*
		Gymnothorax species.
Flounders	Dabs, blackbacks, lemon sole, winter flounder, summer flounder.	Pleuronectidae species.
	Halibut, "California"	*Paralichthys californicus.*
	"Sole"	*Psettichthys melanostictus* (Pacific coast).
Flyingfish		*Cypsilurus californicus.*
Frigate mackerel	"Boo Hoo"	*Auxis thazard.*
Garfish	See sea gar	
Gizzard shad	Nanny shad, mud shad	*Dorosoma cepedianum.*
Goldeye		Hiodon species.
Goldfish	Sand perch	*Carassius auratus.*
Goosefish		*Lophius piscatorius.*
Grayfish	Dogfish	*Squalus sucklii* (Pacific coast).
	Spiny dog	*Squalus acanthias.*
	Smooth dog	*Mustelus mustelus.*
Groupers	"Sea bass"	Epinephelus species.
		Myceteroperca species.
Grunts	Margatefish, sailors choice (Key West)	Haemulon species.
Haddock		*Melanogrammus aeglefinus.*
Hagfish	Slimefish	*Myxine glutinosa.*

Common and scientific names of the commercial fishery products caught in the United States and Alaska—Continued

Common name as shown in Bureau reports	Other common names	Scientific names
Hake	Squirrel hake, Boston hake, ling, black hake, mud hake.	Urophycis species (Atlantic coast).
	Merluccio	*Merluccius productus* (Pacific coast).
Halibut		*Hippoglossus hippoglossus.*
Hardhead		*Orthodon microlepidotus* (Pacific coast).
Harvestfish	Starfish, pappyfish; butterfish (N. C.).	*Peprilus alepidotus.*
Herring:		
Lake	Herring	*Leucichthys artedi* (Great Lakes, except Erie).
Round		*Etrumeus sadina.*
Sea		*Clupea harengus* (Atlantic coast). *Clupea pallasii* (Pacific coast).
Herring smelt	Sea smelt	*Argentina silus.*
Hickory shad	Tailor shad	*Pomolobus mediocris.*
Hogfish	Capitaine, perro perro	*Lachnolaimus maximus* (Florida).
Horse mackerel	Pacific	*Trachurus symmetricus.*
	Atlantic—See tuna.	
Jewfish		*Promicrops itaiara.*
Kingfish	King mackerel	*Scomberomorus cavalla* (Atlantic coast).
	Little roncador, croaker	*Genyonemus lineatus* (California).
King whiting	Northern whiting, kingfish, seaming	Menticirrhus species.
Ladyfish	Bonefish	*Albula vulpes.*
Lake trout		*Cristivomer namaycush.*
Lamprey		*Petromyzon marinus.*
Launce	Sand eel, lant, sand launce	*Ammodytes americanus.*
"Lingcod"	Cultus cod, blue cod, buffalo cod, ling	*Ophiodon elongatus.*
Mackerel		*Scomber scombrus* (Atlantic coast). *Scomber diego* (Pacific coast).
Marlin	Spearfish	*Tetrapturus mitsukurii* (Pacific coast).
Menhaden	Mossbunker, pogy	*Brevoortia tyrannus.*
Minnows		Cyprinidae species.
Mojarro		Eucinostomus species.
Mooneye	Toothed herring	Hiodon species.
Moonfish		*Vomer setipinnis.* *Selene vomer.*
Mullet	Jumping mullet	Mugil species.
Mummichog	Mayfish, killifish	Fundulus species.
Muttonfish		*Lutianus analis.*
Paddlefish	Spoonbill cat	*Polyodon spathula.*
Parrotfish		Scaridae species.
Perch (California)	See surffishes.	
Permit	See pompano.	
Pigfish	Hogfish (N. C.)	*Orthopristis chrysopterus.*
Pike or pickerel	Great Lakes pike	*Esox reticulatus.* *Esox lucius.*
Pilchard	Sardine	*Sardina caerulea.*
Pilotfish		*Naucrates ductor.* *Seriola zonata.*
Pinfish	Bream, salt-water bream	*Lagodon rhomboides.*
Pollock		*Pollachius virens.*
Pompano	Permit, great pompano	*Trachinotus goodei.*
		Trachinotus species (Atlantic coast).
		Palometa simillima (Pacific coast).
Porgies	Porgee	*Calamus* species.
Porkfish	Sisi	*Anisotremus virginicus.*
Quillback	Spearfish or skimfish	Carpiodes species.
Roach	Shiner	*Notemigonus crysoleucas.*
Rock bass	Redeye, goggle-eye	*Amblopiites rupestris* (Mississippi River to Atlantic seaboard).
	Groupers	*Paralabrax nebulifer* (Pacific coast).
Rockfishes	Rock cod	*Sebastodes* species (Pacific coast).
Rosefish		*Sebastes marinus.*
Rudderfish	Blue bass, greenfish	*Girella nigricans* (Pacific coast).
	Halfmoon	*Medialuna californiensis* (Pacific coast).
Sablefish	Black cod	*Anaplopoma fimbria.*
Salmon:		
Atlantic		*Salmo salar* (Atlantic coast).
Pacific:		
Blueback, red, or sockeye.		*Oncorhynchus nerka.*
Chinook or king	Tyee, Columbia, Sacramento, spring	*Oncorhynchus tschawytscha.*
Chum or keta	Dog salmon	*Oncorhynchus keta.*
Humpback or pink.		*Oncorhynchus gorbuscha.*
Silver or coho		*Oncorhynchus kisutch.*
Steelhead	See steelhead trout.	
Sauger	Sand pike	*Stizostedion canadense.*
Sawfish		*Pristis pectinatus.*
Sculpin		Cottidae species.
Scup	Paugy or porgy, fair maid	Stenotomus species.

Common and scientific names of the commercial fishery products caught in the United States and Alaska—Continued

Common name as shown in Bureau reports	Other common names	Scientific names
Sea bass	Black jewfish or black sea bass	*Stereolepis gigas* (Pacific coast).
	Black sea bass	*Centropristes striatus* (Atlantic coast).
	White sea bass	*Cynoscion nobilis* (Pacific coast).
Sea catfish	Gafftopsail	*Bagre marina.*
Sea gar	Needlefish, billfish, houndfish	Tylosurus species.
Sea robin		Prionotus species.
Shad	American shad	*Alosa sapidissima.*
Sharks		*Carcharodon* species; Mustelus species; *Carcharhinus* species; *Sphyrna* species.
Sheepshead		*Archosargus probatocephalus* (Atlantic coast).
	Drum, fresh water	*Aplodinotus grunniens* (fresh water).
	Redfish, flat head	*Pimelometopon pulcher* (Pacific coast).
Silver perch	Sand perch	*Bairdiella chrysura.*
Silversides	Spearing	Menidia species.
Skates		Raja species.
Skipper	Billfish	*Scomberesox saurus.*
Smelts		*Osmerus mordax* (Atlantic coast).
		Argentinidae species (Pacific coast).
	Eulachon	*Thaleichthys pacificus.*
Snapper:		
Mangrove	Gray snapper	*Lutianus griseus.*
Red		*Lutianus Blackfordii.*
Snook	Robalo, sergeantfish	*Centropomus undecimalis.*
Spadefish	Porgy (N. C.)	*Chætodipterus faber.*
Spanish mackerel		*Scomberomorus maculatus.*
Splittail		*Pogonichthys macrolepidotus.*
Spot	Lafayette, goody	*Leiostomus xanthurus.*
Squawfish	Sacramento pike	*Ptychocheilus grandis.*
Squeteague:		
Gray	Gray trout, weakfish, trout	*Cynoscion regalis.*
Spotted	Spotted weakfish, spotted trout	*Cynoscion nebulosus.*
White	Sand trout	*Cynoscion arenarius.*
Squirrelfish		*Diplectrum formosum.*
Squirrel hake	See hake.	
Steelhead trout	Salmon trout	*Salmo gairdneri.*
Striped bass	Rockfish, rock	*Roccus lineatus.*
Sturgeon		*Acipenser* species.
Sturgeon, shovelnose		*Scaphirhynchus platorynchus.*
Sucker	Fresh-water mullet	Catostomidae species.
Sunfish	Bream, perch	Lepomis species.
		Centrarchidae species.
Surffishes	Perch	Embiotocidae species.
Swellfish	Puffer, swell toad, balloonfish, globefish.	*Spheroides maculatus.*
Swordfish		*Xiphias gladius.*
Tai		*Calamus brachysomus.*
Tautog	Blackfish, oysterfish	*Tautoga onitis.*
Tenpounder	Elops	*Elops saurus.*
Thimble-eyed mackerel	Bullseye	*Scomber colias.*
Tilefish		*Lopholatilus chamæleonticeps.*
Tomcod		*Microgadus tomcod* (Atlantic coast).
		Microgadus proximus (Pacific coast).
Tripletail		*Lobotes surinamensis.*
Tullibee	See chubs.	
Tuna and tunalike fishes:		
Albacore	Longfin tuna	*Germo alalunga.*
Bluefin	Tuna, leaping tuna (Pacific coast)	*Thunnus saliens.*
	"Horse mackerel" (Atlantic coast)	*Thunnus secundodorsalis.*
Bonito		*Sarda sarda* (Atlantic coast).
		Sarda chiliensis (Pacific coast).
Skipjack	Striped tuna	*Euthynnus pelamys.*
Yellowfin		*Neothunnus macropterus.*
Turbot	Greenland halibut	*Reinhardtius hippoglossoides* (off New England).
	American turbot	*Balistes carolinensis* (off Florida).
White bass	White lake bass	*Roccus chrysops.*
Whitebait	Small fry of any fish.	
Whitefish:		
Common		*Coregonus clupeiformis* (Great Lakes).
		Caulolatilus princeps (Pacific coast).
Menominee		*Prosopium quadrilaterale.*
White perch		*Morone americana* (Atlantic coast).
Whiting	Silver hake	*Merluccius bilinearis.*
Wolffish		*Anarhichas lupus.*
Yellow perch		*Perca flavescens.*
Yellow pike	Wall-eyed pike, pike perch, dore	*Stizostedion vitreum.*
Yellowtail		*Ocyurus chrysurus* (Atlantic coast).
		Seriola dorsalis (Pacific coast.)

Common and scientific names of the commercial fishery products caught in the United States and Alaska—Continued

Common name as shown in Bureau reports	Other common names	Scientific names
Crabs.		
Hard	Hard-shell crab, blue crab	*Callinectes sapidus.*
	Dungeness crab	*Cancer magister* (Pacific coast).
	Rock crab, hard crab	*Cancer irroratus* (Atlantic coast).
Soft and peelers	Soft-shelled crab, blue crab	*Callinectes sapidus.*
King		*Paralithodes camtschatica* (Pacific coast).
King or horseshoe		*Limulus* (Atlantic coast).
Stone		*Menippi mercenaria.*
Crawfish:		
Fresh-water	Crayfish	Cambarus species (Atlantic coast).
		Astacus species (Pacific coast).
Sea	Rock lobster, crayfish	*Panulirus argus* (Atlantic coast).
		Panulirus interruptus (Pacific coast).
Lobsters:		
Common		*Homarus americanus* (Atlantic coast).
Spiny	(See sea crawfish.)	
Shrimp		*Peneus setiferus.*
		Peneus brasiliensis (Atlantic and Gulf coasts).
		Pandalus species (Pacific coast).
		Pandalopsis species (Pacific coast).
		Crangon species (Pacific coast).
Abalone		Haliotis species.
Clams:		
Cockle		*Cardium corbis* (Pacific coast)
Hard	Butter	*Saxidomus nuttall.*
	Round clam, cherrystone, quahog, little neck.	*Tivela stultorum* (Pacific coast).
		Venus mercenaria (Atlantic coast).
		Venus mortoni (Florida coast).
Pismo		*Tivela stultorum* (Pacific coast).
Razor		Ensis species (Atlantic coast).
		Siliqua patula (Pacific coast).
Soft	Soft shell clam, sand clam, nannynose, manfnose.	Mya arenaria.
Surf	Skimmer	*Mactra solidissimo.*
Cockles	Moonshell	*Natica heros* (Atlantic coast).
Conchs		Strombus species.
		Busycon species.
Coquina	Pompano shells	*Donax variabilis.*
Mussels:		
Sea		*Mytilus californianus* (Pacific coast).
		Mytilus edulis.
Fresh water		Quadrula species.
		Lampsilis species.
		Unio species.
		Symphynota species.
Octopus		*Octopus punctatus* (Pacific coast).
Oysters:		
Eastern		*Ostrea virginica*
Western	Olympia	*Ostrea lurida* (Pacific coast).
Japanese (introduced).	Pacific	*Ostrea gigas.*
Periwinkles		Littorina species.
Scallops:		
Bay		*Pecten irradians* (Atlantic coast).
		Pecten aequisulcatus (Pacific coast).
Sea		*Pecten magellanicus.*
Squid		*Loligo opalescens* (Pacific coast).
		Loligo pealei (Atlantic coast).
Sea urchins		Echinoidea.
Terrapin	Diamond-back terrapin	Malaclemmys species.
Turtles:		
Green		*Chelonia mydas.*
Loggerhead		*Thalassochelys caretta.*
Hawksbill		*Chelonia imbricata.*
Snapping	Hard shell, alligator turtle	*Chelydra serpentina.*
		Macrochalys lacertina.
Soft shell		Trionyx species.
Frogs		Rana species.
Irish moss		*Chrondrus crispus.*
Kelp		Macrocystis species; Nereocystis species; Pelagophycus species; Alaria species.
Sponges:		
Glove		*Spongia graminea* (Hyatt) *Euspongia officianalis* (L.).
Grass		*Hippospongia equina cerebriformis.*
Sheepswool		*Hippospongia canaliculata gossypina.*
Yellow		*Hippospongia equina elastica.*
Trepang	Sea cucumber	*Cucumaria frondosa; Thyone briareus.*

ALASKA FISHERY AND FUR-SEAL INDUSTRIES IN 1936 [1]

By WARD T. BOWER, *Chief, Division of Alaska Fisheries*

CONTENTS

[1] Administrative Report No. 28. Appendix II to the Report of the U. S. Commissioner of Fisheries for 1937. Approved for publication July 22, 1937.

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INTRODUCTION

The duties of the Bureau in regulating the fisheries of Alaska and in protecting and managing the Pribilof Islands fur-seal herd were performed in accordance with the established program. During the month of July the Commissioner of Fisheries made a tour of inspection of all important fishing centers and also visited the Pribilof Islands to observe fur-sealing activities.

Regulations for the protection of the fisheries were revised early in the year to meet conservation requirements in the various localities, and a few minor changes were made during the fishing season as conditions warranted. In general, there were abundant runs of salmon in all districts, with the result that the catch was the largest in the history of the industry and a record pack was produced, amounting to 8,437,603 cases, or nearly a million cases more than the previous record pack in 1934.

A patrol of the fishing grounds was maintained by the Bureau's fleet of 14 vessels and 20 small power boats, supplemented by a number of chartered boats and launches. Approximately 175 persons were employed for varying periods as stream guards and special workmen in connection with the fisheries-protective work. An effective auxiliary patrol was provided by the use of chartered airplanes, especially during weekly closed periods.

Eleven weirs were operated in typical salmon streams, through which the brood fish were counted as a means of determining the relation of escape to catch. During the season observations of the runs were made in all districts to assure that the regulations permitted maximum utilization of the resource consistent with the maintenance of an undiminished supply. An examination of spawning areas after the close of fishing indicated that the escapement in general was satisfactory.

Attention was given to the improvement of conditions for natural propagation by the removal of log jams and other barriers that blocked the passage of salmon to the spawning grounds and by the destruction in certain areas of predatory trout that feed upon salmon eggs and fry. The artificial propagation of salmon in Alaska, at private as well as at Government hatcheries, has been discontinued.

Studies of the life history and fluctuations in the abundance of salmon and herring, which provide information of value in determining appropriate conservation measures, were continued.

On the Pribilof Islands 52,446 fur-seal skins were taken, or 4,850 less than the number obtained in the previous year. Killings were from surplus male seals, chiefly 3-year-olds, suitable provision being made for the breeding reserve. The census of the herd as of August 10, 1936, showed 1,689,743 animals of all classes, an increase of 138,830 over the corresponding figures for the previous year. Foxing operations at the islands during the winter of 1936–37 resulted in the take of 999 blue and 13 white fox pelts.

The byproducts plant at St. Paul Island was in operation during the season and produced 25,252 gallons of seal oil and 138 tons of seal meal. Except for small quantities retained at the islands for use in fox feed, the products were shipped to Seattle, where the oil was sold for commercial purposes and the meal was turned over to the Division of Fish Culture for use in feeding fish at the hatcheries.

There was some extension of improved roads on both islands to facilitate sealing operations, and a limited amount of construction work was accomplished on St. George Island, consisting chiefly in the erection of a building for the electric power and cold storage plant.

Through the courtesy of the Navy Department the U. S. S. *Vega* transported the annual shipment of supplies from Seattle to the Pribilof Islands and brought out the season's take of sealskins on the return trip. Cooperative service also was rendered by the Coast Guard, which assigned vessels to the patrol of the North Pacific and Bering Sea for the protection of fur seals and sea otters.

Acknowledgment is made of assistance by members of the Bureau's staff in the preparation of this document.

VISIT OF THE COMMISSIONER OF FISHERIES AND OTHER OFFICIALS TO ALASKA

The Commissioner of Fisheries left Washington for the Pacific coast on June 8, and on June 25 he sailed from Seattle on the *Brant* to inspect the fishery and fur-seal industries of Alaska. All of the principal ports in southeast and central Alaska were visited on the north-bound cruise. On July 12 the Commissioner boarded the *Penguin* at King Cove for the 2-day trip to the Pribilof Islands. Later he proceeded aboard that vessel to Bristol Bay, where he rejoined the *Brant* at Naknek on July 17. The south-bound voyage was interrupted by numerous stops in all important fishing centers, and the *Brant* docked at Seattle on August 6.

On this inspection trip, the Commissioner was accompanied by Congressman Byron B. Harlan and by Col. Charles H. March of the Federal Trade Commission.

LEGISLATION AND REGULATIONS REGARDING WHALING

On May 1, 1936, an act was passed to give effect to the convention concluded at Geneva on September 24, 1931, and subsequently ratified by the United States and 25 other countries for the regulation of whaling. In addition to restricting their capture and requiring that the fullest possible use be made of all whales taken, this act provides that whaling licenses must be obtained annually from the Secretary of Commerce for each vessel engaged in the taking of whales and for each floating reduction ship and shore station used in the processing of whales, the fees for which are fixed at $1,000 for each processing plant and $250 for each vessel in excess of two engaged in the taking of whales in connection with any such plant. It is also provided that enforcement of the act and regulations thereunder shall be primarily by the Coast Guard and the Bureau of Customs.

Joint regulations of the Secretary of the Treasury and the Secretary of Commerce concerning whaling were approved by the President on October 9, 1936. The chief restrictions of whaling as provided therein are the prohibition of the capture of any right whale or gray whale and of any calf, suckling, or immature whale or of any female accom-

panied by any immature whale of the baleen or whalebone whales, which include, among others, the right, gray, sei, blue, fin, and humpback whales and least rorquals. Certain exceptions are made in regard to the taking of whales for scientific purposes under special permit by the Secretary of Commerce and to whaling carried on by natives or Eskimos who are not employed by others nor under contract to deliver their whaling products to any third person.

Department of Commerce Circular No. 300 contains the text of the convention, the Whaling Treaty Act, and the joint regulations promulgated pursuant thereto.

JAPANESE VESSELS IN BERING SEA

Beginning in 1930, and in the six seasons since then, operations have been conducted by Japanese floating crab canneries on the high seas off the Bering Sea coast of Alaska, and particularly in Bristol Bay. From one to four floating plants, together with their auxiliary fishing vessels, have been engaged each year, and although operations have been confined almost exclusively to crab fishing and canning, one vessel also has operated a reduction plant, manufacturing fish meal.

Two Japanese floating plants were operated in Bering Sea in 1936—the *Taihoku Maru* (8,253 tons), which has been operated in four previous seasons, and the *Toten Maru* (6,000 tons), which has been operated in three previous seasons. The *Taihoku Maru* was accompanied by 3 trawlers of 398 tons each, 2 trawlers of 388 tons each, and 4 sea-bottom seine motorboats of 88 tons each. The *Toten Maru* was accompanied by 3 accessory motor boats ranging in size from 45 to 80 tons each.

In the season of 1936, also, the Japanese floating salmon cannery *Chichibu Maru* was observed about 100 miles southeast of the Pribilof Islands, accompanied by six fishing tenders with approximately 2 miles of gill nets in operation. This vessel was licensed by the Japanese Government to operate off the Siberian coast. Fishing there was delayed by ice conditions, and the *Chichibu Maru* was away from its normal place of operation until such conditions improved.

In addition to these floating canneries, the training ship *Hakuyo Maru* of the Imperial Fisheries Institute made its annual cruise to Bering Sea, as it has for a number of years, for the purpose of instructing students in pelagic fishing methods. Reports indicate that experimental canning of salmon, as well as crab meat, was carried on by this vessel in 1936.

The trawler-type vessel *Tenyo Maru* (657 tons), with one auxiliary motor vessel of 61 tons, made studies of the routes of migration and availability of salmon in extraterritorial waters of Bering Sea under an appropriation by the Japanese Government. It is understood that this study is to be continued during the seasons of 1937 and 1938.

WORKS PROGRESS ADMINISTRATION

An allotment of $55,996 was made to the Bureau by the Works Progress Administration for improving salmon spawning streams, destroying predatory enemies of salmon, and improving the marine railway in Bristol Bay. Of this allotment, $14,000 was later rescinded. Although work began on these projects in October 1935, activities were confined largely to the calendar year 1936.

Among the accomplishments with these funds may be listed the destruction of 773,747 Dolly Varden trout in the Bristol Bay region, for which 213 persons on relief rolls there received $19,343.67 in bounties; the construction of a 70-foot concrete fishway, consisting of 14 steps, over the falls in the stream at the head of Pavlof Harbor in southeastern Alaska; and extensive repairs to the Bureau's marine railway in Bristol Bay. In addition, improvements involving the blasting of impassable falls and the removal of debris were made in important salmon spawning streams throughout the Territory.

FISHERY INDUSTRIES

As in corresponding reports for previous years, the Territory of Alaska is here considered in the three coastal geographic sections generally recognized, as follows: (1) Southeast Alaska—embracing all that narrow strip of mainland and the numerous adjacent islands from Portland Canal northwestward to and including Yakutat Bay; (2) central Alaska—the region on the Pacific from Yakutat Bay westward, including Prince William Sound, Cook Inlet, and the southern coast of Alaska Peninsula, to Unimak Pass; and (3) western Alaska—the north shore of the Alaska Peninsula, including the Aleutian Islands westward from Unimak Pass, Bristol Bay, and the Kuskokwim and Yukon Rivers. These divisions are solely for statistical purposes and do not coincide with areas established in departmental regulations.

Detailed reports and statistical tables dealing with the various fishery industries are presented herewith, and there are also given the important features of certain subjects of special investigation or inquiry.

NEW FISHERY REGULATIONS

The regulations for the protection of the fisheries of Alaska, issued February 8, 1936, were amended by the following regulations issued by the Secretary of Commerce under the dates indicated:

[*March 26, 1936*]

ALL AREAS

Trout fishing.—1. Commercial fishing for trout of any species is prohibited in all streams and lakes: *Provided*, That this prohibition shall not apply to Dolly Varden trout.

2. No person shall take during any one day more than a combined total of 40 trout of all species, except Dolly Varden trout, and no person shall have in his possession at any time more than 80 trout of all species, except Dolly Varden trout.

GENERAL REGULATION

The use of dynamite or any other explosive in the taking or killing of any fish is prohibited.

[*May 14, 1936*]

BRISTOL BAY AREA

Salmon fishery.—Regulation No. 5 (c) is amended so as to permit the use of stake nets or set or anchored gill nets on the south side of Naknek Bay for a distance of 3,000 yards outside the drift gill net prohibitive markers.

COOK INLET AREA

Salmon fishery.—1. Regulation No. 6 is amended to read as follows: The total aggregate length of gill nets on any salmon fishing boat, or in use by such boat, shall not exceed 100 fathoms hung measure.

2. Regulation No. 10 is amended to read as follows: The distance by most direct water measurement from any part of one set or anchored gill net to any part of another set or anchored gill net shall not be less than 600 feet. The distance by most direct water measurement from any part of any set or anchored gill net to any part of any trap shall not be less than 1,000 feet.

3. Regulation No. 11 is amended to read as follows: All set or anchored gill nets shall be removed from the water throughout the weekly closed periods extending from 6 o'clock postmeridian of Saturday of each week to 6 o'clock antemeridian of the Monday following.

[*June 9, 1936*]

SOUTHEASTERN ALASKA AREA

Herring fishery.—Regulation No. 4 is amended so as to permit bait fishing in the waters along the south coast of Baranof Island from Redfish Cape to the light at Port Armstrong in the period from June 1 to July 15, both dates inclusive.

[*July 11, 1936*]

BRISTOL BAY AREA

Salmon fishery.—In addition to existing prohibitions, commercial fishing for salmon in the Nushagak district, which embraces the waters of Nushagak Bay within a line from Point Protection to Etolin Point, is prohibited from 6 o'clock post-meridian Tuesday to 6 o'clock antemeridian Wednesday of each week.

[*July 23, 1936*]

BRISTOL BAY AREA

Salmon fishery.—All commercial fishing for salmon in the Nushagak district, which embraces the waters of Nushagak Bay within a line from Point Protection to Etolin Point, is prohibited prior to 6 o'clock antemeridian August 3.

[*Aug. 6, 1936*]

PRINCE WILLIAM SOUND AREA

Salmon fishery.—Alaska general regulation No. 1 is hereby amended so as to permit the holding of salmon in traps in the Prince William Sound area 72 hours after the termination of the fishing season at 6 o'clock postmeridian on August 5, 1936.

[*Aug. 7, 1936*]

ALASKA PENINSULA AREA

Salmon fishery.—Regulation No. 13 is amended so as to permit commercial fishing for salmon until 6 o'clock postmeridian August 11 in all waters east of Kupreanof Point.

SOUTHEASTERN ALASKA AREA

ICY STRAIT DISTRICT

Salmon fishery.—Regulation No. 7 is amended so as to permit commercial fishing for salmon until 6 o'clock postmeridian August 8 in all waters east of a line from Point Adolphus to Point Gustavus.

[*Aug. 15, 1936*]

SOUTHEASTERN ALASKA AREA

WESTERN DISTRICT

Salmon fishery.—Regulation No. 7 is amended so as to permit commercial fishing for salmon from a true line eastward from the southeastern extremity of Point Couverden south to 58 degrees north latitude until 6 o'clock postmeridian August 17.

EASTERN DISTRICT

Salmon fishery.—Regulation No. 8 is amended so as to permit commercial fishing for salmon south of 57 degrees north latitude until 6 o'clock postmeridian August 17.

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[*Aug. 17, 1936*]

SOUTHEASTERN ALASKA AREA

WESTERN DISTRICT

Salmon fishery.—Regulation No. 8 is amended so as to permit commercial fishing for salmon south of 58 degrees north latitude until 6 o'clock postmeridian August 19.

Revised regulations effective in 1937 for the protection of the fisheries of Alaska were issued by the Secretary of Commerce under date of February 8, 1937, copies of which may be secured, without cost, on application to the Bureau of Fisheries, Washington, D. C.

ANNETTE ISLAND FISHERY RESERVE

The salmon cannery at Metlakatla in the Annette Island Fishery Reserve was again operated by the Annette Island Canning Co., under its lease from the Department of the Interior.

Eight salmon traps were operated by the company, the total catch of which numbered 2,313,927 salmon, and 133,189 salmon taken by seines in the waters of the reservation were purchased from natives. In addition, 1,133,825 salmon were purchased from independent operators of seines, traps, and gill nets outside the reserve. Of the total number of fish obtained, 568,114 were sold to other canneries and the remainder were packed at the company's plant. In the operation of the cannery and fish traps, employment was given to 54 whites and 221 natives.

Profits to the Metlakatlan Indians of the reserve on the cannery operations for 1935, under the provisions of the lease, amounted to $73,221.45. Preliminary estimates for the year 1936 place the figure at about $75,000.

STREAM IMPROVEMENT

Except for the projects carried on with W. P. A. funds, there was no special program of stream improvement in 1936. The most important achievement was the construction of a 70-foot concrete fish ladder, consisting of 14 steps, over the falls in the red-salmon stream at the head of Pavlof Harbor. Formerly salmon could ascend to the spawning grounds on the stream only on the highest tides; during the past season salmon passed upstream through the fishway at all stages of the tide. Improvements were made in the falls of Anan Creek by the removal of several large boulders, so changing the course and velocity of the water as to make the upper stream more readily accessible to salmon.

Preliminary surveys were made of the streams in central Alaska and Bristol Bay to determine the need for improvement work, and plans were made for blasting steps in the falls between Brooks Lake and Naknek Lake in the spring of 1937. Beaver dams were removed from several of the important salmon spawning streams in English Bay and Kalsin Bay, in the Kodiak area, and in the Kalgin Island stream in Cook Inlet. In addition, wardens and temporary employees removed the less serious obstructions which they encountered during the examination of spawning grounds.

The destruction of predatory Dolly Varden trout in the Bristol Bay district was continued with special allotments of Government funds and with contributions from salmon packers of that district. The

Territorial Legislature and the Bristol Bay salmon packers appropriate about $15,000 annually for this purpose, and in 1935 and 1936 these funds were supplemented with $20,000 of W. P. A. funds which were made available as a relief measure. As in previous years, only bona fide residents of Bristol Bay were engaged in this work, and payments were at the rate of 2½ cents for each trout destroyed. Special wardens of the Bureau supervised the work and prepared the necessary vouchers.

Dolly Varden trout also were destroyed during the year by weir crews: 46,260 trout were destroyed at Red River, and 34,754 at the cannery station in Olga Bay.

STREAM MARKING

New markers defining areas closed to commercial fishing were erected to replace those which had become illegible or damaged, and changes were made in the positions of others to conform with changes made in the regulations with respect to closed areas.

STREAM GUARDS

The Bureau employed 177 men in 1936 as stream guards, weir operators, and special workmen in connection with law-enforcement duties. Of these, 85 were stationed in southeast Alaska, 61 in central, and 31 in western Alaska. Some of the workers were engaged for only a few days but the average period of employment ranged from 2 to 5 months.

In southeast Alaska 36 stream watchmen furnished their own launches and were assigned to patrol larger bodies of water or in the vicinity of several streams.

In central Alaska 12 guards were stationed in the Seward-Katalla district, 7 on Cook Inlet, 31 in the Kodiak-Afognak district, 4 at Chignik, and 7 in the Ikatan-Shumagin district. Eleven of these guards, most of whom were in the Seward-Katalla district, furnished their own launches.

In western Alaska 26 were on Bristol Bay and 5 in the Yukon-Kuskokwim district.

There were also 8 special employees engaged in scientific work—2 on herring and 6 on salmon investigations, this work being carried on in southeastern and central Alaska.

In addition, there were 12 statutory employees, 49 men on the Bureau's vessels, and 3 on the chartered boats.

The foregoing makes a grand total of 249 persons identified with fishery protective work in Alaska in 1936, as compared with 241 in 1935.

VESSEL PATROL

Fourteen vessels of the Bureau were engaged in the Alaska fisheries patrol in 1936. Of these, the *Auklet*, *Kittiwake*, *Merganser*, *Murre*, and *Widgeon* were used in southeast Alaska; the *Ibis* was at Chignik; the *Red Wing* and the *Crane* in the Alaska Peninsula area; the *Scoter* on Bristol Bay; and the *Coot* on the Yukon River.

The *Blue Wing* was transferred from the Kodiak area to Prince William Sound in June and continued to operate in the latter district through the rest of the season. The *Eider* transported supplies from Seattle to the Alaska Peninsula area in May, after which it patrolled

the Kodiak region. The *Teal* conducted the patrol on Cook Inlet during the summer and assisted with the stream survey work in southeast Alaska in the fall. The *Brant* was engaged for the most part in general supervisory work, making a cruise as far westward as Bristol Bay in July.

During the spring the *Brant* and *Crane* assisted with the fur-seal patrol in the vicinity of Neah Bay, Wash., and the *Kittiwake* performed similar duty near Sitka, Alaska. The last-named vessel was used also in herring tagging operations. From February to April the *Eider* was assigned to the Works Progress Administration project of stream improvement in the Juneau and Wrangell districts of southeast Alaska, and the *Auklet* was identified with the project in April in connection with the construction of a fish ladder at Pavlof Harbor. From November 17, 1936, to February 4, 1937, the *Crane* was detailed to the service of the Post Office Department for the purpose of transporting mail between Seattle and Juneau during the maritime strike.

As in the previous year, four speed boats were in operation, one each on Bristol Bay, in Prince William Sound, in the Wrangell district, and in the vicinity of Juneau. Sixteen other small power boats also were in use, including a number of skiffs equipped with outboard motors. Of these, five were used on Bristol Bay, two in the Alaska Peninsula area, one at Chignik, three at Kodiak, one on Cook Inlet, two in the Seward-Katalla district, one at Yakutat, and one on the west coast of Prince of Wales Island.

In addition to the foregoing, a few boats were chartered for patrolling the fishing grounds, as follows: The gas boat *Mars* in the Ketchikan district, the *Wingham* in the Seward-Katalla district, the *Auk* and later the *Popof* in the Alaska Peninsula area, and the launch *Marie S* on the Yukon River.

AERIAL PATROL

Airplanes chartered from commercial companies were used to a considerable extent in the patrol of fishing grounds in southeast Alaska and the Seward-Katalla district, especially during weekly closed periods. Their use to supplement the vessel patrol is of distinct advantage, as a very large area can be covered in a short time, and fishermen are deterred from illegal operations because they do not know which plane is on patrol nor is there time to adjust their apparatus at the approach of an investigator. Planes were used also in making inspections of some of the spawning grounds and in transporting officials of the Bureau to isolated districts. During the 1936 season a total of 14,413 nautical miles was traveled in these activities, on 46 days, the total flying time amounting to about 143 hours.

COMPLAINTS AND PROSECUTIONS

In southeast Alaska 9 purse-seine boats, with an aggregate of 41 men in the crews, most of whom were Indians, were seized for fishing in closed waters during the month of August. The cases were tried before local United States Commissioners and convictions were secured in each instance. Salmon aboard the seized vessels were sold and the proceeds turned over to the Department of Justice.

In the case of the seine boat *St. Joseph*, found fishing about 1 mile inside the markers in Rudyerd Bay and within 500 yards of the mouth of a salmon stream, the captain pleaded guilty and was fined $100, upon payment of which the boat was released. A fine of $100 also

was imposed in the case of the *Atlas*, which fished in closed waters of Shipley Bay, and the salmon aboard the vessel at the time of the seizure were confiscated and sold for $67.66. Crew members of the *Isabelle R*, *Eagle*, and *Dorothy D*, which operated in closed waters of Trocadero Bay, Shipley Bay, and off San Fernando Island, respectively, were fined $50 each, or a total of $700. Seized fish from the *Isabelle R* were sold for $132.32 and from the *Eagle* for $255, while those from the *Dorothy D* were dumped, as they had been held too long for canning.

Fines amounting to $150 were imposed in the case against the seine boat *Skeeziks* for fishing within 500 yards of the mouth of a salmon stream on San Fernando Island, the captain being assessed $50 and each of the crew $25. For a similar violation of the regulations in that locality the captain and each of the 4 crew members of the *Lilly* were fined $75 and $50, respectively, as it was the second time this boat had been found fishing inside markers of salmon streams in the last 2 years. Salmon that were aboard the *Skeeziks* at the time of the seizure were sold for $22.73.

The captain and crew of the *Eagle March*, found fishing within 500 yards of the mouth of a salmon stream on the southwest shore of Prince of Wales Island, pleaded guilty and were given a 60-day suspended sentence, in view of extenuating circumstances. Six hundred and twenty salmon seized from this boat brought $39.62. Operators of the seine boat *U & I*, upon trial before the Commissioner at Juneau, pleaded guilty to the charge of fishing illegally in closed waters of Hanus Bay and were fined $150.

The gas boats *Inger* and *Agnes Ann*, each operated by two men, were found gill-netting for salmon in Barnes Lake on June 29. Fines totaling $400, plus costs of $10 for a watchman, were assessed, and one of the men was given a 60-day suspended sentence. Seized fish from the boats were sold for $116.40. The owner of the troll boat *31A750*, charged with illegally fishing for salmon near Morris Reef during a weekly closed period, was fined $25 by the Commissioner at Juneau. A fisherman of Petersburg was arrested for taking undersized and soft-shelled crabs at Grief Island and was fined $25.

Two operators of drift gill nets in the Yakutat district were brought before the local Commissioner for fishing during a weekly closed period, and upon pleading guilty were fined $50 each and given a 90-day suspended sentence. Salmon taken from their boats were sold for $61.25 and $69, respectively. In the Yakutat district, also, two operators were arrested by the Bureau's warden, at the instance of the local United States Commissioner, for using resident's instead of nonresident's fishing licenses. Upon trial before the Commissioner's court they were found guilty of swearing falsely to fishing license application, were fined $100 each, and given 60 days in which to prove residence in Alaska.

A salmon trap operated by the Pioneer Sea Foods Co., on the north end of Montague Island, was seized for fishing during a weekly closed period on July 25. Upon trial in the Commissioner's court at Cordova, the defendant entered a plea of *nolo contendere* and was fined $500. The trap watchman was fined $20 and sentenced to 5 days in jail.

Six purse-seine boats in the Seward-Katalla district were seized for illegal fishing in closed waters. One of these, an unnamed boat operated by Julius Strom and John Johnson, was found fishing near the mouth of a salmon stream in Unakwik Inlet during a weekly closed period. The *Martino* was operated near the mouth of a salmon stream

in Jackpot Bay; the *31A589*, near the mouth of a salmon stream in Comfort Cove; the *31C223*, near a salmon stream at the head of Beartrap Bay, Port Gravina; and the *31A809* and *31A820* in closed waters in the west arm of Long Bay. Upon trial before the Commissioner at Cordova the three men on the two last-named boats were fined $40 each; 3,115 pink salmon and 5 reds that were aboard at the time of the seizure were sold for $125.35, and the proceeds were turned over to the Department of Justice. The men on the other four boats were fined $25 each.

In the Seward-Katalla district, also, prosecutions were brought against five gill-net operators for fishing in sloughs or within 500 yards of the Grass Banks in the Copper River area. A case against one of the men, for fishing in the prohibited area near Cottonwood Point, was dismissed because of insufficient evidence; for a second offense 2 weeks later in the same locality the fisherman was fined $75. The other gill-net operators were fined $25 each, as were two clam diggers who took undersized clams for commercial purposes in the vicinity of Point Whitshed. Clams totaling 644 pounds were seized from these diggers and sold for $32.20. Two shackles of gill net with 19 red salmon were picked up in Dago Slough, but the owner was not apprehended. The salmon were sold for the account of the Government for $5.90.

In the Kodiak area, operators of the seine boat *L & W* were arrested for fishing in a weekly closed period. The captain was fined $50; and each of the two other members of the crew, $25. They appealed the fines, but later dropped the appeal. A fisherman found operating in Gurney Bay with a gill net in excess of the prescribed maximum length was fined $25 and costs. Several minor offenses were observed which were settled without the necessity of making arrests.

Prosecution was brought against H. J. Emard, of the Emard Packing Co., at Anchorage, in Cook Inlet, for wanton waste of fish, as this company twice during July, after first sorting out and canning the red salmon from their supplies of raw fish, had allowed some 15 tons of salmon to spoil and had then hauled them to near-by farms for use as fertilizer. The defendant, through his attorney, entered a plea of guilty on both counts and paid a fine of $100.

In the Alaska Peninsula area the *Frostland* was apprehended while laying a seine within a few feet of another seine off Bear River, Port Moller. The owners pleaded guilty before the Commissioner's court at Unalaska, and a fine of $300 and costs was imposed. There were 2,875 salmon forfeited from this boat, which brought $350.34. The owner of the *Hawk*, who operated a beach seine in closed waters at the mouth of Minor Creek, in the Shumagin Islands region, pleaded guilty before the Commissioner at Squaw Harbor and was fined $300.

Cases against the purse-seine boats *Frisco*, *Lion*, *Sunlight*, and *Wisconsin*, involving the carrying of an additional net in their fishing operations in Ikatan Bay contrary to existing regulations, were not taken into court, but the boats were released by the district attorney, who ordered forfeiture of their fish. The confiscated fish were sold for the account of the Government as follows: 1,673 from the *Frisco*, for $187.87; 13,371 from the *Lion*, for $1,122.30; 9,237 from the *Sunlight*, for $813.83; and 7,333 from the *Wisconsin*, for $665.65; a total of 31,614 fish, for $2,789.65.

Twenty stake-net fishermen and 10 operators of gill-net boats were arrested for illegal fishing in the Bristol Bay area. The stake-net fishermen, charged with fishing in the Nushagak area during a weekly closed period and with setting nets less than the required distance interval apart, were tried before the United States Commissioner at Nushagak; all pleaded guilty and were assessed fines ranging from $5 to $46.25, the total amounting to $271.60. Cases against the operators of the gill-net boats were tried before the Commissioner's court at Naknek. Fines of $35 each were assessed against the six operators of three boats belonging to the Alaska Packers Association which fished during a closed period in the Ugashik district; $50 each against two operators of the Red Salmon Canning Co.'s boat *No. 40* for laying a net too close to other gear in the Naknek district; and $100 each against two operators of the Red Salmon Canning Co.'s boat *No. 7* for fishing during a weekly closed period in the Naknek district. From the last-named boat, 1,635 salmon were confiscated; they were sold for $204.79, and the proceeds were turned over to the Department of Justice.

SETTLEMENT OF CLAIM OF WALES ISLAND PACKING CO.

An act of May 5, 1936, authorized payment of $100,000 to the Wales Island Packing Co., in full settlement of its claim against the Government of the United States for injuries to its business and property on Wales Island, in Portland Inlet, on account of the decision of the Alaska boundary tribunal in 1903, under which possession of said island passed from the United States to the Dominion of Canada. As agreed upon in the treaty of March 3, 1903, between the United States and Great Britain, the decision of the tribunal regarding the boundary line rested solely upon the interpretation of the description of the boundary in the Russian-British treaty of 1825, irrespective of any rights and claims which the United States held subsequently in the disputed territory.

The Wales Island Packing Co. had established a salmon cannery on Wales Island and had operated it only two seasons when the change in boundary deprived it of advantages it had enjoyed as an American firm with respect to fishing in Alaska waters and selling its products in American markets. As a result of these hindrances to its profitable operation, the plant was idle for a number of years and was finally sold to a Canadian firm for a small fraction of its original cost. The settlement of the company's claim against the Government for compensation for the losses sustained closes a case that has been pending since 1904.

TERRITORIAL LICENSE TAX

Fisheries license taxes were collected by the Territory under the general revenue law of 1921, as amended in subsequent sessions of the Territorial Legislature. A statement from Oscar G. Olson, Territorial treasurer, under date of April 29, 1937, gives the collections made to that date for the year 1936, representing the taxes on operations of the previous year. It was stated that collections under the several schedules were fairly complete, although a few of the fisheries companies had not yet made full settlement. The outstanding salmon pack taxes amounted to approximately $12,000.

Fishery license taxes collected by Territory for fiscal year ended Dec. 31, 1936

Schedule	Division No. 1	Division No. 2	Division No. 3	Total
Salmon canneries (pack)	$177,831.78		$165,523.71	$343,355.49
Clam canneries	4.44		215.49	219.93
Salteries	2,022.79	$31.54	4,063.67	6,118.00
Cold-storage plants	1,025.00			1,025.00
Fish-oil works and fertilizer and fish-meal plants	17,113.99		14,139.74	31,253.73
Whale oil and fertilizer stations			10,412.00	10,412.00
Fish traps	55,200.00		31,050.00	86,250.00
Trap catches in excess of 100,000 fish	7,932.62		11,272.24	19,204.86
Gill nets	464.30	10.00	1,382.76	1,857.06
Seines	5,645.00		2,625.00	8,270.00
Total	267,239.92	41.54	240,684.61	507,966.07
Salmon canneries (net income), not possible of segregation as to judicial division				33,961.25
Total collections				541,927.32

KUSKOKWIM RIVER

A patrol of the Kuskokwim River district was maintained by stream guard Charles McGonagall from the first of June until the end of July, when it was terminated because the chartered launch *Marie S* broke down beyond repair for the rest of the season. The king salmon run started on June 2 and held up well until July 10, after which it slacked off, although a few of this species were still being caught in the river at the time the patrol was discontinued. Good runs of reds and chums started on June 18, and cohos on July 20. As the catches of the earlier runs provided amply for local needs, there was little fishing for cohos. On an inspection trip from Bethel to Crooked Creek in the latter half of July the stream guard observed that all the smoke houses were full of smoked fish and most of the wheels were idle, the only fishing being for daily use.

Robert Gherkie, whose camp was about 1 mile below Bethel, was the only operator engaged in commercial fishing operations in the district. He prepared 12 tierces of pickled king salmon, which were shipped to Seattle. Three hundred and seventy-one natives fished in the river for local food requirements, using 295 gill nets of 4,955 fathoms, 46 wheels, and a number of small boats. They prepared 357 tons of dried chums.

YUKON RIVER

Four plants on the Yukon River engaged in salting salmon for the outside market—those of Frank Kern and the Northern Commercial Co. in Acharon Channel, Chris Lauredson at Ageklarok Point (locally known as Tin-can Point), and St. Mary's Mission at the head of Sunshine Bay. The two last-named operators put up very limited amounts, as the run did not appear at Ageklarok Point, as it had in previous years, and driftwood interfered with the operation of fish wheels at Sunshine Bay while the best runs were on. Frank Kern withdrew from the industry at the close of the season, after selling his saltery and equipment to the Northern Commercial Co.

Inspector Calvin F. Townsend and a stream guard patrolled the Yukon River aboard the *Coot*, which left Nenana on May 20 and returned on September 17. During the trip down the river in May there were no signs of activity on shore, as the residents were out hunting muskrats. On May 31, the *Coot* reached Kwiguk, where several fish

wheels had caught 30 king salmon on that and the preceding day—the earliest a catch of this size has been taken there.

The run of king salmon, however, was comparatively light during the season and reached its peak on June 16. The main run of chums started on June 17, and, like that of the kings, was rather irregular. The best catches of chum salmon were made the first part of July. Cohos began to appear on July 12, or about 2 weeks earlier than usual. Catches of both chums and cohos were unusually large, especially on the upper Yukon and Tanana Rivers. In some places a part of the season's production of dried fish was damaged by rain.

Products of the Yukon and Tanana fisheries, including the commercial output, were as follows: 190 cases of kings canned, 242 tierces of mild-cured kings, 10,900 pounds of kings, 4,115 pounds of cohos, and 2,900 pounds of chums pickled; 9,600 pounds of kings dry-salted; and 324 tons of chums and 40 tons of cohos dried. Apparatus consisted of 251 wheels, 119 gill nets of 2,318 fathoms, 3 motor vessels of 78 tons, 2 power dories, 15 gill-net boats, and miscellaneous small boats. There were 11 whites and 350 natives engaged in the fishery.

WEIRS FOR COUNTING SALMON ESCAPEMENT

Eleven weirs for counting the escapement of salmon to the spawning grounds were operated in Alaska in 1936, the same number as in the preceding year, and in addition a count was made at Kalgin Island Creek without the use of a rack. One new weir was installed this season in Fish Creek, a tributary of Knik Arm at the head of Cook Inlet, while the Morzhovoi weir, which had been in operation in 1935, was not reestablished.

Reports of the weir operations and the counts of salmon in 1936 are as follows:

KLAWAK CREEK

The Klawak Creek weir, placed in the same location as in previous years, was completed on June 10, and the first red salmon were counted through on the following day. The run gradually increased and held up well throughout July, although the largest escapement of red salmon for any one day was 2,843 on July 7. The pink salmon run began on July 29, but it was not until after August 6 that this species appeared in any appreciable numbers. The bulk of the escapement of pink salmon was tallied between August 10 and September 12, the peak of the run being on September 7, when 60,421 passed through the weir. No salmon were counted on the last 3 days of August, because of low water in the stream, nor again on September 8 and 9 when the water was high. The total count of salmon at the Klawak weir during the season ending October 2 numbered 594,692 pinks, 65,314 reds, 9,382 cohos, and 37,416 chums.

Lloyd M. Johnson was weir foreman and Fred C. Thomas weir assistant, under the supervision of Warden Donald S. Haley.

LITTLE PORT WALTER

Through the weir in the stream at the head of Little Port Walter, which is maintained primarily to furnish information in connection with biological studies of pink salmon in southeast Alaska, 5,164 pink salmon, 55 chums, 40 cohos, and 14 reds were counted from August 24 to September 19, inclusive. A few pinks and chums were below the

weir at the time it was removed on September 20, and a small school of cohos was in the bay. S. J. Hutchinson operated the weir under the direction of Dr. Frederick A. Davidson.

SITUK RIVER

From June 9 to August 8, inclusive, there were counted through the weir in Situk River 178,054 red salmon, 76,381 pinks, 816 kings, 387 cohos, and 23 chums. Twice during the season it was necessary to extend the weekly closed period for commercial fishing, such fishing being prohibited through July 6 until 8 o'clock antemeridian July 7 and through July 20 until 6 o'clock postmeridian July 21, in order to assure an escapement of at least 50 percent of the run to the spawning grounds. The weir was removed on August 9, as high water had washed out the bottom around the pickets and horses, causing the structure to sag.

A. W. Tveter handled the work at this weir, under the supervision of Warden William B. Berry.

ALITAK BAY

The cannery station weir on Olga Bay in the Alitak Bay region was installed in April for the purpose of catching predatory trout, and 34,754 were taken during the season. It was not until May 22 that the first red salmon passed upstream. The run was light but fairly steady until July 8, then almost negligible for the remainder of the month, after which it increased heavily. The bulk of the escapement occurred during August, the peak being reached on August 17, when 34,481 red salmon were counted through the rack. Large numbers of salmon were still ascending the stream at the time the weir was removed on August 23. The total count for the season was 100,447 red salmon, 21,622 pinks, and 231 cohos. Henry Looff was in charge of the work at this place, under the direction of Warden Charles P. Turner.

CHIGNIK RIVER

The Chignik weir was located about 175 feet below the site used in the previous year, where the river is about 460 feet wide and from 2 to 5½ feet deep. Construction was started on April 23 and completed on May 21. The first red salmon were tallied on May 30, and within a few days the fish were appearing in large numbers. A freshet on June 16 raised the river 7 inches, causing some damage to the weir, so that it was necessary to estimate part of the escapement for the next 5 days. The run was heavy in June and held up fairly well until July 20, after which there was a gradual decline until counting was discontinued on September 10. The total count for the season consisted of 902,298 red salmon, 58,097 cohos, and 1,622 kings.

Under departmental regulation commercial fishing for salmon in the Chignik area was prohibited prior to June 1 and after October 1. In addition, it was necessary to prohibit fishing in Chignik Lagoon and part of Chignik Bay during the week ending August 29, as the catch of red salmon exceeded the escapement. The total commercial catch of red salmon from the Chignik run was 870,142.

Warden Charles Petry was in charge of the Bureau's work at this place.

CHINIK CREEK

The weir in Chinik Creek, which empties into Kamishak Bay, was ready for operation on June 18. From June 19 to August 1, inclusive, 19,349 red salmon were counted, and it was estimated that between 4,000 and 5,000 ascended the stream afterward. The work at this weir was carried on by stream guard T. W. Lloyd, under the supervision of Acting Warden Wallace R. Newcomb.

ENGLISH BAY

From June 1 to August 10, inclusive, 15,767 red salmon and 171 pinks were counted through the weir in the stream at the head of English Bay. It was estimated that 750 red salmon ascended the stream in May, before the weir was completed. Stream guard P. G. Maltbie performed the work here, under the direction of Acting Warden Wallace R. Newcomb.

FISH CREEK

A new weir was operated this year in Fish Creek, about 15 miles north of Anchorage, on the west shore of Knik Arm at the head of Cook Inlet. This weir was established in order that additional data might be obtained in connection with the conservation of salmon in that locality, where recent colonization makes the preservation of the fisheries a matter of increasing importance. In Fish Creek, as in a number of other streams in the Cook Inlet area, the salmon runs may be seriously damaged both by settlers and bears, owing to the fact that when the fish are disturbed in the early part of their journey upstream they return to salt water, and if the tide is out they are stranded on the quicksand and destroyed.

The season's escapement tallied at the weir from July 15 to August 11, inclusive, consisted of 203,032 red salmon, 2,383 pinks, 1,558 cohos, 23 chums, and 3 kings.

Andrew Berg served as stream guard and weir operator at this place, under Acting Warden Wallace R. Newcomb.

KALGIN ISLAND CREEK

A count of salmon ascending the creek on the east side of Kalgin Island was again made by the stream guard stationed in that locality. No weir was erected, as the creek spreads out over the flats as it enters salt water, and a barrier would cause the ascending salmon to turn back and become stranded. Salmon can enter the stream only during or near high tide, and they were counted on both day and night tides. The total count from June 1 to August 4, was 18,670 red salmon. Jack Tansy carried on the patrol at this place and kept the channel clear of debris and barriers that would prevent the ascent of salmon to the spawning grounds. His work was under the direction of Acting Warden Wallace R. Newcomb.

KARLUK RIVER

Construction of the weir in Karluk River was begun on May 7 and completed on May 11. Although the weather was bad, the water level was not high for the time of year, and the work was accomplished without unusual difficulties. Traps were installed to facili-

tate the disposal of spent pinks that float downstream in the latter part of the season.

The first count of salmon was on May 17, but the numbers were negligible for about 10 days. A steady and fairly heavy run began on May 29 and continued until July 2, followed by a light and irregular run for several weeks. A second heavy run began in the third week of August and continued until September 26. The largest escapement of red salmon for any one day was 142,182 on September 1. When counting was discontinued on October 5, the total escapement numbered 1,375,659 red salmon, 526,207 pinks, 42,709 cohos, and 4,989 kings.

In order that the commercial catch should not exceed the escapement, commercial fishing in the Karluk area was suspended from 12 o'clock noon June 24 to 6 o'clock antemeridian July 6, and the fishing season was closed at 6 o'clock postmeridian August 1, in the section from Bear Island to Cape Karluk, and at 6 o'clock postmeridian August 13, in the entire area. The total commercial catch of red salmon from the Karluk run was 991,138.

Young red salmon migrating downstream were observed in large numbers at the weir from May 28 to June 12, and a further run appeared on June 23 and 24. The downstream migration of Dolly Varden trout was very much lighter than in 1935.

James O'Brien was in charge of the weir, under the supervision of Warden Charles P. Turner.

ORZENOI RIVER

The weir in Orzenoi River was ready for operation on June 18, and the first red salmon were counted through on June 23. From that date until the weir was removed on August 8, there were counted 31,720 red salmon, 3,405 pinks, 708 cohos, 195 chums, and 133 kings. It was estimated that 6,500 pink salmon were spawning in the streams below the weir, but very few were out in salt water at the time the weir was removed. Gordon Ashton was in charge of this weir, under the supervision of Warden J. Steele Culbertson.

RED RIVER

At the time the weir was being erected in Red River, king salmon were already ascending to the spawning grounds, and the first count was made on May 18. Red salmon began passing through the weir on May 20, and within a few days they were running in good numbers. This run continued fairly steady for several weeks, reaching its peak on June 23, with an escapement of 18,621 red salmon for the day. More than one-half the season's escapement occurred during the month of June. Weir operations were discontinued at the close of August 31, when the total count numbered 491,362 reds, 223,233 pinks, 11,275 cohos, and 2,515 kings. The run of red salmon appeared to be well over at that time, but there were many cohos in the lagoon and lower river.

A heavy downstream migration of young red salmon was observed during the early part of June. Traps were operated for catching predatory trout and the take numbered 46,260 to August 1, when the traps ceased fishing because of low water.

Tom Frost was in charge of the Red River weir, under the direction of Warden Charles P. Turner.

SALMON TAGGING

A salmon-tagging experiment was conducted in southeast Alaska in 1936, as in the previous year, to secure further information concerning the migrations of pink salmon in Clarence and Sumner Straits. During closed periods from July 18 to August 16, inclusive, 2,500 pink salmon were tagged, of which 2,000 were tagged at McLean Point and 500 at Point Colpoys. The patrol vessel *Murre* and later the *Kittiwake* assisted in the tagging operations. A reward of 25 cents each was paid for the return of tags accompanied by information as to the date and place of recapture. The returns amounted to 38 percent of the total number of tags used.

SALMON LIFE-HISTORY STUDIES

Studies of the life histories and fluctuations in the abundance of the Pacific salmon in Alaska were continued in 1936 by the staff of the Fisheries Biological Station at Seattle, Wash. The major investigations of the red salmon at Karluk and of the pink salmon at Little Port Walter were carried on as formerly. Biological data on the red salmon in the Bristol Bay, Chignik, and Copper River areas were also collected.

Salmon-counting weirs in the Karluk and Little Port Walter Rivers furnished information regarding the number of salmon that returned to these streams to spawn. Studies carried on at these locations resulted in further evidence regarding natural factors that affect the abundance of the salmon.

Studies dealing with biological changes within the pink salmon due to sexual development, which affect the quality of the commercial pack, were continued in cooperation with the Seattle branch of the National Canners Association. The samples of pink salmon taken during the 1936 season are being analyzed for changes both in intensity of red coloration and in chemical composition.

The collection, compilation, and analysis of records of the daily catch of salmon in Alaska by the principal types of fishing apparatus were continued in 1936, and provided information as to the fluctuation in abundance and time of appearance of salmon runs in the various districts. This information is of importance in determining adequate regulations for the conservation of the salmon.

ABNORMAL CONDITION OF SALMON

Reports were received from a number of localities about the middle of the 1936 fishing season that an abnormal condition had appeared in salmon, greatly affecting their quality. At the time this condition was most severe, difficulty was experienced in transporting the salmon catches to the canneries without spoilage. For a relatively short period of time some of the canneries ceased operations in order to maintain a high-quality pack.

The abnormal condition of the salmon consisted in the presence of areas in their bodies that were highly congested with blood. These congested areas were found for the most part in the tail region, but in some cases they were present in all parts of the body. An examination of these congested areas did not reveal any evidence of a diseased condition of the fish. The absence of dead or dying salmon in the fishing gear and along the shores in the localities where this abnormal

condition was most critical confirmed the conclusion that disease organisms were not responsible.

It was found through experimental work that the highly congested areas in the salmon were caused by bruising in commercial handling, both before and after death. Although such bruising was severe in only a few localities, it was found to a limited extent in practically all the fishing districts of Alaska. In view of this fact and the evidence resulting from the examination of the texture of the flesh, it has been concluded that salmon composing the 1936 runs were unusually soft or tender and did not withstand the treatment they are normally subjected to in handling.

Some peculiarity in the growth of salmon prior to their spawning migration has been advanced in explanation of the possible cause for the unusual, tender condition of the flesh. The occurrence of more bruised fish in some localities than in others may have been due to an accentuation of this tender condition by excessively warm weather and the accompanying abnormally high ocean temperature that prevailed in the localities where the bruising of salmon was most severe. That there was some relationship between the higher ocean temperatures and increased bruising of the salmon is evidenced by the fact that rains and lower temperatures greatly reduced the occurrence of bruised individuals in the catches.

OBSERVATIONS ON THE ESCAPEMENT OF SALMON

The volume of the salmon runs is closely watched in each district so that there may be the fullest possible commercial utilization of this resource without endangering its future. Upon the basis of these observations the regulations were modified during the season in such a way as to secure the most desirable spawning escapement. After the close of fishing operations, representative spawning streams in all parts of the Territory were examined to determine the adequacy of such escapement.

Southeast Alaska.—Pink salmon were abundant in nearly all parts of southeast Alaska. The runs of this species were early in the southern part of the area, while in the northern part, as in other recent years, the runs were late. A long period of clear, warm weather in August caused the water level of many of the small streams to fall so low that salmon could not reach the spawning gravels. This condition was relieved by heavy rains in September and there was no appreciable loss of spawning fish except on the west coast of Prince of Wales Island.

In the southern district the pink salmon run was in progress when the season opened, and, increasing steadily in volume until the close of fishing, it produced a pack exceeding all previous records. This exceptionally heavy run resulted in a generally satisfactory escapement throughout the district. The streams in Boca de Quadra, Smeaton Bay, Rudyerd Bay, and Walker Cove were especially well seeded.

The run in the southern part of the Clarence Strait district, like that of the southern district, was early; and pink salmon were unusually abundant throughout the season. Although the escapement of pink salmon in the streams along the east coast of Prince of Wales Island was not as large as in the southern district it was considered adequate. The run in the northern part of the district was small

and the escapement was correspondingly small. There was no fall fishing for chum salmon in the Clarence Strait district, and the escapement of this species was good.

The pink salmon run in the South Prince of Wales Island district was the largest recorded in recent years. This run commenced about the middle of July and increased steadily in volume until the middle of August. There was a sharp decline in abundance of this species after August 20, but the escapement throughout the district was very satisfactory. The sockeye salmon run was of unusual duration, extending throughout the entire fishing season, and the spawning grounds were well seeded. There was also a good run of chums and a good escapement. Cohos were comparatively few, but a fair escapement was secured. The streams in this region were exceptionally low until early September, when the fall rains set in, and many salmon died without spawning. The number of salmon reaching the spawning beds, however, was considered adequate.

The salmon runs in the southwestern part of the Sumner Strait district were early, and pinks were particularly abundant. It is evident that these runs were not destined for the inside waters of the district, for only a small intermittent run was observed there. The spawning escapement was not large except in the streams on Kuiu Island and in Totem Bay.

Pink salmon did not appear in appreciable numbers in the Icy Strait, western, and eastern districts until late July, when large runs set in. These runs continued heavy until the close of the fishing season, after which there was a definite decline in abundance. An excellent escapement of pinks was obtained in these districts. The runs of sockeyes and chums in the Icy Strait, western, and eastern districts were better than in other recent years, and all spawning grounds for these species were well seeded. The coho runs were about average and the escapement in general was good.

In the Yakutat district the runs and escapements of all species, except kings in Dry Bay, were very satisfactory. In Dry Bay the king salmon run was small and the escapement was poor.

Prince William Sound and Copper River region.—The pink salmon run was at a very low level from the opening date of fishing until July 18, when a heavy run set in through Montague Strait and moved northward through Knight Island Passage. By July 20, this large run had spread to the eastern side of Prince William Sound, and good catches were made there. The run increased in volume in nearly all parts of the area until July 24, after which it continued at a high level until the close of fishing. This extremely large run resulted in the heaviest pink salmon escapement ever observed in the streams of Prince William Sound. The escapement of chums was fair, while that of cohos was good.

Commercial fishing for red salmon in the Copper River region was successful, and the escapement of this species, although difficult to estimate, was believed to be adequate. The king salmon run was small and the escapement likewise was small. Cohos appeared to be plentiful, and as there was no commercial fishing for this species the entire run escaped to the spawning grounds.

Cook Inlet.—The run of red salmon commenced about June 28, and reached a peak of abundance on July 16, but did not decline appreciably until 10 days later. This run was considerably above average

and there was a correspondingly good escapement to all spawning grounds. The king salmon run was normal, as was the escapement also. The pink run was heavy and seeding was satisfactory in most of the suitable streams of the area. The coho run also was better than average, and the escapement was considered adequate. The chum run was poor and the escapement unsatisfactory.

Kodiak area.—The runs of pink salmon were very light in nearly all parts of the Kodiak area, and in most instances the spawning escapements also were small. Satisfactory seeding of this species was observed in the Chiniak Bay region, in Karluk River, in Alitak Bay, and in the region between Ugak and Kaguyak Bays. The runs of red salmon to Karluk and Red Rivers were the largest in recent years, and the escapements to both streams were satisfactory. The run and escapement of this species in Uganik Bay were small. The run of chums was not large and the escapement was only fair.

Chignik.—The red salmon run was much better than in the preceding year, and slightly more than half the run escaped to the spawning grounds. The principal part of this run appeared between June 7 and July 20, after which there was a gradual decline. The runs and escapements of other species were normal.

Alaska Peninsula.—The runs of red salmon along the south side of the Alaska Peninsula and at Port Moller are known to be bound chiefly for spawning grounds tributary to Bristol Bay, but they do contribute heavily to the fishery of this area. These runs began in the Ikatan-Shumagin region about June 13, reached a peak about 2 weeks later, and thereafter declined. On the north side of the peninsula the run was somewhat later, and the peak was not reached until about July 18. The pink salmon run on the south side of the peninsula was exceptionally large, and the runs of chums, cohos, and kings, were above average. The escapements of these species were good.

Bristol Bay.—The red salmon runs were large in the Kvichak-Naknek district, good in the Egegik and Ugashik districts, and very small in the Nushagak district. The spawning grounds were well seeded in all districts except the Nushagak, where the escapement was poor.

HATCHERIES

From the 34,383,000 red-salmon eggs that were collected in 1935 at the hatchery of the Pacific American Fisheries, Inc., on Hugh Smith Lake, 32,531,000 salmon fry were produced and liberated in Alaska waters.

Under provisions of the act of June 26, 1906, for the protection and regulation of the fisheries of Alaska, the owners of private hatcheries in Alaska who are also packers of canned salmon receive a rebate on license fees and taxes of every nature on their catch and pack of salmon at the rate of 40 cents per 1,000 king or red salmon fry liberated by them. In the fiscal year ended June 30, 1936, therefore, the rebate due the Pacific American Fisheries, Inc., on the 32,531,000 red-salmon fry liberated at Hugh Smith Lake during the year amounted to $13,012.40.

No collection of salmon eggs was made by the above-mentioned company in 1936, and the hatchery has been abandoned. This marks the close of fish-cultural operations in Alaska.

GENERAL STATISTICS OF THE FISHERIES

The total number of persons engaged in the fisheries of Alaska in 1936 was 30,383, or 7,763 more than in 1935. Fishery products were valued at $50,455,272, an increase of $19,224,626, or about 62 percent, over the value in the preceding year. Of the total amount, 92.2 percent represented the value of salmon products; 4.1 percent, herring; 1.9 percent, halibut; and 1.8 percent, the value of all other fishery products.

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Summary of persons engaged and products of the Alaska fisheries in 1936

Item	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Number	Value	Number	Value	Number	Value	Number	Value
PERSONS ENGAGED								
Whites	7,399		4,939		4,551		16,889	
Natives	3,699		1,685		1,574		6,958	
Chinese	112		242		307		661	
Japanese	548		385		277		1,210	
Filipinos	1,617		1,380		776		3,773	
Mexicans	10		10		604		624	
Puerto Ricans	3		9		108		120	
Kanakas	9		8		22		39	
Negroes	25		4		34		63	
Miscellaneous	8		2		36		46	
Total	13,430		8,664		8,289		30,383	
PRODUCTS								
Salmon:								
Canned (cases)	4,076,717	$17,417,701	2,869,681	$15,260,522	1,491,205	$12,073,410	8,437,603	$44,751,633
Mild cured (pounds)	4,289,600	774,364			193,600	24,200	4,483,200	798,564
Pickled (do)	104,300	8,570	314,450	32,529	454,165	55,411	872,915	96,510
Fresh, for food (do)	4,690,507	369,442					4,690,507	369,442
Frozen, for food (do)	5,574,914	374,330					5,574,914	374,330
Fresh, for fox feed (do)			44,980	430			44,980	430
Frozen, for bait (do)	439,238	4,535					439,238	4,535
Dry-salted and dried (do)	20,500	3,075			1,451,600	58,640	1,472,100	61,715
Fish pudding (cases)			75	500			75	500
Fertilizer (pounds)	1,300,000	20,000	254,000	4,579			1,554,000	24,579
Oil (gallons)	36,000	10,000	9,435	3,984			45,435	13,984
Herring:								
Fresh, for bait (pounds)	2,649,400	29,201	4,700	59			2,654,100	29,260
Frozen, for bait (do)	3,057,805	21,940					3,057,805	21,940
Pickled, for bait (do)	586,200	6,000					586,200	6,000
Pickled, for food:								
Scotch cure (do)	759,250	36,374	8,162,525	392,093	2,491,450	109,744	11,413,225	538,211
Norwegian cure (do)			2,125	92			2,125	92
Roused, for food (bloater stock) (do)					66,800	11,597	66,800	11,597
Spiced (do)	1,500	125					1,500	125
Meal (do)	11,628,749	223,165	16,756,319	298,849			28,385,068	522,014
Oil (gallons)	1,364,707	372,680	2,371,466	573,713			3,736,173	946,393
Halibut:								
Fresh (pounds)	6,957,336	443,762					6,957,336	443,762
Frozen (do)	6,609,004	445,692					6,609,004	445,692
Livers (do)	153,000	68,850					153,000	68,850

Cod:								
Dry-salted ... do			158,607	7,711			158,607	7,711
Pickled ... do			80,769	2,821			80,769	2,821
Stockfish ... do			9,355	1,304			9,355	1,304
Tongues ... do			600	45			600	45
Whale:								
Oil ... gallons			319,550	119,831	346,550	129,956	666,100	249,787
Sperm oil ... do			43,650	10,563	149,700	36,227	193,350	46,790
Fertilizer ... pounds			1,000,000	15,804	1,368,000	22,080	2,368,000	37,884
Clam: Canned ... cases			30,959	201,887			30,959	201,887
Crab:								
Canned ... do	6,050	46,984	8,463	77,941			14,513	124,925
Meat ... pounds	61,452	23,706	29,110	8,051			90,562	31,757
Whole in shell ... dozen	1,476	1,887	182	305			1,658	2,192
Shrimp:								
Meat ... pounds	467,407	159,420					467,407	159,420
Frozen ... do	5,666	2,126					5,666	2,126
Whole in shell, fresh ... do	5,676	728					5,676	728
Trout:								
Fresh ... do	1,847	178	3,680	436			5,527	614
Frozen ... do	40,836	3,222					40,836	3,222
Sablefish:								
Frozen ... do	614,536	27,431					614,536	27,431
Pickled ... do	134,730	5,017					134,730	5,017
Livers ... do	40,000	18,000					40,000	18,000
Rockfish, frozen ... do	21,532	814					21,532	814
"Lingcod", livers ... do	1,421	639					1,421	639
Total		20,919,958		17,014,049		12,521,265		[1] 50,455,272

[1] These figures represent the value of the manufactured product. It is estimated that the value of the catch, exclusive of whales, to the fishermen was approximately $13,891,000. The round weight of the salmon catch landed by the fishermen was approximately 726,853,000 pounds, and the corresponding figure for herring was approximately 172,828,000 pounds. The cod figures given above do not include the offshore catch from waters adjacent to Alaska, which amounted to 3,879,657 pounds of dry-salted cod and 11,650 pounds of tongues, having a total value of $194,897, landed at ports of the Pacific Coast States.

SALMON

There was a general abundance of salmon in practically all areas of Alaska in 1936, and the catch was the largest that has ever been taken from Alaska waters. The output of canned salmon exceeded the previous record pack for 1934 by 955,773 cases.

Red salmon were more abundant in southeast Alaska than for any other year since 1930, while in central Alaska the presence of good runs in various localities resulted in the largest catch of red salmon that has been recorded for this district. Although the fish were plentiful in Bristol Bay, the most important red-salmon district in Alaska, they were of smaller size than in some years, and the pack was not as large as usual in proportion to the catch.

Immense numbers of pink salmon entered the waters of southeast and central Alaska, and both the catch and pack of this species reached new levels. The increase was especially apparent in the central district, where the volume of the output was augmented not only by the great numbers taken but also by the unusually large size of the individual fish in certain areas, notably Kodiak and Chignik.

Of the three less abundant species of salmon in Alaska, the catch of each showed a gain over that of the preceding year and compared favorably with the annual average for any 5-year period. That these catches had been surpassed a few times in previous years does not of itself signify that the runs in 1936 were lighter than they had been formerly, as the curtailment of fall fishing affected the 1936 catch to some extent. For example, there was no fall catch from the runs of cohos in Copper and Eyak Rivers, as cannerymen would not meet the prices demanded by the fishermen. The unusually large pack during the summer, of course, was the chief factor that led to a curtailment of fall operations.

The total catch of salmon increased about 77 percent over that for 1935. By districts, the increase was 60 percent in southeast Alaska, 44 percent in central, and 420 percent in western Alaska.

As compared with the apparatus operated in Alaska as a whole in 1935, there was an increase of 5 percent in the number of fathoms of seines, 111 percent in the number of fathoms of gill nets, and 1 percent in the number of traps used in the salmon fishery.

CATCH AND APPARATUS

The total number of seines used in the salmon industry in 1936 was 952, of which 735 were purse seines and 217 beach seines. The purse seines aggregated 118,705 fathoms of webbing, and the beach seines 20,129 fathoms. The number of gill nets used was 4,211, having a total length of 296,573 fathoms. There were 169 driven and 284 floating traps—a total of 453.

Southeastern Alaska was accredited with 552 seines, or a total of 96,085 fathoms, a decrease of 17 seines but an increase of 6,645 fathoms of webbing from the number used in 1935; also with 359 gill nets, aggregating 26,330 fathoms, the same number of nets but a decrease of 2,095 fathoms of webbing; and with 30 driven and 254 floating traps, the same number of driven traps and an increase of four floating traps, as compared with the number operated in 1935.

Corresponding figures for central Alaska show 396 seines, or 41,749 fathoms, as compared with 397 seines, or 41,412 fathoms, in 1935; 1,522 gill nets, or 85,690 fathoms, as compared with 993 gill nets, or

67,676 fathoms, in 1935; and 139 driven and 30 floating traps, as compared with 134 driven and 33 floating traps in 1935.

In western Alaska four seines, or 1,000 fathoms of webbing, were used, a decrease of four seines and 900 fathoms of webbing from the number operated in 1935. There were 2,330 gill nets used, or an aggregate of 184,553 fathoms, an increase of 1,286 nets and 140,291 fathoms of webbing. No traps were operated in this district.

Seines caught 27 percent of the salmon taken in 1936, gill nets 21 percent, and traps 51 percent, while lines and wheels took the remaining 1 percent.

Percentage of salmon caught in each Alaska district, by principal forms of apparatus

Apparatus	Southeast Alaska		Central Alaska		Western Alaska	
	1935	1936	1935	1936	1935	1936
Seines	32	33	47	30	10	2
Gill nets	3	2	7	8	81	96
Traps	62	63	46	62		
Lines	3	2				
Wheels					9	2

The total catch of salmon in 1936 was 129,326,203, an increase of 56,062,399, or nearly 77 percent, over the number taken in 1935. Every district showed a substantial gain, the increase in southeast Alaska being 23,612,462, in central Alaska 12,865,810, and in western Alaska 19,584,127. By species, the catch of cohos increased 465,428; chums, 2,628,476; pinks, 27,765,385; kings, 93,597; and reds, 25,109,513.

Salmon taken in 1936, by apparatus and species, in each geographic section of Alaska

Apparatus and species	Southeast Alaska	Central Alaska	Western Alaska	Total
Seines:				
Coho, or silver	168,893	92,270	440	261,603
Chum, or keta	3,865,146	1,274,923	17,359	5,157,428
Pink, or humpback	16,432,891	9,499,190	6,091	25,938,172
King, or spring	1,717	1,917	613	4,247
Red, or sockeye	653,221	1,815,800	437,830	2,906,851
Total	21,121,868	12,684,100	462,333	34,268,301
Gill nets:				
Coho, or silver	168,027	173,392	24,267	365,686
Chum, or keta	131,557	92,331	722,479	946,367
Pink, or humpback	248,141	496,272	597,962	1,342,375
King, or spring	25,793	73,020	71,248	170,061
Red, or sockeye	388,160	2,266,641	21,879,054	24,533,855
Total	961,678	3,101,656	23,295,010	27,358,344
Traps:				
Coho, or silver	712,930	635,942		1,348,872
Chum, or keta	3,584,449	1,932,335		5,516,784
Pink, or humpback	34,058,004	16,637,722		50,695,726
King, or spring	6,908	36,403		43,311
Red, or sockeye	1,361,839	6,809,003		8,170,842
Total	39,724,130	26,051,405		65,775,535
Lines:				
Coho, or silver	749,963			749,963
Chum, or keta	24,744			24,744
Pink, or humpback	8,351			8,351
King, or spring	646,645			646,645
Red, or sockeye	177			177
Total	1,429,880			1,429,880

Salmon taken in 1936, by apparatus and species, in each geographic section of Alaska—Continued

Apparatus and species	Southeast Alaska	Central Alaska	Western Alaska	Total
Wheels:				
Coho, or silver			48,000	48,000
Chum, or keta			416,315	416,315
King, or spring			29,828	29,828
Total			494,143	494,143
Total:				
Coho, or silver	1,799,813	901,604	72,707	2,774,124
Chum, or keta	7,605,896	3,299,589	1,156,153	12,061,638
Pink, or humpback	50,747,387	26,633,184	604,053	77,984,624
King, or spring	681,063	111,340	101,689	894,092
Red, or sockeye	2,403,397	10,891,444	22,316,884	35,611,725
Grand total	63,237,556	41,837,161	24,251,486	129,326,203

CANNING

CHANGES IN CANNERIES

The Demmert Packing Co.'s cannery at Klawak, which had been taken over by the Klawock Packing Co. in 1933, was leased to Robert Lindenberger in 1936 and operated as the Klawak cannery of the Ocean Packing Co., the other plant of this company at Klawak being known as the Bayview cannery. A shore plant was operated by the Berg Packing Co. at Ketchikan during the season, the equipment for which had been removed from the floating cannery *Pioneer*, and the vessel was hauled out on a grid for use as living quarters of the cannery workmen. The plant of A. R. Brueger at Wrangell, which had been operated in 1935 under the owner's name, is now listed as the A R B Packing Co. The floating plant *Retriever*, of the Red Salmon Packers Association, was moved from its former location in the Yakutat district to Sitka, where it engaged chiefly in canning troll-caught salmon for the Alaska Trollers Cooperative Marketing Association.

In central Alaska the Halibut Bay Packing Co. was reorganized and incorporated as the Alaska Red Salmon Packers, Inc. An iron building, 178 by 28 feet, was erected to replace the small hand cannery, and equipment was transferred from the dismantled plant of the Pacific American Fisheries, Inc., at Uyak. The cannery site at Halibut Bay has been given the name of Carmel. The Pioneer Sea Foods Co., whose plant on Eyak River was destroyed by fire in November 1935, leased and operated the plant of the Pacific American Fisheries, Inc., at Orca. The modern shore plant of the Glacier Sea Foods Co., built at Cordova to replace a floating cannery, was put into operation this season. The Shepard Point cannery of the Shepard Point Packing Co. and the Ninilchik Packing Co.'s cannery at Ninilchik were reopened after a period of idleness. Harry W. Crosby adopted the name of Chignik Packing Co. for his cannery at Chignik. The floating plant of the Western Pacific Packing Co. was moved from Mist Harbor in the Shumagin Islands to the Egegik River in the Bristol Bay area.

Fourteen canneries in western Alaska that had been idle in 1935 because of the rigid curtailment of fishing in Bristol Bay for the purpose of rebuilding the weak cyclical run of red salmon were reopened.

The Columbia River Packers Association again operated its plant at Nushagak which had been closed since 1931, and the Lowe Trading Co. leased and operated in lieu of the *Santa Flavia* the Nushagak plant of the Pacific American Fisheries, Inc., formerly belonging to the Northwestern Fisheries Co. As the latter plant had been partly dismantled it was dropped from the list of idle plants in 1935. Two lines of modern cannery machinery were installed in preparation for its renewed operation.

NEW CANNERIES

Three new canneries were operated in Alaska in 1936, as follows: The Seaport Salmon Co., which installed a canning outfit in buildings purchased from the Steve Selig estate at Ketchikan; the Anchor Line Packing Co., which operated a small hand cannery on a scow in Cook Inlet; and the Aleutian Fishing and Packing Co., which built a new single-line cannery at Sand Point and equipped it with modern high-speed machinery.

The Kayler-Otness Co., at Petersburg, put up a small pack of canned salmon, but it is not included in the list of salmon canneries, as the plant was primarily engaged in the canning of crabs.

CANNERIES NOT OPERATED

The Alaska Icepak Corporation at Cordova was engaged only in the production of canned crabs and clams; it went into receivership in June and was later sold to satisfy a judgment. Scotty's Packing Co. at Hartney Point also packed no salmon during the year, its operations being confined to the canning of clams, and the plant of the Strand-Jensen Fisheries at Cordova was closed.

Canneries that have been dropped from the list of idle plants because there is little likelihood of their being reopened are as follows: Alaska Pacific Salmon Co., Tenakee; Hoonah Packing Co., Gambier Bay; Alaska Packers Association, Alitak; Pacific American Fisheries, Inc., Hunter Bay, Bering River, Uyak, Valdez, and Zachar Bay; and Icy Straits Fisheries, Inc., floating plant at Idaho Inlet.

The following canneries were closed during the year but may be reopened:

Southeast Alaska:	
Alaska Pacific Fisheries	Burnett Inlet.
Alaska Pacific Salmon Co	Boca de Quadra.
	Chomly.
	Funter Bay.
	Pybus Bay.
Alaska Packers Association	Loring.
	Wrangell.
Alaska Sanitary Packing Co	Cape Fanshaw.
Libby, McNeill & Libby	Klawak.
Nakat Packing Corporation, The	Ketchikan.
Pacific American Fisheries, Inc	Excursion Inlet.
	Kasaan.
	Ketchikan.
	Port Walter.
	Santa Ana.
Karl Thiele	Lake Bay.
Central Alaska:	
Alaska Packers Association	Chignik.
	Kasilof.
Anderson Mercantile Co., Inc	Deep Creek.
W. G. Culver	Point McManus.
General Fish Co	Anchorage.

Central Alaska—Continued.	
Gustan & Vogel	Point Possession.
North Coast Packing Co	Ninilchik.
Northern Light Packing Co	Mountain Slough.
Pacific American Fisheries, Inc	Chignik. Kenai. Unakwik Inlet.
Point Possession Fish Co	Point Possession.
Redoubt Bay Packing Co	Redoubt Bay.
E. Sandvik	Swansons Creek.
Seward Fisheries, Inc	Seward.
Harvey J. Smith	West Foreland.
Spur Fish Corporation	Nikishka Bay.
Strand-Jensen Fisheries Co	Cordova.
Sunset Packing Co	Otter Creek.
John Wik	Kenai.
Jake Young	Port Chatham.
Western Alaska:	
Alaska Packers Association	Naknek River.
Herendeen Bay Consolidated Canneries	Herendeen Bay.
Pacific American Fisheries, Inc	Naknek River.
Red Salmon Canning Co	Do.

TOTAL CANNERIES OPERATED

One hundred and seventeen canneries were operated in Alaska in 1936—46 in southeast, 47 in central, and 24 in western Alaska—which is an increase of 1 for the southeast, 2 for the central, and 15 for the western district, a net increase of 18 plants over the number operated in 1935. The floating canneries *La Merced*, of the Alaska Southern Packing Co., *Memnon*, of the Columbia River Packers Association, and *International*, of the International Packing Co., were operated in both central and western Alaska, but all are credited to the central district.

Companies that canned salmon in Alaska, number and location of canneries operated, and number of traps owned by each, 1936

[New canneries indicated by (*)]

Company	Canneries		Traps		
	Number	Location	Driven	Floating	Total
Southeast Alaska:					
Alaska Pacific Salmon Co	4	Kake		11	11
		Ketchikan	3	7	10
		Port Althorp		19	19
		Rose Inlet		9	9
Annette Island Canning Co	1	Metlakatla	1	7	8
A R B Packing Co	1	Wrangell			
Balcom-Payne Fisheries, Inc	1	Ketchikan			
Beegle Packing Co	1	do	2	2	4
Berg Packing Co	1	do			
Consolidated Fisheries	1	Excursion Inlet	1	12	13
Deep Sea Salmon Co	1	Skowl Arm		10	10
Diamond K Packing Co	1	Wrangell	2	5	7
Douglas Fisheries Co., Inc	1	Douglas			
Fidalgo Island Packing Co	2	Bay of Pillars	5		5
		Ketchikan	3	2	5
Haines Packing Co	1	Letnikof Cove			
P. E. Harris & Co	1	Hawk Inlet		7	7
Hood Bay Canning Co	1	Hood Bay		4	4
Hydaburg Fisheries, Inc	1	Hydaburg			
Icy Straits Salmon Co	1	Hoonah			
Independent Salmon Canneries, Inc	1	Ketchikan		1	1
Ketchikan Packing Co	1	do		2	2
Lane Bros	1	Moira Sound			
Libby, McNeill & Libby	4	Craig	1	8	9
		George Inlet		6	6
		Taku Harbor	5	9	14
		Yakutat			

Companies that canned salmon in Alaska, number and location of canneries operated, and number of traps owned by each, 1936—Continued

Company	Canneries		Traps		
	Number	Location	Driven	Floating	Total
Southeast Alaska—Continued.					
Lindenberger Packing Co.	1	Craig			
Nakat Packing Corporation, The	3	Hidden Inlet		6	6
		Union Bay		6	6
		Waterfall		9	9
New England Fish Co.	3	Chatham		5	5
		Ketchikan		5	5
		Noyes Island		6	6
Ocean Packing Co.	2	Klawak		1	1
Pacific American Fisheries, Inc.	1	Ketchikan [1]	3	9	12
		Petersburg	3	4	7
Peril Straits Packing Co.	1	Todd		6	6
Pyramid Packing Co., Inc.	1	Sitka		4	4
Red Salmon Packers Association	1	Sitka (floating)			
Scow Bay Packing Co.	1	Scow Bay	1	3	4
Seaport Salmon Co.	1	Ketchikan*			
Sebastian Stuart Fish Co.	1	Tyee		6	6
Superior Packing Co.	1	Tenakee		5	5
Ward's Cove Packing Co.	1	Ward Cove		4	4
Wrangell Packing Co.	1	Wrangell		3	3
Central Alaska:					
Alaska Native Consolidated Canning Co.	1	Sand Point Village			
Alaska Pacific Salmon Co.	2	Drier Bay		4	4
		Sand Point	3		3
Alaska Packers Association	2	Chignik	2		2
		Karluk	3		3
Alaska Red Salmon Packers, Inc.	1	Carmel			
Alaska Southern Packing Co.	1	Ikatan Bay and Kupreanof Harbor (floating).	1		1
Alaska Year-Round Canneries Co.	1	Seldovia	4		4
Aleutian Fishing & Packing Co.	1	Sand Point*	2		2
Anchor Line Packing Co.	1	Katnu River and Nikiska Bay (floating).*			
Chignik Packing Co.	1	Chignik			
Columbia River Packers Association	1	Chignik [1]	4		4
		Ikatan Bay, and Fox Island (floating).			
Cook Inlet Packing Co.	1	Seldovia	7		7
Copper River Packing Co.	1	McClure Bay		5	5
Herbert T. Domenici	1	Uyak			
Emard Packing Co.	1	Anchorage	5		5
Fidalgo Island Packing Co.	1	Fort Graham	8		8
General Fish Co.		Anchorage [1]	2		2
W. R. Gilbert Co., Inc.	1	Point Whitshed			
Glacier Sea Foods Co.	1	Cordova			
Grimes Packing Co.	1	Uzinki			
P. E. Harris & Co.	1	False Pass	8		8
International Packing Co.	1	Ikatan Bay, Ivanof Bay, and Unga Spit (floating).			
Kadiak Fisheries Co.	2	Kodiak	5		5
		Shearwater Bay			
Kustatan Packing Co.	1	Anchorage	2		2
Libby, McNeil & Libby	1	Kenai	9		9
New England Fish Co.	1	Cordova	4		4
A. N. Nilson	1	Portlock			
Ninilchik Packing Co.	1	Ninilchik	2		2
North Pacific Sea Foods Co.	1	Fort Liscum			
Pacific American Fisheries, Inc.	5	Alitak	6		6
		Chignik [1]	2		2
		King Cove	14		14
		Squaw Harbor	2		2
Pioneer Canneries, Inc.	1	Cordova	2	1	3
Pioneer Sea Foods Co.	1	Orca		3	3
Premier Salmon Co.	1	Stevens Creek	2	1	3
Puget & Alaska Canning Co.	1	Seldovia			
San Juan Fishing & Packing Co.	2	Port San Juan	2	2	4
		Uganik Bay	4		4
Sandvik Hand Cannery	1	Uganik Village			
Shelikof Packing Co., Inc.	1	Zachar Bay			
Shepard Point Packing Co.	2	Port Ashton		1	1
		Shepard Point		8	8
Snug Harbor Packing Co.	1	Snug Harbor	8		8
Surf Canneries, Inc.	1	Kukak Bay			
Uganik Fisheries, Inc.	1	Uganik	3		3
Washington Fish & Oyster Co., Inc.	1	Port Williams			

[1] Traps only were operated, the fish being packed at other canneries.

Companies that canned salmon in Alaska, number and location of canneries operated, and number of traps owned by each, 1936—Continued

Company	Canneries		Traps		
	Number	Location	Driven	Floating	Total
Western Alaska:					
Alaska Packers Association	7	Egegik River Kvichak Bay (2) Naknek River (2) Nushagak Bay Ugashik River			
Alaska Salmon Co.	1	Wood River			
Alaska Southern Packing Co.	1	Port Moller (floating)			
Bristol Bay Packing Co.	1	Kvichak River			
Columbia River Packers Association	2	Nushagak Port Moller (floating)			
International Packing Co.	1	Port Moller (floating)			
Libby, McNeil & Libby	6	Egegik River Ekuk Koggiung Libbyville Lockanok Nushagak			
Lowe Trading Co.	1	Nushagak			
Nakat Packing Corporation, The	1	Nakeen			
Pacific American Fisheries, Inc.	3	Naknek River Nushagak River Port Moller			
Red Salmon Canning Co.	2	Naknek River Ugashik River			
Western Pacific Packing Co.	1	Egegik River (floating)			

LOSSES AND DISASTERS

Reported property losses in the Alaska fisheries in 1936 amounted to $852,303, most of which pertained to the salmon industry. Of this amount, $543,224 represented the loss of the plant of the Bristol Bay Packing Co. on Kvichak River and a considerable part of the season's pack of salmon, when the cannery buildings were burned down on July 7. The work of rebuilding was begun in the fall, and it is expected that a new five-line cannery will be in operation by the company next season. Another plant in the Bristol Bay region, that of the Red Salmon Canning Co. at Ugashik, was destroyed by fire on February 15, with a loss of $63,197. Construction of a modern cannery to replace it was completed before commercial fishing began, and the new plant, equipped with two lines of high-speed machinery, was operated during the season. Other losses in western Alaska, consisting of boats, gill nets, anchors, and miscellaneous supplies, amounted to $78,631, the largest single item being the whaling steamer *Westport*, valued at $59,000.

Two plants in central Alaska, together with equipment, fishing apparatus, and part of the season's pack, were destroyed by fire in September—the salmon and clam cannery of the Surf Canneries, Inc., at Kukak Bay, with a loss of $93,667, and the salmon cannery of the North Pacific Sea Foods Co. at Fort Liscum, with a loss of $47,906. Before the end of the month the latter company started rebuilding at Swanport, on Port Valdez, a short distance west of the former location. Other losses in central Alaska, chiefly boats and fishing gear, amounted to $10,048.

In southeast Alaska the total reported losses amounted to $15,630, consisting of a bunkhouse and other small buildings, and various fishing apparatus and equipment.

In addition to the foregoing, the floating plant *Santa Flavia*, of the Associated Fishermen of Alaska, which had been operated on the Nushagak River in recent years by the Lowe Trading Co., was badly damaged by fire at Seattle on April 7. As the cost of repairs would be prohibitive, the vessel was condemned.

Thirty-one lives were lost during the year—8 in southeast Alaska, 9 in central, and 14 in western Alaska. In the southeastern district three fishermen, one shoresman, and three transporters were drowned, and one fisherman died of disease. One fisherman and two transporters in central Alaska were drowned, one fisherman committed suicide, and one fisherman, three shoresmen, and one transporter died of disease. In western Alaska two fishermen and one shoresman were drowned, two fishermen and seven shoresmen died of disease, and two shoresmen were killed in accidents.

STATISTICS

One hundred and seventeen canneries were operated in Alaska in 1936, or 18 more than in the previous year. Employment was given to 25,221 persons, as compared with 17,529 in 1935, an increase of 7,692. White employees increased 4,238, natives 720, Chinese 253, Japanese 269, Filipinos 1,371, Mexicans 598, Kanakas 37, Puerto Ricans 119, Negroes 62, and miscellaneous (Koreans, Chileans, Peruvians, etc.) 25.

The total pack of canned salmon was 8,437,603 cases, valued at $44,751,633. This is an increase of 64 percent in quantity and about 74 percent in value over the production in 1935, when the pack amounted to 5,133,122 cases, valued at $25,768,136. The greater proportionate increase in value was owing chiefly to the fact that red salmon comprised a larger percentage of the total pack in 1936 than in the preceding year. There was, however, a general decline in the average price per case, only the cohos showing a slight increase as compared with the value in 1935.

The output of canned salmon in southeast Alaska increased from 3,054,038 cases in 1935 to 4,076,717 cases in 1936, or 33 percent; in central Alaska from 1,802,231 cases to 2,869,681 cases, or 59 percent; and in western Alaska from 276,853 cases to 1,491,205 cases, or nearly 439 percent. By species, in Alaska as a whole the pack of cohos increased from 190,177 cases in 1935 to 222,300 cases in 1936, or 17 percent; chums, from 852,928 cases to 1,101,083 cases, or 29 percent; pinks, from 3,244,066 cases to 4,559,794 cases, or 41 percent; kings, from 36,405 cases to 51,884 cases, or 43 percent; and reds, from 809,546 cases to 2,502,542 cases, or 209 percent.

Details are included in the following tables to show comparison of the 1936 pack with the average for the 5 preceding years, 1931 to 1935, by cases of each species and by districts. All species show gains over the 5-year average, the increase ranging from approximately 3 percent for king salmon to 59 percent for pinks. By districts, the pack in 1936 increased approximately 55 percent over the 5-year average in southeast Alaska, approximately 61 percent in the central district, and approximately 17 percent in western Alaska, a net increase of 48 percent over the 5-year average for all of Alaska.

Persons engaged, wages paid, and operating units of Alaska salmon canning industry, 1936

Item	Southeast Alaska	Central Alaska	Western Alaska	Total
PERSONS ENGAGED				
Fishermen:				
Whites	1,783	1,443	2,085	5,311
Natives	1,599	727	587	2,913
Filipinos	7		3	10
Mexicans	2			2
Kanakas		2		2
Miscellaneous [1]			1	1
Total	3,391	2,172	2,676	8,239
Shoresmen:				
Whites	2,335	1,675	1,812	5,822
Natives	1,822	793	140	2,755
Chinese	110	235	307	652
Japanese	525	377	277	1,179
Filipinos	1,586	1,371	773	3,730
Mexicans	7	9	604	620
Puerto Ricans	3	9	108	120
Kanakas	9	6	22	37
Negroes	25	4	34	63
Miscellaneous [1]	8	2	35	45
Total	6,430	4,481	4,112	15,023
Transporters:				
Whites	784	624	454	1,862
Natives	18	70	2	90
Chinese		4		4
Japanese	1	1		2
Filipino		1		1
Total	803	700	456	1,959
Total:				
Whites	4,902	3,742	4,351	12,995
Natives	3,439	1,590	729	5,758
Chinese	110	239	307	656
Japanese	526	378	277	1,181
Filipinos	1,593	1,372	776	3,741
Mexicans	9	9	604	622
Puerto Ricans	3	9	108	120
Kanakas	9	8	22	39
Negroes	25	4	34	63
Miscellaneous [1]	8	2	36	46
Grand total	10,624	7,353	7,244	25,221
Wages paid shoresmen	$1,752,884	$1,432,638	$1,769,135	$4,954,657
Wages paid transporters	357,784	346,041	235,000	938,825
OPERATING UNITS				
Plants:				
Shore canneries	45	43	23	111
Floating canneries—				
Power vessels	1	3		4
Net tonnage	245	5,849		6,094
Barges		1	1	2
Net tonnage		34	494	528
Total plants operated	46	47	24	117
Vessels:				
Power, over 5 tons	585	213	91	889
Net tonnage	10,299	9,996	20,433	40,728
Launches	199	201	27	427
Power dories	31	84	11	126
Gill-net boats	131	248	1,100	1,479
Seine skiffs	313	220		533
Other rowboats and skiffs	719	567	249	1,535
Lighters and scows	207	200	158	565
Houseboats	20	3	36	59
Pile drivers	26	32	18	76
Pile pullers	2	6		8
Rigging scows	35	11		46
Apparatus:				
Purse seines	546	184	4	734
Fathoms	95,485	22,120	1,000	118,605
Beach seines	6	188		194
Fathoms	600	17,839		18,439
Gill nets	316	1,477	1,902	3,695
Fathoms	25,100	83,895	176,335	285,330
Traps, driven	30	139		169
Traps, floating	254	30		284

[1] Koreans, Chileans, Peruvians, etc.

Output and value of canned salmon in Alaska in 1936 [1]

Product	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Cases	Value	Cases	Value	Cases	Value	Cases	Value
Coho, or silver:								
½-pound flat	6,427	$59,030	882	$7,761			7,309	$66,791
1-pound flat	2	14	1,333	10,082			1,335	10,096
1-pound tall	128,293	827,483	83,792	531,146	1,571	$10,552	213,656	1,369,181
Total	134,722	886,527	86,007	548,989	1,571	10,552	222,300	1,446,068
Chum, or keta:								
½-pound flat	686	3,763	814	4,551			1,500	8,314
1-pound tall	777,653	2,799,016	295,374	1,034,318	26,556	97,245	1,099,583	3,930,579
Total	778,339	2,802,779	296,188	1,038,869	26,556	97,245	1,101,083	3,938,893
Pink, or humpback:								
½-pound flat	35,198	211,367	2,208	13,379			37,406	224,746
1-pound tall	2,889,946	11,456,128	1,601,376	6,174,077	31,066	123,303	4,522,388	17,753,508
Total	2,925,144	11,667,495	1,603,584	6,187,456	31,066	123,303	4,559,794	17,978,254
King, or spring:								
½-pound flat	4,130	40,084	6,258	72,118			10,388	112,202
1-pound flat	1,102	10,839	4,414	43,051	206	1,886	5,722	55,776
1-pound tall	15,273	103,563	16,401	113,381	4,100	27,622	35,774	244,566
Total	20,505	154,486	27,073	228,550	4,306	29,508	51,884	412,544
Red, or sockeye:								
½-pound flat	44,127	477,055	77,693	949,791	15,399	184,794	137,219	1,611,640
1-pound flat	13,591	135,910	102,492	935,832	2,007	18,589	118,090	1,090,331
1-pound tall	160,289	1,293,449	676,644	5,371,035	1,410,300	11,609,419	2,247,233	18,273,903
Total	218,007	1,906,414	856,829	7,256,658	1,427,706	11,812,802	2,502,542	20,975,874
Grand total	4,076,717	17,417,701	2,869,681	15,260,522	1,491,205	12,073,410	8,437,603	44,751,633

[1] Cases containing ½-pound cans have been reduced ½ in number, and thus, for the purpose of affording fair comparison, all are put upon the basis of 48 1-pound cans to the case.

Output of canned salmon in Alaska, in cases, 1931 to 1936 [1]

BY SPECIES

Product	1931	1932	1933	1934	1935	Average for 5-year period, 1931-35	1936	Percentage increase or decrease in 1936, as compared with 5-year average
Coho, or silver:								
½-pound flat	9,962	3,442	3,367	5,785	6,822	5,876	7,309	+24.39
1-pound flat	2,902	1,763	4,657	8,283	2,833	4,087	1,335	−67.34
1-pound tall	157,014	142,970	154,544	222,049	180,522	171,420	213,656	+24.64
Total	169,878	148,175	162,568	236,117	190,177	181,383	222,300	+22.56
Chum, or keta:								
½-pound flat	4,242	624	658	2,298	1,647	1,894	1,500	−20.80
1-pound flat	35					7		−100.00
1-pound tall	529,579	819,932	658,131	738,343	851,281	719,453	1,099,583	+52.84
Total	533,856	820,556	658,789	740,641	852,928	721,354	1,101,083	+52.64
Pink, or humpback:								
½-pound flat	46,524	7,166	14,857	28,793	44,560	28,380	37,406	+31.80
1-pound flat	4,410			1,668	687	1,353		−100.00
1-pound tall	2,902,926	2,105,979	2,167,694	3,793,732	3,198,819	2,833,830	4,522,388	+59.59
Total	2,953,860	2,113,145	2,182,551	3,824,193	3,244,066	2,863,563	4,559,794	+59.23
King, or spring:								
½-pound flat	13,208	11,713	9,955	9,983	13,462	11,664	10,388	−10.94
1-pound flat	16,721	14,800	10,021	10,214	6,520	11,655	5,722	−50.91
1-pound tall	21,938	43,013	21,437	32,666	16,423	27,096	35,774	+32.03
Total	51,867	69,526	41,413	52,863	36,405	50,415	51,884	+2.91
Red, or sockeye:								
½-pound flat	58,178	47,707	53,638	88,051	87,498	67,015	137,219	+104.76
1-pound flat	41,002	75,524	60,052	73,430	57,693	61,540	118,090	+91.89
1-pound tall	1,595,098	1,979,850	2,066,593	2,466,535	664,855	1,754,486	2,247,233	+28.08
Total	1,694,278	2,103,081	2,180,283	2,628,016	809,546	1,883,041	2,502,542	+32.90
Grand total	5,403,739	5,254,483	5,225,604	7,481,830	5,133,122	5,699,756	8,437,603	+48.08

[1] The number of cases has been put upon the common basis of 48 1-pound cans per case.

Output of canned salmon in Alaska, in cases, 1931 to 1936—Continued

BY DISTRICTS AND SPECIES

Product	1931	1932	1933	1934	1935	Average for 5-year period, 1931–35	1936	Percentage increase or decrease in 1936, as compared with 5-year average
Southeast Alaska:								
Coho, or silver	88,455	87,038	95,805	158,527	142,493	114,464	134,722	+17.70
Chum, or keta	274,248	579,443	424,861	394,212	540,948	442,742	778,339	+75.80
Pink, or humpback	2,013,442	1,379,006	1,478,013	2,622,362	2,200,060	1,938,577	2,925,144	+50.89
King, or spring	14,896	23,624	8,146	15,594	11,108	14,673	20,505	+39.75
Red, or sockeye	147,895	138,942	81,126	104,398	159,429	126,358	218,007	+72.53
Total	2,538,936	2,208,053	2,087,951	3,295,093	3,054,038	2,636,814	4,076,717	+54.61
Central Alaska:								
Coho, or silver	81,331	60,674	65,307	76,371	47,461	66,229	86,007	+29.86
Chum, or keta	193,053	147,410	207,879	313,233	302,123	232,740	296,188	+27.26
Pink, or humpback	940,418	724,051	704,538	1,199,872	1,044,002	922,576	1,603,584	+73.82
King, or spring	27,599	32,302	23,786	28,472	24,462	27,324	27,073	−.92
Red, or sockeye	439,153	660,161	484,484	709,470	384,183	535,490	856,829	+60.01
Total	1,681,554	1,624,598	1,485,994	2,327,418	1,802,231	1,784,359	2,869,681	+60.82
Western Alaska:								
Coho, or silver	92	463	1,456	1,219	223	691	1,571	+127.35
Chum, or keta	66,555	93,703	26,049	33,196	9,857	45,872	26,556	−42.11
Pink, or humpback		10,088		1,959	4	2,410	31,066	+1,189.05
King, or spring	9,372	13,600	9,481	8,797	835	8,417	4,306	−48.84
Red, or sockeye	1,107,230	1,303,978	1,614,673	1,814,148	265,934	1,221,193	1,427,706	+16.91
Total	1,183,249	1,421,832	1,651,659	1,859,319	276,853	1,278,583	1,491,205	+16.63
Grand total	5,403,739	5,254,483	5,225,604	7,481,830	5,133,122	5,699,756	8,437,603	+48.03

Relative importance of each species of canned salmon within each district in 1936

District	Coho	Chum	Pink	King	Red	Total, all species
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Southeast Alaska	3.3	19.1	71.8	0.5	5.3	100.0
Central Alaska	3.0	10.3	55.9	.9	29.9	100.0
Western Alaska	.1	1.8	2.1	.3	95.7	100.0
All Alaska	2.6	13.1	54.0	.6	29.7	100.0

Relative importance of each district in the production of each species of salmon canned in 1936

District	Coho	Chum	Pink	King	Red	Total, all species
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Southeast Alaska	60.6	70.7	64.1	39.5	8.7	48.3
Central Alaska	38.7	26.9	35.2	52.2	34.2	34.0
Western Alaska	.7	2.4	.7	8.3	57.1	17.7
Total	100.0	100.0	100.0	100.0	100.0	100.0

Average annual price per case of 48 1-pound cans of salmon, 1926 to 1936

Product	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936
Coho, or silver	$8.40	$8.51	$7.12	$7.59	$8.26	$6.51	$4.12	$5.20	$5.23	$6.40	$6.51
Chum, or keta	5.01	5.47	6.06	5.35	3.60	3.19	2.79	4.12	3.65	3.83	3.58
Pink, or humpback	5.39	5.87	6.56	6.06	4.17	3.46	3.14	4.52	4.10	4.14	3.94
King, or spring	10.37	11.25	11.13	11.92	13.32	9.40	5.46	7.51	6.85	8.70	7.95
Red, or sockeye	9.89	12.08	9.41	10.71	12.57	9.20	5.61	6.71	6.72	9.32	8.38

PACK IN CERTAIN DISTRICTS

Statistics of the salmon pack are again presented for subdivisions of the three main districts of Alaska, and comparison is made with similar statistics for 1935. Where the pack at a given cannery is made up of fish from more than one district, as in the case of that at certain Cordova canneries which pack fish caught both in Prince William Sound and in the Copper River area or at various plants in southeastern Alaska which draw for their supply on the catch of more than one district, due segregation has been made in order to credit each district with the pack from salmon caught therein. These districts are described as follows:

WESTERN ALASKA

Bristol Bay.—The Bering Sea shore, east and north of the Ugashik River.
Port Moller and Herendeen Bay.—Port Moller, Herendeen Bay, and Nelson Lagoon.

CENTRAL ALASKA

Ikatan-Shumagin Islands.—False Pass, Ikatan Bay, King Cove, and the Shumagin Islands.
Chignik.—Canneries located at Chignik.
Kodiak-Afognak Islands.—Kodiak, Spruce, and Raspberry Islands.
Cook Inlet.—The shores of Cook Inlet.
Prince William Sound.—Resurrection Bay to Point Whitshed.
Copper and Bering Rivers.—Point Whitshed to Bering River.

SOUTHEASTERN ALASKA

Yakutat and Dry Bay.—Yakutat Bay to and including Dry Bay.
Icy Strait-Lynn Canal.—West coast of Baranof and Chichagof Islands, the shores of Cross Sound, Icy Strait, Lynn Canal, and Stephens Passage, south to Taku Harbor.
Chatham Strait-Frederick Sound.—Both shores of Chatham Strait and its bays from Point Augusta to Cape Ommaney, and through Frederick Sound and its bays northward to Taku Harbor, including Kake.
Sumner Strait-Dixon Entrance.—Southward from Petersburg and eastward from Port Beauclerc to Cape Chacon and Dixon Entrance, and including all canneries on the mainland and intervening islands from the Stikine River to Portland Canal.
West coast, Prince of Wales Island.—Territory west and south of a line from Cape Chacon to Point Baker and Cape Ommaney.

Pack of canned salmon in Alaska in 1936, by districts [1]

District	Coho	Chum	Pink	King	Red	Total	Percentage increase or decrease from 1935
	Cases	*Cases*	*Cases*	*Cases*	*Cases*	*Cases*	
Bristol Bay	1,571	25,045	30,773	4,092	1,388,776	1,450,257	+607.08
Port Moller and Herendeen Bay		1,511	293	214	38,930	40,948	+7.87
Ikatan-Shumagin Islands	27,226	199,222	512,740	3,678	276,548	1,019,414	+92.00
Chignik	4,643	10,278	35,917	108	100,499	151,445	+52.86
Kodiak-Afognak Islands	17,548	39,248	394,025	620	202,983	654,424	−6.91
Cook Inlet	31,345	23,780	51,350	19,723	188,063	314,261	+79.12
Prince William Sound	5,245	23,660	609,537	431	13,440	652,313	+137.08
Copper and Bering Rivers			15	2,513	75,296	77,824	+318.45
Yakutat and Dry Bay	13,609	105	9,737	1,102	22,545	47,098	+9.61
Icy Strait-Lynn Canal	20,791	183,036	349,700	5,583	69,191	628,301	+83.86
Chatham Strait-Frederick Sound	17,162	213,543	409,094	2,386	15,941	658,126	+26.10
Sumner Strait-Dixon Entrance	56,611	265,676	1,449,927	1,380	82,909	1,856,503	+7.66
West Coast, Prince of Wales Island	26,549	115,979	706,680	10,054	27,421	886,689	+109.59
Total	222,300	1,101,083	4,559,794	51,884	2,502,542	8,437,603	+64.38

[1] Pack reduced to the basis of 48 1-pound cans per case.

MILD CURING

Operations in the salmon mild-curing industry were on about the same scale as in the preceding year. As usual, the bulk of the product was prepared in southeast Alaska, partly in conjunction with other branches of the fisheries, while the western district contributed a limited output.

The registration by the Bureau of trolling boats in southeast Alaska was incomplete, and it has been necessary therefore to estimate, in part, the total number operated.

Twenty-one plants were engaged in the industry and 1,513 persons were employed, as compared with 24 plants and 1,465 persons in 1935.

The total production of mild-cured salmon was 4,483,200 pounds, valued at $798,564, an increase of 40,800 pounds in quantity, and a decrease of $75,129 in value, from the output of the previous year.

Persons engaged, wages paid, and operating units, Alaska salmon mild-curing industry, 1936

Item	Southeast Alaska	Western Alaska	Total
PERSONS ENGAGED			
Fishermen:			
Whites	1,045	2	1,047
Natives	116	29	145
Chinese	2		2
Filipinos	5		5
Total	1,168	31	1,199
Shoresmen:			
Whites	173	1	174
Natives	14	47	61
Total	187	48	235
Transporters:			
Whites	73	1	74
Natives		5	5
Total	73	6	79
Grand total	1,428	85	1,513
Wages paid shoresmen	$111,227	$5,853	$117,080
Wages paid transporters	$47,285	$830	$48,115
OPERATING UNITS			
Plants:			
Shore	15	4	19
Floating:			
Barges	2		2
Net tonnage	300		300
Total plants operated	17	4	21
Vessels:			
Power, over 5 tons	233	3	236
Net tonnage	2,297	78	2,375
Launches	659	2	661
Power dory		1	1
Gill-net boats		15	15
Rowboats and skiffs	150		150
Lighters and scows	10	1	11
Apparatus:			
Gill nets		27	27
Fathoms		1,395	1,395
Lines	3,580		3,580
Wheels		7	7

Products of Alaska salmon mild-curing industry in 1936

Product	Southeast Alaska		Western Alaska		Total	
	Pounds	Value	Pounds	Value	Pounds	Value
Coho, or silver	264,000	$26,875			[1] 264,000	$26,875
Chum, or keta	232,800	10,470			[2] 232,800	10,470
King, or spring	[3] 3,792,800	737,019	[4] 193,600	$24,200	[5] 3,986,400	761,219
Total	4,289,600	774,364	193,600	24,200	4,483,200	798,564

[1] 330 tierces. [2] 291 tierces. [3] 4,741 tierces. [4] 242 tierces. [5] 4,983 tierces.

PICKLING

For the first time in many years the output of pickled salmon in Alaska showed no strong fluctuation as compared with that for the preceding season. In western Alaska there was some curtailment, but this was largely offset by increased packs in the southeastern and central districts.

Most of the production in southeast Alaska was from the Yakutat district, while in central Alaska the Cook Inlet area rivaled the Ikatan-Shumagin region in the amount prepared, with the Kodiak, Prince William Sound, and Chignik areas also supplying part of the output, in the order named. The bulk of the pickled salmon in western Alaska came from the Bristol Bay region, where the preparation of this product was carried on partly in conjunction with canning operations. There was also a limited amount of pickled salmon from the Yukon-Kushokwim area and from Port Heiden.

One hundred and six persons were employed in the industry—a decrease of 17 from the number reported for the previous year. The total output was 872,915 pounds, valued at $96,510, as compared with 896,175 pounds valued at $95,158 in 1935.

Persons engaged, wages paid, and operating units, Alaska salmon-pickling industry, 1936

Item	Southeast Alaska	Central Alaska	Western Alaska	Total
PERSONS ENGAGED				
Fishermen:				
Whites	7	41	10	58
Natives		7	13	20
Total	7	48	23	78
Shoresmen:				
Whites		1	8	9
Natives		8	11	19
Total		9	19	28
Grand total	7	57	42	106
Wages paid shoresmen		$799	$2,747	$3,546
OPERATING UNITS				
Plants, shore	3	26	7	36
Vessels:				
Power, over 5 tons	1	3		4
Net tonnage	27	33		60
Launches		9		9
Power dories		11		11
Gill-net boats	5	4	2	11
Seine skiffs		13		13
Rowboats and skiffs	1	16	7	24
Lighters and scows	1	1	1	3
Apparatus:				
Purse seine		1		1
Fathoms		100		100
Beach seines		22		22
Fathoms		1,600		1,600
Gill nets	11	45	14	70
Fathoms	330	1,795	945	3,070

Products of Alaska salmon-pickling industry in 1936

Product	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Coho, or silver	91,900	$7,020	165,850	$15,094	49,215	$4,847	306,965	$26,961
Chum, or keta					2,900	174	2,900	174
Pink, or humpback			400	32	8,500	510	8,900	542
King, or spring			32,700	3,823	22,400	2,513	55,100	6,336
Red, or sockeye	12,400	1,550	115,500	13,580	371,150	47,367	499,050	62,497
Total	104,300	8,570	314,450	32,529	454,165	55,411	872,915	96,510

FRESH SALMON

Twenty-four firms in southeast Alaska, most of which were engaged primarily in other branches of the fisheries, reported an output of fresh salmon. The total products amounted to 4,690,507 pounds, valued at $369,442, as compared with 2,951,636 pounds valued at $168,427 in 1935—an increase of 59 percent in quantity and 119 percent in value. These figures do not include salmon for fox feed, which is shown under miscellaneous salmon products.

Products of the Alaska fresh-salmon industry in 1936

Species	Pounds	Value
Coho, or silver	1,967,543	$101,410
Chum, or keta	43,051	860
Pink, or humpback	2,500	75
King, or spring	2,677,413	267,097
Total	4,690,507	369,442

FREEZING

The freezing of salmon in Alaska was largely incidental to the mild-curing industry and was carried on only in the southeastern district. One cold-storage plant whose chief output was frozen salmon gave employment to 18 white shoresmen. The total output was 5,574,914 pounds, valued at $374,330, as compared with 4,266,834 pounds valued at $270,178 in 1935—an increase of about 31 percent in quantity and 39 percent in value.

Salmon that were frozen for use as bait in the halibut fishery are not included in the above figures but are shown under miscellaneous salmon products.

Products of the Alaska frozen-salmon industry in 1936

Species	Pounds	Value
Coho, or silver	2,805,468	$195,404
Chum, or keta	771,468	22,418
Pink, or humpback	51,128	1,749
King, or spring	1,946,054	154,684
Red, or sockeye	796	75
Total	5,574,914	374,330

DRY-SALTED, DRIED, AND OTHER MISCELLANEOUS SALMON PRODUCTS

Two operators in southeast Alaska and one in the western district reported the dry-salting of salmon, the total production amounting to 30,100 pounds, valued at $4,035. Seven white fishermen were employed in these operations in southeast Alaska. In the central district one of the canneries on Cook Inlet prepared 75 cases, or 3,600 pounds, of fish pudding, Norwegian style, valued at $500. The fish used for this purpose were mostly chums, with a small amount of cohos and pinks. Other miscellaneous products consisted of 439,238 pounds of frozen salmon, valued at $4,535, for use as bait in the halibut fishery, and 44,980 pounds of fresh salmon for fox feed, valued at $430.

In the fishery of the Yukon, Tanana, and Kuskokwim Rivers, which is carried on principally by natives, 1,362,000 pounds of dried chum salmon and 80,000 pounds of dried cohos were prepared, valued at $54,480 and $3,200, respectively. Nine whites and 692 natives engaged in the fishery and the apparatus used consisted of 290 wheels, 387 gill nets of 5,878 fathoms, 2 dories, and 50 rowboats and skiffs.

Production of dry-salted, dried, and other miscellaneous salmon products in Alaska in 1936

Product	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Dry-salted:								
Coho, or silver	10,200	$1,528					10,200	$1,528
King, or spring	2,400	341			9,600	$960	12,000	1,301
Red, or sockeye	7,900	1,206					7,900	1,206
Total	20,500	3,075			9,600	960	30,100	4,035
Dried:								
Coho, or silver					80,000	3,200	80,000	3,200
Chum, or keta					1,362,000	54,480	1,362,000	54,480
Total					1,442,000	57,680	1,442,000	57,680
Fish pudding, Norwegian style			3,600	$500			3,600	500
Frozen for bait:								
Coho, or silver	1,048	26					1,048	26
Chum, or keta	292,536	2,925					292,536	2,925
Pink, or humpback	140,908	1,409					140,908	1,409
King, or spring	840	8					840	8
Red, or sockeye	3,906	167					3,906	167
Total	439,238	4,535					439,238	4,535
Fresh for fox feed:								
Coho, or silver			30,980	310			30,980	310
Pink, or humpback			14,000	120			14,000	120
Total			44,980	430			44,980	430
Grand total	459,738	7,610	48,580	930	1,451,600	58,640	1,959,918	67,180

BYPRODUCTS

A byproducts plant in southeast Alaska was engaged in the manufacture of salmon meal and oil, giving employment to 20 white shoresmen and 2 white transporters during the season. Two salmon canneries in central Alaska also prepared limited amounts of byproducts in connection with their canning operations. The total production was 1,554,000 pounds of fertilizer valued at $24,579, and 45,435 gallons of oil valued at $13,984, as compared with 1,171,900 pounds of fertilizer valued at $16,763 and 49,000 gallons of oil valued at $15,200 in 1935—an increase of about 33 percent in the output of fertilizer and a decrease of 7 percent in the amount of oil.

HERRING

Operations in the herring fishery in 1936 were marked by a sharp decline in southeast and western Alaska and an expansion in the central district, with the result that the total quantity of herring products was somewhat short of that for the preceding year, although well above the general average.

The weak market for herring oil and the problem of meeting higher prices demanded by the fishermen caused three firms in southeast

Alaska to keep their saltery and reduction plants closed. Only five plants were in operation in that district, the same number as in 1931 and 1932. The output of meal and oil in southeast Alaska was the smallest since 1924, and the amount of Scotch-cured herring there was the lowest that has been recorded since this method of curing was introduced in the Territory in 1917. This indicates that the decline was due not only to the operation of fewer plants as a result of increased production costs and unfavorable market conditions, but also to a scarcity of herring that were suitable for curing.

In Prince William Sound the herring run was light early in the season but developed into a very heavy run in September, and the plants were operating to capacity for a number of weeks. The run in the Kodiak area was said to be the best in recent years, with the fish showing up well when the season opened on June 15 and continuing in good numbers until the early part of August. In July many boats from Prince William Sound fished in the Kodiak area, making a gross catch of approximately 58,500 barrels. The long haul to Prince William Sound in unusually warm weather did not improve the quality of the fish, and practically the entire amount thus taken was reduced to meal and oil.

In the Aleutian Islands region the herring were not as abundant as in 1935, but they were of very good quality. The Golovin Bay Packing Co. reported that fishing for herring in Golovin Bay was a complete failure, there being no catch whatever.

About 41 percent of the total output of Scotch-cured herring in Alaska in 1936 came from the Kodiak Island area, where the production amounted to 4,750,100 pounds, an increase of more than a million pounds over that for 1935, and the largest pack for any year except 1932, when 5,411,400 pounds were prepared. The production in Prince William Sound dropped from 5,626,500 pounds in 1935 to 3,412,425 pounds, and in the Aleutian Islands region from 3,404,675 pounds to 2,491,450 pounds, these districts supplying 30 percent and 22 percent, respectively, of the total output in 1936. Only 7 percent of the Scotch-cured product came from southeast Alaska, where the production amounted to 759,250 pounds, as compared with 2,187,000 pounds in 1935.

Of the 20 concerns which handled herring in southeast Alaska, 6 were cold-storage plants that froze herring for bait and 8 were engaged solely in the production of bait herring. The following companies operated saltery and reduction plants in this district:

Arentsen & Co	Big Port Walter.
Atlas Packing Corporation	Deep Cove.
Buchan & Heinen Packing Co	Port Armstrong.
Northwestern Herring Co	Port Conclusion.
Storfold & Grondahl Packing Co	Washington Bay.

In central Alaska the Oceanic Fisheries Co. operated its floating saltery, the *Donna Lane*, in the Kodiak area until about the middle of August and then moved it to Prince William Sound, where saltery operations were carried on aboard the vessel in conjunction with reduction operations at the shore plant leased from the Perfection Fisheries, Inc. Two other floating plants were operated in the Kodiak area—the *Rosamond*, belonging to the San Marco Fish Co., and the *John A*, formerly a codfish schooner, which was purchased by the Chatham Strait Fish Co. and converted into a herring saltery.

The Oceanic Fisheries Co. also built and operated a new herring plant on the east shore of Raspberry Island midway between the plants of the Southwestern Herring, Inc., and the Apex Fish Co., at the location known as Port Vita. A new firm, Jacobson Bros., leased the plant at Port Williams, Shuyak Strait, belonging to David Buvick, and the latter operated at Port Hobron. The more important operators in the central district were as follows:

Salteries:

David Buvick	Port Hobron.
Chatham Strait Fish Co	Floating plant.
Jacobson Bros	Port Williams.
Oceanic Fisheries Co., Inc	Floating plant.
San Marco Fish Co	Do.

Saltery and reduction plants:

Apex Fish Co	Port Wakefield.
Chatham Strait Fish Co	Crab Bay.
Evans Bay Packing Co., Inc	Port Benny.
George Hogg & Co	Blue Fox Bay.
Johnson Fisheries Co	Thumb Bay.
Oceanic Fisheries Co., Inc	Thumb Bay and Port Vita.
San Juan Fishing & Packing Co	Port San Juan.
Shepard Point Packing Co	Port Ashton.
Southwestern Herring, Inc	Iron Creek.

Herring packing in the western district was carried on only at Dutch Harbor and Unalaska. The following operators prepared Scotch-cured herring, and a small amount of bloater stock was put up incidentally:

Austnes & Rod	Unalaska.
Campbell & Dougal	Dutch Harbor.
Ed Jacobsen & Co	Do.
Northwestern Herring Co	Do.
Svere Omsund	Unalaska.
Tonnes Pederson	Dutch Harbor.
Polar Packing Co	Do.
Chris Simeon	Do.

Studies concerning the life history and fluctuations in the abundance of the herring populations in Alaska were continued by Edwin H. Dahlgren and an assistant. These studies are centered chiefly in the Chatham Strait fishing area of southeast Alaska, but are producing results that are of fundamental application to the conservation of the herring populations throughout the Territory.

STATISTICAL SUMMARY

There were 1,111 persons engaged in the herring industry in 1936, as compared with 1,339 in 1935. The number of plants decreased from 32 to 27. Products of the fishery were valued at $2,075,632, a decrease of $298,460, or about 13 percent from 1935, when the total value was $2,374,092. Scotch-cured herring decreased from 14,942,750 pounds valued at $808,064 to 11,413,225 pounds valued at $538,211, or about 24 percent in quantity and 33 percent in value. Herring for bait increased from 5,959,475 pounds valued at $50,512 to 6,298,105 pounds valued at $57,200, or about 6 percent in quantity and 13 percent in value. Meal decreased about 6 percent in quantity but increased 46 percent in value, and oil decreased 1 percent in quantity and 15 percent in value.

Persons engaged, wages paid, and operating units, Alaska herring industry, 1936

Item	Southeast Alaska	Central Alaska	Western Alaska	Total
PERSONS ENGAGED				
Fishermen:				
Whites	226	214	19	[a]459
Natives	----------	4	3	7
Total	226	218	22	466
Shoresmen:				
Whites	170	384	42	596
Natives	----------	3	32	35
Total	170	387	74	631
Transporters: Whites	----------	14	----------	14
Grand total	396	619	96	1,111
Wages paid shoresmen	$70,968	$164,034	$17,974	$252,976
Wages paid transporters	----------	23,091	----------	23,091
OPERATING UNITS				
Plants:				
Shore	5	11	8	24
Floating:				
Power vessel	----------	1	----------	1
Net tonnage	----------	1,597	----------	1,597
Sailing vessels	----------	2	----------	2
Net tonnage	----------	1,303	----------	1,303
Total plants operated	5	14	8	27
Vessels:				
Power, over 5 tons	35	34	2	71
Net tonnage	1,100	1,101	11	2,212
Launches	1	----------	2	3
Power dories	----------	----------	4	4
Seine skiffs	13	17	2	32
Other rowboats and skiffs	17	9	10	36
Scows	3	----------	----------	3
Pile driver	----------	1	----------	1
Apparatus:				
Purse seines	36	32	----------	68
Fathoms	5,830	5,288	----------	11,118
Gill nets	----------	----------	33	33
Fathoms	----------	----------	1,271	1,271
Pound seines	8	1	----------	9
Pounds	5	2	----------	7

Products of Alaska herring industry in 1936

Item	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Fresh, for bait	2,649,400	$29,201	4,700	$59	----------	----------	2,654,100	$29,260
Frozen, for bait	3,057,805	21,940	----------	----------	----------	----------	3,057,805	21,940
Pickled, for bait	586,200	6,000	----------	----------	----------	----------	586,200	6,000
Pickled, for food:								
Scotch cure	759,250	36,374	8,162,525	392,093	2,491,450	$109,744	11,413,225	538,211
Norwegian cure	----------	----------	2,125	92	----------	----------	2,125	92
Roused for food (bloater stock)	----------	----------	----------	----------	66,800	11,597	66,800	11,597
Spiced	1,500	125	----------	----------	----------	----------	1,500	125
Meal	11,628,749	223,165	16,756,319	298,849	----------	----------	28,385,068	522,014
Oil	[1] 10,235,302	372,680	[2] 17,785,995	573,713	----------	----------	[3] 28,021,297	946,393
Total	28,918,206	689,485	42,711,664	1,264,806	2,558,250	121,341	74,188,120	2,075,632

[1] 1,364,707 gallons. [2] 2,371,466 gallons. [3] 3,736,173 gallons.

HALIBUT

The voluntary control of production by the halibut fleet was continued in 1936 on practically the same basis as in the preceding year, its advantages being increasingly apparent as the provisions were

more generally adhered to by the various operators. Under this control program the fleet was divided so that some of the vessels began operations with the opening of the season on March 16, others started a week later, and the remainder on March 26. The program also involved catch limits per man per trip, depending upon the area in which fishing was carried on and the port of landing, and a stay in port for 10 days between trips, or longer if trip quotas were exceeded.

As in previous years, operations were also governed by regulations of the International Fisheries Commission, which again established catch quotas for areas 2 and 3 and limited the fishing season to the period from March 16 to November 30, unless quotas were attained in a shorter period. Closing dates for areas 1 and 4 coincided with those in areas 2 and 3, respectively. The quota in area 2 was reached comparatively early, and fishing there was closed on August 10. In area 3 fishing was spread over a longer time, and as a result of unusually favorable weather conditions in October the catch was considerably in excess of the quota when the season was closed on November 3.

For the fifth consecutive season the utilization of the fish livers has been a profitable adjunct of the halibut industry. The growing importance of this product for pharmaceutical use is indicated by the fact that prices paid the fishermen for halibut livers have increased in each successive year, the rate in 1936 being 45 cents a pound, as compared with 12 cents in 1932.

Biological studies of the Pacific halibut were continued by the International Fisheries Commission under the direction of Dr. W. F. Thompson. The schooner *Eagle* was chartered for research work on the spawning banks off Cape St. James in the winter of 1935–36.

STATISTICAL SUMMARY

Five hundred and ninety-four persons were employed in the Alaska halibut fishery in 1936—an increase of 169 over the number reported for the preceding year, and products, exclusive of livers, amounted to 13,566,340 pounds, valued at $889,454. This production represents the total fares of the Alaska halibut fleet, which comprises all American vessels landing more than one-half of their catch in Alaska or British Columbia ports rather than in the States. Landings of halibut, exclusive of livers, in Alaska totaled 8,658,774 pounds valued at $507,484, which include 4,000 pounds valued at $240 landed by Canadian vessels. In 1935 the landings of the Alaska fleet were 9,805,680 pounds, valued at $607,845, and landings in Alaska amounted to 6,382,681 pounds valued at $377,123. Fares of the Alaska fleet in 1936, therefore, increased 38 percent in quantity and 46 percent in value over 1935. The landings in Alaska ports in 1936 increased about 36 percent in quantity and 35 percent in value over the preceding year.

The amount of halibut livers landed by the Alaska fleet was not reported, but it was stated that there were altogether about 1,212,000 pounds of halibut, sablefish, "lingcod", and rockfish livers, valued at about $545,000, landed at Alaska and Pacific coast ports during 1936 by American vessels. The estimated amount of halibut livers landed in Alaska was 153,000 pounds, valued at $68,850.

These statistics were compiled from data collected by the International Fisheries Commission and by agents of the Bureau.

Persons engaged, wages paid, and operating units, Alaska halibut industry, 1936

Item	Total	Item	Total
PERSONS ENGAGED		OPERATING UNITS	
Fishermen: Whites	525	Vessels:	
Shoresmen: Whites	69	Power, over 5 tons	104
Total	594	Net tonnage	1,412
Wages paid shoresmen	$31,862	Launches	26
		Skates of lines	2,358

Products of the Alaska halibut fishery in 1936

Product	Pounds	Value
Fresh (including local)	6,957,336	$443,762
Frozen	6,609,004	445,692
Livers [1]	153,000	68,850
Total	13,719,340	958,304

[1] The amount of livers landed by the Alaska fleet was not segregated; the quantity shown herein is the estimated amount landed in Alaska.

COD

Cod fishing from shore stations in Alaska is carried on only in a small way and is to some extent incidental to salmon pickling. Nineteen persons, whites, were engaged in the industry in 1936, an increase of nine over the number reported for the previous year. Products of the shore fishery were as follows: 158,607 pounds of dry-salted cod, valued at $7,711; 80,769 pounds of pickled cod, valued at $2,821; 9,355 pounds of stockfish, valued at $1,304; and 600 pounds of tongues, valued at $45—a total of 249,331 pounds, valued at $11,881, as compared with 147,737 pounds, valued at $6,813, in 1935.

There were five sailing vessels in the Bering Sea fleet, the products of which are not included with the Alaska fisheries output because the vessels operate from and land their fares in ports of the Pacific Coast States. These were the same vessels that operated in the preceding year, namely, the *Sophie Christenson* (570 tons) of the Pacific Coast Codfish Co., the *Azalea* (365 tons) and the *Wawona* (413 tons) of the Robinson Fisheries Co., and the *Louise* (328 tons) and *William H. Smith* (496 tons) of the Union Fish Co.

Products of the offshore fishery were 3,879,657 pounds of dry-salted cod, valued at $193,956, and 11,650 pounds of tongues, valued at $941—a total of 3,891,307 pounds valued at $194,897, as compared with 4,439,337 pounds valued at $200,189 in 1935. The offshore fleet employed 194 persons, or 8 less than in the previous year.

WHALES

The American Pacific Whaling Co. again operated its plants at Akutan and Port Hobron. Seven steam whalers were used by the two plants during the season, and employment was given to 223 persons, of whom 206 were whites and 17 natives. One of the whalers, the *Westport*, valued at $59,000, struck a reef off Akutan Island in September and was a total loss.

Three hundred and eighty-five whales were taken, consisting of 160 finback, 118 humpback, 41 sulphur bottom, and 66 sperm whales. This is a decrease of nine from the number taken in 1935.

Products of the whale fishery were 666,100 gallons of whale oil, valued at $249,787; 193,350 gallons of sperm oil, valued at $46,790; 789 tons of fertilizer from meat, valued at $28,404; and 395 tons of bone fertilizer, valued at $9,480—a total value of $334,461, as compared with $390,384 in 1935.

CLAMS

Clam canning was carried on at seven plants in the Prince William Sound-Copper River region, the most important clam-producing area of Alaska. As usual, operations were extremely limited in the first 3 months of the year because of weather conditions. Exceptionally good weather prevailed during April, and 90 percent of the pack was prepared in that month. The catch limit specified by the regulations was reached on May 1, and the closed season extended from that date until August 16. Operations were not resumed, however, because of a shipping strike, and the production for the year was somewhat below that for 1935. The output in this region amounted to about 70 percent of the total Alaska clam pack.

The age composition of the commercial catch in the Prince William Sound-Copper River region was again determined by Paul E. Thompson, special warden assigned to clam patrol duty. In 1936 more than 95 percent of the clams taken were mature, and 54 percent had spawned more than once. The 1936 catch, therefore, was similar in composition to that of 1935 and other recent years.

Clams were canned at three plants in the Kodiak area, where the bulk of the pack came from Kukak Bay. No production of clams was reported in Cook Inlet or southeast Alaska.

Operations in the clam industry were largely in conjunction with other branches of the fisheries. The following operators handled clams during the season: Alaska Icepak Corporation, M. C. Dale & Co., W. R. Gilbert Co., Inc., E. A. Haltness, Pioneer Canneries, Inc., Scotty's Packing Co., and S. E. Smith Packing Co., in Cordova and vicinity; Pacific American Fisheries, Inc., at Alitak; Sandvik Hand Cannery at Uganik; and the Surf Canneries at Kukak Bay.

There were 393 persons employed, of whom 321 were whites, 59 natives, 7 Japanese, 3 Chinese, and 3 Filipinos. The total production amounted to 30,959 cases, containing 780,264 pounds of razor clams, valued at $201,887. This is a decrease of about 12 percent in quantity but an increase of 2 percent in value, as compared with the statistics for 1935, when clam products amounted to 889,302 pounds, valued at $197,581.

Products of the Alaska clam industry in 1936

Item	Cases	Pounds	Value
Minced:			
½-pound cans (48 to case)	26,404	633,696	$167,812
10-ounce cans (48 to case)	3,487	104,610	23,950
1-pound cans (48 to case)	106	5,088	1,060
20-ounce cans (24 to case)	20	600	120
Whole:			
10-ounce cans (48 to case)	497	14,910	4,011
1-pound cans (48 to case)	445	21,360	4,934
Total	30,959	780,264	201,887

SHRIMP

As in the preceding year, three plants in southeast Alaska were engaged in the shrimp industry. The plant of the Stikine Sea Food Co. at Wrangell changed hands in April, having been sold to the Alaskan Glacier Sea Food Co. It was allowed to remain idle until late October, after which it was overhauled and put into operation. Other plants in the shrimp fishery were the Alaskan Glacier Sea Food Co. at Petersburg and the Reliance Shrimp Co. at Wrangell. No production of shrimp was reported from the Cordova district.

There were 176 persons engaged in the industry, of whom 49 were whites, 88 natives, 20 Japanese, and 19 Filipinos. Products consisted of 467,407 pounds of shrimp meat, valued at $159,420; 5,666 pounds of frozen shrimp, valued at $2,126; and 5,676 pounds of fresh shrimp in the shell, valued at $728—a total of 478,749 pounds, valued at $162,274. Comparable figures for 1935 show a production of 383,867 pounds, valued at $128,900.

CRABS

Operations in the crab fishery were carried on at seven plants in southeast Alaska, including two that were used chiefly in the shrimp fishery, and at four plants in central Alaska, one of which was primarily a clam cannery. The Alaskan Glacier Sea Food Co. again packed crabs at Hoonah and Petersburg, the latter in connection with the shrimp industry, and extended its activities to the central district, continuing operations at the Cordova plant of the Northern Sea Food Co., which it purchased in April. Other important operators in the crab fishery were the Kayler-Otness, Inc., at Petersburg, the Boardway Canning Co. (under which name the liquidated business of V. L. Boardway & Co. was reorganized) at Wrangell, and the Alaska Icepak Corporation and Gulf Packing Co. at Cordova.

Under the regulations effective in 1936 the size limit on crabs taken for commercial purposes was changed to 7 inches in greatest width of shell instead of 6½ inches as formerly. Although certain fishermen seemed inclined at first to disregard this regulation, there was general cooperation before the season was over. Effective in 1936, also, the closed season in southeast Alaska was adjusted to include the period when the crabs are soft and economically least valuable.

Notwithstanding the fact that operations in central Alaska were seriously hindered for a number of weeks in August and September by the strike on the Copper River railroad and the Cordova docks, which prevented delivery of cans and other supplies, the pack of crabs at Cordova was well above that for the preceding year. Of the total amount of crab products in Alaska, the central district produced a little more than 50 percent, as compared with less than 19 percent in 1935.

An investigation of the Dungeness crab fishery was undertaken by A. M. Rafn, who examined sample catches from various parts of Icy Strait, Tenakee Inlet, and Hoonah Sound during the closed period for commercial crab fishing and for a short time thereafter to determine the proportion of crabs which were soft and unfit for commercial use. This study indicated that from 20 to 27 percent of the crabs taken from June 24 to July 1 were soft. During this period and throughout July and early August there was a general decline in relative abundance of soft-shelled crabs. It was found, however, that

the size, condition, and quantity of crabs varied from one bay to the next, as did the percentage of soft-shelled crabs.

There were 271 persons engaged in the industry, of whom 210 were whites, 52 natives, 2 Japanese, 5 Filipinos, and 2 Mexicans. Products consisted of 340,293 pounds canned (2,842 cases of 6½-ounce cans, and 7,783 cases of ½-pound cans, 48 to the case; and 3,093 cases of 1-pound cans and 795 cases of 20-ounce cans, 24 to the case), valued at $124,925; 90,562 pounds of cold-packed meat, valued at $31,757; and 1,658 dozen whole crabs in the shell, valued at $2,192. With the exception of 840 pounds of canned king crabs (35 cases of ½-pound cans), valued at $245, the entire production was of Dungeness crab. The total output of crab products in 1936 was 473,245 pounds, valued at $158,874, as compared with 499,538 pounds valued at $163,328 in 1935, a decrease of 5 percent in quantity and 3 percent in value.

Products of the Alaska crab industry in 1936

Product	Southeast Alaska			Central Alaska			Total		
	Number	Pounds	Value	Number	Pounds	Value	Number	Pounds	Value
DUNGENESS CRABS									
Canned:									
6½-ounce cans (48 to case) cases	1,886	36,777	$14,146	956	18,642	$7,170	2,842	55,419	$21,316
½-pound cans (48 to case) cases	4,037	96,888	31,820	3,711	89,064	29,688	7,748	185,952	61,508
1-pound cans (24 to case) cases	92	2,208	773	3,001	72,024	34,345	3,093	74,232	35,118
20-ounce cans (24 to case) cases	-------	-------	-------	795	23,850	6,738	795	23,850	6,738
Cold-packed meat:									
1-pound cans	34,957	34,957	13,983	-------	-------	-------	34,957	34,957	13,983
5-pound cans	5,299	26,495	9,723	3,240	16,200	5,994	8,539	42,695	15,717
10-pound cans	-------	-------	-------	1,291	12,910	2,057	1,291	12,910	2,057
Whole in shell dozen	1,476	36,930	1,887	182	5,460	305	1,658	42,390	2,192
KING CRABS									
Canned: ½-pound cans (48 to case) cases	35	840	245	-------	-------	-------	35	840	245
Total	-------	235,095	72,577	-------	238,150	86,297	-------	473,245	158,874

TROUT

As in the previous year, the commercial output of Dolly Varden and steelhead trout in Alaska was small, and the production was incidental to other branches of the fisheries. The reported products were as follows: Dolly Vardens, 5,527 pounds fresh, valued at $614, and 7,443 pounds frozen, valued at $670; steelheads, 33,393 pounds frozen, valued at $2,552. Except for 3,680 pounds of Dolly Vardens fresh, valued at $436, from the central district, these products were from southeast Alaska. The total output of both species was 46,363 pounds valued at $3,836, as compared with 32,882 pounds valued at $2,405 in 1935.

MISCELLANEOUS FISHERY PRODUCTS

Fish of minor commercial importance are taken in small quantities, chiefly in connection with the halibut fishery, and are landed in ports of Alaska and British Columbia and at Seattle. Such products landed in Alaska in 1936 were as follows: Sablefish, 614,536 pounds frozen,

valued at $27,431; 134,730 pounds pickled, valued at $5,017; and 40,000 pounds of livers, valued at $18,000; rockfish, 21,532 pounds frozen, valued at $814; and "lingcod", 1,421 pounds of livers, valued at $639.

FUR-SEAL INDUSTRY

PRIBILOF ISLANDS

GENERAL ADMINISTRATIVE WORK

In 1936, 52,446 fur-seal skins were taken at the Pribilof Islands, a decrease of 4,850 skins from the number obtained in the preceding year. The smaller take this season was attributed, in part at least, to the fact that unusually warm weather prevailed in the Bering Sea area, which is not conducive to the hauling out of seals.

Fifteen percent of the season's take of sealskins were delivered to a representative of the Canadian Government at Seattle as its share in accordance with the terms of the fur-seal treaty of July 7, 1911, and the remaining 85 percent were shipped to the Fouke Fur Co. at St. Louis, Mo. After the latter skins are processed and sold, allotment of Japan's share of 15 percent of the season's take, due under the same treaty, will be made from the net proceeds.

Seal carcasses were again processed at the byproducts plant on St. Paul Island. The yield for the season amounted to 25,252 gallons of oil and 138 tons of meal. Except for small quantities retained at the Pribilof Islands for use in fox feed, the products were shipped to Seattle, where the oil was sold by competitive bidding and the meal was distributed for fish food at the various Federal hatcheries throughout the country.

The care of blue-fox herds on St. Paul and St. George Islands was given attention during the winter months, and 999 blue and 13 white foxskins were taken in the 1936–37 season.

Sealing and foxing operations, together with work incidental thereto, were performed by the Pribilof Islands natives and by approximately 90 Aleutian natives hired for a few months, under the direction of white employees. The Pribilof natives, as virtual wards of the Government, received in return for their services food, clothing, shelter, and other necessaries of life, including medical aid and educational facilities. In addition, they were paid in cash on a piecework basis for the taking of seal and fox skins.

Some extension of improved roads was made on both islands to facilitate sealing operations, and attention was given to the repair and upkeep of buildings and equipment. A very limited amount of new construction was undertaken.

Coast Guard cutters maintained a patrol for the protection of the fur-seal herd during its northward migration along the Pacific coast and while it remained in Bering Sea waters, as well as performing other services in connection with the Bureau's work. Cooperative assistance was given also by the Navy Department, which detailed the U. S. S. *Vega* to make a round trip from Seattle to the Pribilofs to carry the annual shipment of supplies and to bring out the season's take of sealskins.

TRANSPORTATION OF SUPPLIES

The U. S. S. *Vega*, naval supply vessel, sailed from Seattle on July 22 with the annual shipment of supplies for the Pribilof Islands. The cargo consisted of 1,187 tons of general freight and 63,752 board-feet

of lumber for St. Paul Island and 689 tons of freight and 138,290 board-feet of lumber for St. George Island, a total of 1,876 tons of freight and 202,042 board-feet of lumber. Other supplies were transported to St. Paul Island and to various points along the Aleutian Islands for the Navy Department and the Coast and Geodetic Survey.

The *Vega* arrived at St. Paul Island on August 5. After completing the discharge of cargo and the loading of outgoing freight, the vessel left the islands on August 13 and arrived at Seattle on August 22. The return cargo consisted of 52,433 fur-seal skins, 250 drums of seal oil, and miscellaneous freight.

Additional supplies were shipped to the islands on each of the five trips of the *Penguin* from Seattle.

POWER VESSEL "PENGUIN"

At the beginning of the year the *Penguin* was docked at Seattle undergoing a general overhauling. In addition to the usual repairs, a fathometer was installed. This device adds considerably to the safety of operations, particularly on the hazardous trips made from time to time throughout the year to villages on the Aleutian Islands.

The *Penguin* made five round-trip voyages from Seattle to the Pribilof Islands in the calendar year 1936, carrying shipments of supplies and transporting employees engaged in fur-seal work. In May, trips were made to Indian settlements along the Alaska Peninsula and on the Aleutian Islands for the purpose of obtaining native laborers to assist with sealing operations and general maintenance work at the Pribilofs. These natives were returned to their homes at the end of the season. Interisland service also was rendered by the *Penguin* during the year.

The northbound voyages of the *Penguin* were as follows: February 5–21, May 1–13, June 10–21, September 1–12, and October 11–26. Southbound voyages from the Pribilof Islands to Seattle were made in the following periods: March 25–April 6, May 18–28, August 1–12, September 14–29, and November 4–18. On these voyages transportation was afforded 72 white passengers for the Bureau, 25 for the Navy Department, and 6 for the Office of Indian Affairs. Similar service was extended to 12 unofficial travelers.

Commissioner Bell and his party transferred from the U. S. F. S. *Brant* to the *Penguin* at King Cove on July 12 and were transported to the Pribilof Islands for a short inspection and observation of sealing operations. They left the islands on July 15 and boarded the *Brant* again at Naknek on July 17.

The *Penguin* cruised 28,784 nautical miles during the year.

ROADS

St. Paul Island.—The Reef Road on St. Paul Island was extended 700 feet, and approximately 9,500 feet of new scoria road toward Marunich was completed. The latter road branches westward from the Northeast Point Road near Halfway Point.

Extensive repairs were made on the Northeast Point Road. Unusually high water in the lake at Halfway Point, caused by an early spring thaw, washed out the bridge and flume. The bridge was replaced by a rock and scoria fill. Work was started also on a retaining wall for the road bank around Big Lake.

The roads to Polovina, Zapadni, and Lukanin were repaired and partly resurfaced with scoria.

St. George Island.—The plank road to Zapadni on St. George Island was extended 5,400 feet, and 1,000 feet of the extension was filled in with rock and scoria. The plank road to North Rookery was raised, leveled, and filled with scoria.

BUILDINGS

St. Paul Island.—No major improvements were undertaken at St. Paul Island in 1936.

St. George Island.—A building for the new electric power and cold-storage plant was erected at St. George Island, and part of the electrical equipment and a new engine were installed. An extension was added to the garage, to permit housing an extra truck and to provide room for overhauling trucks during the winter.

BYPRODUCTS PLANT

During the season of 1936 there were manufactured at the byproducts plant at St. Paul Island 25,252 gallons of seal oil and 276,040 pounds of seal meal. Eighteen thousand six hundred and twenty-two seal carcasses, approximately 373,000 pounds of blubber, and 600 gallons of foots remaining from 1935 were utilized by the plant during the season's operations.

Two hundred and fifty barrels containing 13,293 gallons of no. 1 oil were shipped on the supply vessel and sold for a total of $4,219.84. One hundred and eighty-eight barrels containing 10,376 gallons of no. 2 oil were shipped on the November trip of the *Penguin* and sold for $3,009.04. One thousand gallons of no. 1 oil were retained at St. Paul Island to be used in starting operations next season. The few hundred gallons of poor-quality oil remaining, together with 2,011 pounds of seal meal, were divided between St. Paul Island and St. George Island to be used for the feeding of foxes.

Two thousand three hundred and ten sacks containing about 274,000 pounds of seal meal were shipped to Seattle on the *Penguin* and transferred to the Division of Fish Culture for use as fish food at hatcheries throughout the country.

NATIVES

CENSUS

On December 31, 1936, the total native population of St. Paul Island was 253, including 15 persons who were temporarily absent from the island. There were 11 births, 5 deaths, 2 permanent additions, and 2 permanent departures during the year, making a net increase of 6 in the population.

The census of St. George Island on December 31, 1936, showed a population of 159 natives. This includes a child born in August 1935, who was omitted from the census at the close of that year, and 3 persons temporarily absent from the island. There were 3 births, 4 deaths, and 2 permanent departures during the year.

The total native population of both islands at the end of 1936 was 412.

MEDICAL SERVICE

Two physicians were stationed at the Pribilof Islands throughout the year to give medical aid to the natives and to Government employees and their families. The general health of the natives and the sanitary conditions on both islands were good.

An epidemic of scarlet fever occurred on St. Paul Island in July, and 17 cases were treated. Through the prompt action of the resident physician and the cooperation of the Coast Guard cutter *Alert* in rushing antitoxin to the island from Unalaska the spread of the fever was soon checked, and all those who had contracted the disease recovered.

A great deal of dental work should be taken care of on both islands, and plans are being made for the employment of a dentist for the coming year.

SCHOOLS

The Bureau maintains schools for the native children on St. Paul and St. George Islands, and all children between the ages of 6 and 16 are required to attend. Two teachers are employed on each island. Instruction is confined to the elementary branches, including some manual training and home economics.

The 1935–36 school year on both islands began on September 11, 1935; it closed on May 8, 1936, on St. George Island, and on May 15 on St. Paul Island.

On St. Paul Island there were 11 girls and 23 boys enrolled in the junior school, and 16 girls and 14 boys in the senior school, a total enrollment of 64. On St. George Island 11 girls and 9 boys were in the junior school and 12 girls and 11 boys in the senior school, a total of 43 pupils.

SAVINGS ACCOUNTS

Certain funds belonging to the Pribilof Islands natives were in the custody of the Commissioner of Fisheries as trustee. These funds were on deposit in the Washington Loan & Trust Co., Washington, D. C., where interest, compounded semiannually, was received at the rate of 2½ percent. The following is a summary of the trust account for the year 1936:

On hand Jan. 1, 1936	$5,021.05
Interest earned from Jan. 1 to Dec. 31, 1936	121.12
Total	5,142.17
Withdrawn by natives	395.24
On hand Dec. 31, 1936	4,746.93

The following is an itemized statement of the funds, setting forth the individual accounts:

Funds of the Pribilof Islands natives in the custody of the United States Commissioner of Fisheries, as trustee, Dec. 31, 1936

Kochutin, Alexandra	$1,925.67	Merculief, Erena	$664.86
Kozloff, Marina	134.31	Merculief, George	109.58
Lestenkof, Michael	425.29	Merculief, Tatiana	599.86
Merculief, Alexandra	92.77	Pankoff, Agrippina	206.03
Merculief, Daniel	516.65		
Merculief, Elizabeth	71.91	Total	4,746.93

PAYMENTS FOR TAKING FUR-SEAL SKINS

For their work in taking sealskins, the natives of the Pribilof Islands are paid cash at a specified rate per skin. In order that the collective earnings may be equitably distributed, the sealers on each island are divided into classes according to their skill and ability, and the total amount for the island is apportioned among them, each

member of a given class receiving an equal share. Small bonuses are paid for special services.

Payments to natives on St. Paul Island in 1936 were at the rate of 60 cents per skin. For the 43,522 sealskins taken, the total payment was $26,113.20, and in addition $180 was paid to two foremen and four mess attendants.

Natives on St. George Island received cash payment at the rate of 75 cents per skin on the take of fur-seal skins in 1936. For the 8,924 sealskins taken, the sum of $6,693 was distributed among the various classes of workmen. An additional sum of $100 was paid to two native foremen.

The details of these payments are shown in the following table:

Payments to Pribilof Islands natives for taking fur-seal skins, calendar year 1936

Classification	St. Paul Island			St. George Island		
	Number of men	Share of each	Total	Number of men	Share of each	Total
First class	34	$517.20	$17,584.80	27	$178.50	$4,819.50
Second class	9	438.00	3,942.00	8	125.25	1,002.00
Third class	8	274.20	2,193.60	5	93.00	465.00
Fourth class	9	210.00	1,890.00	3	71.25	213.75
Fifth class	7	56.40	394.80	2	49.50	99.00
Boys' class	4	27.00	108.00	3	27.00	81.00
Do				1	12.75	12.75
Foreman (additional compensation)			60.00			55.00
Do			40.00			45.00
Mess attendants, 4			80.00			
Total	71		26,293.20	49		6,763.00

PAYMENTS FOR TAKING FOX SKINS

The natives were paid $5 in cash for each fox skin taken on the Pribilof Islands in the 1935–36 season. The total payments amounted to $1,145 for the 229 skins taken on St. Paul Island and $4,025 for the 805 skins taken on St. George Island, a total of $5,170.

FUR SEALS

KILLINGS

In 1936, 52,446 fur seals were killed, of which 43,522 were taken on St. Paul Island and 8,924 on St. George Island. Details in regard to the killings are shown in the following tabulations:

Sea killings on Pribilof Islands in 1936

ST. PAUL ISLAND

Date	Serial number of drive	Hauling ground	Skins secured
June 2	1	Sea Lion Rock (Sivutch)	126
10	2	Reef and Gorbatch	58
19	3	Zapadni	301
20	4	Reef and Gorbatch	651
21	5	Polovina	115
22	6	Vostochni and Morjovi	480
23	7	Zapadni and Little Zapadni	324
24	8	Tolstoi, Lukanin, and Kitovi	228
25	9	Reef and Gorbatch	937
26	10	Polovina and Little Polovina	179
27	11	Vostochni and Morjovi	1,664
28	12	Zapadni and Little Zapadni	838
29	13	Tolstoi, Lukanin, and Kitovi	536
30	14	Reef and Gorbatch	1,730

Seal killings on Pribilof Islands in 1936—Continued

ST. PAUL ISLAND—Continued

Date	Serial number of drive	Hauling ground	Skins secured
July 1	15	Vostochni and Morjovi	1,281
2	16	Polovina and Little Polovina	638
3	17	Zapadni and Little Zapadni	1,184
4	18	Tolstoi, Lukanin, and Kitovi	310
5	19	Reef and Gorbatch	1,421
6	20	Polovina and Little Polovina	485
7	21	Vostochni and Morjovi	2,148
8	22	Zapadni and Little Zapadni	2,282
9	23	Tolstoi, Lukanin, and Kitovi	909
10	24	Reef and Gorbatch	2,420
11	25	Polovina and Little Polovina	668
12	26	Vostochni and Morjovi	2,261
13	27	Zapadni and Little Zapadni	2,028
14	28	Tolstoi, Lukanin, and Kitovi	423
15	29	Reef and Gorbatch	1,370
16	30	Polovina and Little Polovina	772
17	31	Vostochni and Morjovi	1,785
18	32	Zapadni and Little Zapadni	1,625
19	33	Tolstoi, Lukanin, and Kitovi	404
20	34	Reef and Gorbatch	2,043
21	35	Polovina and Little Polovina	511
22	36	Vostochni and Morjovi	1,039
23	37	Zapadni and Little Zapadni	757
24	38	Tolstoi, Lukanin, and Kitovi	284
25	39	Reef and Gorbatch	937
26	40	Vostochni, Morjovi, Polovina, and Little Polovina	1,501
27	41	Zapadni, Little Zapadni, Tolstoi, Lukanin, and Kitovi	972
28	42	Reef and Gorbatch	922
29	43	Vostochni, Morjovi, Polovina, and Little Polovina	876
30	44	Zapadni, Little Zapadni, Tolstoi, Lukanin, and Kitovi	332
31	45	Reef and Gorbatch	436
Aug. 1	46	Polovina and Little Polovina	332
		Total	43,522

ST. GEORGE ISLAND

June 4	1	North	12
12	2	do	35
16	3	Zapadni	70
18	4	East	47
20	5	North and Staraya Artil	77
22	6	East	32
23	7	Zapadni	74
24	8	North and Staraya Artil	302
26	9	East	103
27	10	Zapadni	74
28	11	North and Staraya Artil	538
30	12	East	109
July 1	13	Zapadni	199
2	14	North and Staraya Artil	344
4	15	East	81
5	16	Zapadni	302
6	17	North and Staraya Artil	663
8	18	East	188
9	19	Zapadni	100
10	20	North and Staraya Artil	696
12	21	East	294
13	22	Zapadni	104
15	23	North and Staraya Artil	640
16	24	East	357
17	25	Zapadni	129
18	26	North and Staraya Artil	1,009
19	27	East	66
20	28	Zapadni	98
21	29	North and Staraya Artil	145
22	30	East	120
23	31	Zapadni	33
24	32	North and Staraya Artil	326
25	33	East	245
26	34	Zapadni	78
27	35	North and Staraya Artil	413
28	36	East	289
29	37	Zapadni	24
30	38	North and Staraya Artil	255
31	39	East	258
		Total	8,924

AGE CLASSES

The age class of a male seal of the Pribilof Islands herd is determined from the length of its body. The classification was derived from measurements of a large number of pups branded in 1912 and killed in subsequent years. The limits of the various age classes are shown in the table following:

Age classes of male seals, Pribilof Islands

Age	Length (inches)	Age	Length (inches)
Yearlings	Up to 36.75	4-year-olds	46 to 51.75
2-year-olds	37 to 40.75	5-year-olds	52 to 57.75
3-year-olds	41 to 45.75	6-year-olds	58 to 63.75

Ages of seals killed on Pribilof Islands, calendar year 1936

[On basis of classification shown in preceding table]

Age	St. Paul Island	St. George Island	Total
2-year-old males	923	380	1,303
3-year-old males	41,394	8,172	49,566
4-year-old males	1,045	312	1,357
5-year-old male	1		1
Cows [1]	159	60	219
Total	43,522	8,924	52,446

[1] Cows unavoidably and accidentally killed or found dead.

Some of the seals recorded in the above tabulation as 2-year-olds and 4-year-olds probably were 3-year-olds, as not all male seals of a given age fall within the length limits assigned for the males of that age. As far as possible, the killings in 1936 were confined to 3-year-old males.

COMPUTATION OF FUR-SEAL HERD

The computation of the fur-seal herd in 1936 was made by Supt. H. J. Christoffers. As of August 10 the total of all classes was 1,689,743—a numerical increase of 138,830 over the figures for the preceding year. The detailed report will be found on pages 341 to 347 of this document. Following is a comparative statement of the numerical strength of the various elements of the fur-seal herd in the years 1925 to 1936, inclusive.

General comparison of computations of the seal herd on the Pribilof Islands, 1925 to 1936

Classes	1925	1926	1927	1928	1929	1930
Harem bulls	3,526	4,034	4,643	6,050	7,187	8,312
Breeding cows	226,090	244,114	263,566	284,725	307,491	332,084
Surplus bulls	3,558	2,002	4,827	5,285	5,207	3,963
Idle bulls	311	423	972	1,449	1,633	1,899
6-year-old males	4,105	13,434	13,450	12,857	10,399	5,612
5-year-old males	16,792	16,812	16,073	13,001	7,016	8,191
4-year-old males	18,692	17,872	14,448	7,798	9,102	11,327
3-year-old males	21,185	17,189	9,730	11,133	13,639	14,871
2-year-old males	43,515	38,183	41,252	49,087	64,354	69,674
Yearling males	52,091	56,514	61,026	65,861	85,381	92,232
2-year-old cows	49,786	44,415	48,186	57,061	67,210	72,605
Yearling cows	57,309	62,175	67,131	72,481	85,417	92,247
Pups	226,090	244,114	263,566	284,725	307,491	332,084
Total	723,050	761,281	808,870	871,513	971,527	1,045,101

General comparison of computations of the seal herd on the Pribilof Islands, 1925 to 1936—Continued

Class	1931	1932	1933	1934	1935	1936
Harem bulls	9,233	10,088	10,213	10,770	11,547	12,321
Breeding cows	358,642	387,320	418,299	451,751	487,883	526,848
Surplus bulls	3,291	2,893	4,700	6,494	6,139	7,994
Idle bulls	1,888	2,349	2,341	2,282	2,535	2,733
6-year-old males	6,553	8,154	9,335	8,173	11,117	11,421
5-year-old males	10,193	11,669	10,216	13,897	14,276	18,985
4-year-old males	12,966	11,351	15,441	15,862	21,096	23,991
3-year-old males	13,198	17,849	18,216	24,770	28,165	40,170
2-year-old males	74,828	81,101	87,662	94,920	102,555	110,505
Yearling males	99,612	107,592	116,195	125,490	135,525	146,365
2-year-old cows	78,410	84,682	91,454	98,768	106,666	115,197
Yearling cows	99,626	107,593	116,197	125,490	135,526	146,365
Pups	358,642	387,320	418,299	451,751	487,883	526,848
Total	1,127,082	1,219,961	1,318,568	1,430,418	1,550,913	1,689,743

FOXES

Incidental to the fur-seal industry, several hundred pelts are obtained each year from sizable herds of blue foxes on St. Paul and St. George Islands. The feeding of these animals in the winter months, when natural food is scarce, is one of the most important seasonal activities on the islands. The prepared food consists of mush and biscuits made of cereals, seal meal, and seal oil cooked together. Salted seal carcasses also are fed to the foxes on St. George Island. During December and January the animals are trapped for their pelts, and toward the close of the trapping season a suitable number of those captured are marked and released for breeding stock.

TRAPPING SEASON OF 1936–37

In the 1936–37 season there were taken 1,012 fox pelts, of which 999 were blue and 13 white. Ninety-seven blue and 9 white pelts were taken on St. Paul Island and 902 blue and 4 white pelts on St. George Island.

There were trapped, marked, and released for breeding stock 54 male and 46 female foxes on St. Paul Island and 56 males and 57 females on St. George Island. The breeding reserve includes also a considerable number of animals that were not captured during the season.

Although the take of fox pelts on St. Paul Island was the smallest for any season since 1928–29, the comparatively large number of animals that were marked for the breeding reserve indicates a satisfactory condition of the herd. An open winter and an abundance of food on the beaches kept the animals from entering the traps in numbers until late in the killing season. All the trapping on St. Paul Island was by means of box traps, as it is believed that the use of steel traps in the past has been detrimental to the herd. On St. George Island, also, box traps were used chiefly, although the operation of steel traps was continued to some extent at Garden Cove and Zapadni.

REINDEER

St. Paul Island.—During the year ended September 30, 1936, 37 reindeer on St. Paul Island were killed and used for food. A count of the animals in the herd on October 5 showed a total of 1,388, of which it was estimated that 340 were the young of the season. The herd appeared to be in good condition.

St. George Island.—No reindeer were killed for food on St. George Island during the year ending September 30, 1936. A count made on

September 30 showed 44 animals in the herd, of which 9 were the young of the season. This is a marked decline from the census of the herd in the preceding year, the reason for which cannot be determined.

FUR-SEAL SKINS

SHIPMENTS

Six hundred and thirty-eight barrels containing 52,433 fur-seal skins taken on the Pribilof Islands in 1936 were shipped on the U. S. S. *Vega* and arrived at Seattle on August 22. Delivery of 7,867 skins, packed in 99 barrels, was made to a representative of the Canadian Government at Seattle on August 24, in accordance with provisions of the fur-seal treaty. The remaining 44,566 skins were forwarded by freight to the Fouke Fur Co. at St. Louis, Mo., and arrived there on September 1.

Thirteen sealskins taken in 1936, specially cured for experimental purposes, were brought to Seattle on the *Penguin* in August and were turned over to a representative of the Fouke Fur Co. for transporting to St. Louis.

SALES

Two public auction sales of fur-seal skins taken on the Pribilof Islands were held at St. Louis in 1936—on April 27 and September 14, respectively—at which a total of 42,239 skins were sold for a gross sum of $1,192,172. During the year, also, 1,171 sealskins taken on the Pribilof Islands were disposed of at private sales, under special authorization of the Secretary of Commerce, for a total of $30,143.18. In the following detailed statements the sales of other sealskins by the Department of Commerce for the account of the Government are included, in order that the records may be complete.

April 27, 1936.—Twenty-two thousand three hundred and seventy-three Pribilof Islands fur-seal skins, dressed, dyed, and machined, were sold on April 27 for $600,770.25. These skins consisted of 9,721 dyed black, 12,154 dyed Safari brown, and 498 dyed logwood brown. In addition, 171 dressed, dyed, and machined fur-seal skins, dyed Safari brown, and 30 miscellaneous unfinished skins taken by the Japanese Government on Robben Island in 1935 and allotted to the United States as its share of such skins under provisions of the fur-seal treaty were sold for $4,814.75. There was also sold 1 confiscated fur-seal skin, raw salted, for $1, making a total of $605,586 for fur-seal skins at this sale.

September 14, 1936.—At the sale on September 14, 19,866 Pribilof Islands fur-seal skins were sold for $591,401.75. Of these, 19,775 dressed, dyed, and machined, brought $591,341.25, and 91 miscellaneous raw and partly processed skins brought $60.50.

Special sales.—During the year, 1,171 Pribilof Islands fur-seal skins were sold under special authorization by the Department for advertising and promotional purposes, the gross sales amounting to $30,143.18. Of these skins, 591 dyed Safari brown brought $16,310.83; 556 dyed black, $13,351.83; 13 specially prepared for exhibition purposes, $359.19; and 11 partly processed skins, $121.33.

Further details in regard to the sales of sealskins by the Department of Commerce for the account of the Government in 1936 are given in the following tables:

Comparative values, by sizes and grades, with percentages each size, of Pribilof sealskins sold at public auction in 1936

Classes and sales	Grade	Number	High	Low	Average	Total	Total number	Average price	Total amount	Percentage
DYED BLACK										
Extra extra large:										
Apr. 27	Scarred, faulty, etc.	11	$25.50	$25.50	$25.50	$280.50	12	$24.42	$293.00	0.12
	III	1	12.50	12.50	12.50	12.50				
Extra large:										
Apr. 27	I and II	248	33.00	30.00	31.76	7,876.00	537	28.22	15,154.50	5.52
	Scarred, faulty, etc.	282	26.00	25.00	25.50	7,191.00				
	III	7	12.50	12.50	12.50	87.50				
Sept. 14	I and II	95	38.50	38.50	38.50	3,657.50	215	33.62	7,227.50	2.48
	Scarred, faulty, etc.	120	30.00	29.50	29.75	3,570.00				
Large:										
Apr. 27	I and II	1,797	32.50	28.00	30.38	54,586.50	3,410	27.73	94,553.75	35.08
	Scarred, faulty, etc.	1,591	26.50	24.00	24.95	39,692.25				
	III	22	12.50	12.50	12.50	275.00				
Sept. 14	I and II	1,110	36.00	31.50	34.03	37,772.50	2,420	30.79	74,505.00	27.88
	Scarred, faulty, etc.	1,260	29.50	27.00	28.60	36,032.50				
	III	50	14.00	14.00	14.00	700.00				
Medium:										
Apr. 27	I and II	2,447	28.00	22.50	26.85	65,697.50	4,976	24.49	121,838.00	51.19
	Scarred, faulty, etc.	2,436	24.00	21.50	22.60	55,046.00				
	III	93	12.50	10.50	11.77	1,094.50				
Sept. 14	I and II	2,220	31.75	29.00	30.55	67,830.00	4,930	27.03	133,260.00	56.80
	Scarred, faulty, etc.	2,560	26.25	23.50	24.84	63,580.00				
	III	150	14.00	11.50	12.33	1,850.00				
Small medium:										
Apr. 27	I and II	391	22.50	21.50	21.92	8,572.50	786	19.95	15,682.50	8.09
	Scarred, faulty, etc.	329	20.00	18.00	19.50	6,417.00				
	III	66	10.50	10.50	10.50	693.00				
Sept. 14	I and II	430	25.50	24.00	24.60	10,580.00	1,115	21.45	23,915.00	12.84
	Scarred, faulty, etc.	585	21.75	20.50	21.00	12,285.00				
	III	100	10.50	10.50	10.50	1,050.00				
All classes:										
Apr. 27							9,721	26.46	247,521.75	100.00
Sept. 14							8,680	27.52	238,907.50	100.00
DYED SAFARI BROWN										
Extra extra large:										
Apr. 27	I and II	7	35.00	32.00	32.43	227.00	19	28.68	545.00	0.16
	Scarred, faulty, etc.	12	26.50	26.50	26.50	318.00				
Extra large:										
Apr. 27	I and II	633	35.00	31.00	32.64	20,664.00	1,043	30.63	31,942.00	8.58
	Scarred, faulty, etc.	396	31.00	26.50	28.00	11,089.00				
	III	14	13.50	13.50	13.50	189.00				
Sept. 14	I and II	228	42.00	36.50	39.11	8,916.00	371	36.29	13,462.00	3.34
	Scarred, faulty, etc.	143	32.00	31.50	31.79	4,546.00				

Comparative values, by sizes and grades, with percentages each size, of Pribilof sealskins sold at public auction in 1936—Continued

Classes and sales	Grade	Number	High	Low	Average	Total	Total number	Average price	Total amount	Percentage
Large:										
Apr. 27	I and II	2,885	$34.50	$28.50	$30.72	$88,625.00	5,230	$29.08	152,077.50	43.03
	Scarred, faulty, etc.	2,284	30.00	25.50	27.42	62,629.00				
	III	61	13.50	13.50	13.50	823.50				
Sept. 14	I and II	2,293	40.00	35.50	37.07	84,998.00	3,808	34.57	131,639.00	34.32
	Scarred, faulty, etc.	1,486	33.50	29.00	31.16	46,307.50				
	III	29	11.50	11.50	11.50	333.50				
Medium:										
Apr. 27	I and II	2,970	30.50	27.00	28.18	83,685.00	5,392	27.06	145,892.00	44.36
	Scarred, faulty, etc.	2,362	28.50	25.00	26.03	61,487.00				
	III	60	12.00	12.00	12.00	720.00				
Sept. 14	I and II	3,801	35.50	31.00	31.90	121,243.25	6,217	30.55	189,952.25	56.04
	Scarred, faulty, etc.	2,350	30.00	27.50	28.91	67,950.00				
	III	66	11.50	11.50	11.50	759.00				
Small medium:										
Apr. 27	I and II	260	27.50	24.00	24.64	6,406.00	470	22.82	10,726.00	3.87
	Scarred, faulty, etc.	195	21.50	21.00	21.23	4,140.00				
	III	15	12.00	12.00	12.00	180.00				
Sept. 14	I and II	409	27.00	26.50	26.67	10,908.00	669	24.86	17,380.50	6.30
	Scarred, faulty, etc.	290	22.75	22.00	22.32	6,472.50				
All classes:										
Apr. 27							12,154	28.07	341,182.50	100.00
Sept. 14							11,095	31.77	352,433.75	100.00
DYED LOGWOOD BROWN										
Extra extra large:										
Apr. 27	I and II	1	26.50	26.50	26.50	26.50	2	26.50	53.00	0.40
	Scarred, faulty, etc.	1	26.50	26.50	26.50	26.50				
Extra large:										
Apr. 27	Scarred, faulty, etc.	1	26.50	26.50	26.50	26.50	1	26.50	26.50	0.20
Large:										
Apr. 27	I and II	128	28.00	26.50	27.05	3,462.50	204	26.42	5,389.00	40.96
	Scarred, faulty, etc.	76	26.50	25.00	25.35	1,926.50				
Medium:										
Apr. 27	I and II	72	25.00	24.50	24.72	1,780.00	284	22.61	6,422.50	57.03
	Scarred, faulty, etc.	212	26.50	21.50	21.90	4,642.50				
Small medium:										
Apr. 27	I and II	7	25.00	25.00	25.00	175.00	7	25.00	175.00	1.41
All classes:										
Apr. 27							498	24.23	12,066.00	100.00
MISCELLANEOUS										
Sept. 14	Unhaired and dressed	30	1.00	1.00	1.00	30.00	91	.66	60.50	100.00
	Unhaired	18	.50	.50	.50	9.00				
	Partly unhaired	39	.50	.50	.50	19.50				
	Raw	4	.50	.50	.50	2.00				

Special sales of Pribilof Islands fur-seal skins in 1936

Date	Number of skins	Description	Price per skin	Total
Jan. 31	70	Dyed Safari brown, large	$27.63	$1,934.10
	80	Dyed black, medium	22.34	1,787.20
Feb. 29	70	Dyed Safari brown, large	27.63	1,934.10
	40	Dyed Safari brown, medium	26.21	1,048.40
	40	Dyed Safari brown, medium, scarred and faulty	22.95	918.00
	120	Dyed black, medium	22.34	2,680.80
	40	Dyed black, medium, scarred and faulty	19.08	763.20
Mar. 5	70	Dyed Safari brown, large	27.63	1,934.10
	40	Dyed Safari brown, medium	26.21	1,048.40
	40	Dyed Safari brown, medium, scarred and faulty	22.95	918.00
	80	Dyed black, medium	22.34	1,787.20
Apr. 13	13	Exhibition skins	27.63	359.19
May 6	35	Dyed black, large	30.38	1,063.30
	50	Dyed black, small medium, scarred and faulty	19.50	975.00
May 22	70	Dyed Safari brown, large	30.72	2,150.40
	80	Dyed Safari brown, medium	28.18	2,254.40
	70	Dyed Safari brown, large	30.72	2,150.40
June 22	70	Dyed black, large	30.38	2,126.60
July 30	80	Dyed black, medium	26.85	2,148.00
Sept. 30	1	Dyed Safari brown, large	20.53	20.53
	1	Dyed black, large	20.53	20.53
	11	Partly processed	11.03	121.33
	1,171			30,143.18

Sale at St. Louis, Mo., Apr. 27, 1936, of 201 fur-seal skins received from Japanese Government under treaty provisions

Number of skins	Trade classification	Price per skin	Total
41	Dressed, dyed, and machined, Safari brown	$30.50	$1,250.50
64	Do	29.00	1,856.00
34	Dressed, dyed, and machined, Safari brown; scarred and faulty	23.50	799.00
32	Do	25.00	800.00
29	Unhaired and dressed	3.75	108.75
1	Washed and dried	.50	.50
201			4,814.75

DISPOSITION OF FUR-SEAL SKINS TAKEN ON PRIBILOF ISLANDS

On January 1, 1936, there were on hand 63,394 fur-seal skins taken on the Pribilof Islands. Of these, 63,376 were at St. Louis, Mo., and 18 at Washington. In 1936, 52,446 fur-seal skins were taken on the Pribilof Islands, of which 7,867 were allotted to the Government of the Dominion of Canada as its share of the season's take and the remaining 44,579 were shipped to St. Louis. Of the skins on hand at the beginning of the year, 43,410 were disposed of, leaving 19,984 unsold, which with the 44,579 from the 1936 take make a total of 64,563 on hand on December 31, 1936. The following tables show further details in regard to fur-seal skins taken on the Pribilof Islands, as well as details in regard to other Government fur-seal skins under the control of the Department of Commerce.

Summary of Government-owned fur-seal skins in the custody of Fouke Fur Co., at St. Louis, Mo., calendar year 1936

Source	On hand Jan. 1	Receipts in 1936	Sales in 1936	On hand Dec. 31
Taken on Pribilof Islands:				
Calendar year 1933	325	----------	325	----------
Calendar year 1934	14,349	----------	14,342	7
Calendar year 1935	48,702	----------	28,743	19,959
Calendar year 1936	----------	44,579	----------	44,579
United States' share of Japanese fur-seal skins:				
Season of 1935	----------	201	201	----------
Confiscated fur-seal skins	1	----------	1	----------
Total	63,377	44,780	43,612	64,545

Summary of all Government-owned fur-seal skins under control of Department of Commerce, calendar year 1936

Source	On hand Jan. 1			Receipts in 1936	Disposed of in 1936		On hand Dec. 31		
	Fouke Fur Co.	Washington office	Total		Sales	Delivered to Canada	Fouke Fur Co.	Washington office	Total
Taken on Pribilof Islands:									
Calendar year 1918, held for reference purposes	.....	7	7	.....	.....	.....	.....	7	7
Calendar year 1923	.....	3	3	.....	.....	.....	.....	3	3
Calendar year 1924	.....	1	1	.....	.....	.....	.....	1	1
Calendar year 1929	.....	5	5	.....	.....	.....	.....	5	5
Calendar year 1930	.....	2	2	.....	.....	.....	.....	2	2
Calendar year 1933	325	.....	325	.....	325	.....	.....	.....	.....
Calendar year 1934	14,349	.....	14,349	.....	14,342	.....	7	.....	7
Calendar year 1935	48,702	.....	48,702	.....	28,743	.....	19,959	.....	19,959
Calendar year 1936	.....	.....	.....	52,446	.....	7,867	44,579	.....	44,579
Miscellaneous skins held for reference purposes	.....	4	4	.....	.....	.....	.....	4	4
United States' share of Japanese sealskins: Season of 1935	.....	.....	.....	201	201	.....	.....	.....	.....
Confiscated skins	1	.....	1	.....	1	.....	.....	.....	.....
Total	63,377	22	63,399	52,647	43,612	7,867	64,545	22	64,567

SHIPMENT AND SALE OF FOXSKINS

The 220 blue and 9 white foxskins taken on St. Paul Island and the 799 blue and 6 white foxskins taken on St. George Island in the season of 1935–36 were shipped from the islands on the *Penguin*, sailing on March 25. The vessel reached Seattle on April 6, and the foxskins were forwarded by express to the Department's selling agents at St. Louis, Mo.

At the public auction sale in St. Louis on April 27, 1936, 492 blue foxskins of the 1934–35 season's take were sold for $14,816, an average of $30.11 per skin. The maximum price was $83, obtained for a no. 1 silvery pelt sold singly.

On September 14, 1936, there were sold at public auction at St. Louis 509 blue and 15 white foxskins taken on the Pribilof Islands in the 1935–36 season. The blue pelts brought $12,418, an average of $24.40 per skin; and the white pelts brought $238, an average of $15.87 each. The maximum price was $96, obtained for a single silvery pelt.

SEA-OTTER SKINS

Twelve sea-otter skins were forfeited to the Government in 1936, of which 4 were pup skins and 3 others were from very small animals. All were unsold at the close of the year.

Four sea-otter skins, including 1 pup skin, that had been seized in the previous year were sold at public auction in 1936 by the Department's selling agents at St. Louis, Mo. Prices for these skins were $310, $125, $85, and $6.50, respectively, a total of $526.50.

FUR-SEAL PATROL

UNITED STATES COAST GUARD

Five cutters, two 165-foot patrol boats, and two 125-foot patrol boats of the Coast Guard were assigned by the Secretary of the Treasury to patrol the waters of the North Pacific Ocean and Bering Sea for the protection of fur seals and sea otters which have their breeding grounds in Alaskan territory.

The cutter *Redwing* patrolled between the Oregon-Washington boundary and Dixon Entrance, southeast Alaska, from April 1 to April 20. On the latter date the *Tallapoosa* sailed from Juneau to take up the patrol from Dixon Entrance to Unalaska until the middle of May. The *Shoshone* left San Francisco on April 15 for Unalaska, via Seattle, and remained north until July 31, and the *Chelan* sailed from Seattle on June 20 and based at Unalaska until October 1. As in previous years, the *Northland* made a cruise to the Arctic Ocean and patrolled in Bering Sea and adjacent waters. The vessel departed from Seattle on this voyage on May 10.

The patrol boats *Morris* and *Cyane* sailed from Seward and Ketchikan, respectively, on April 20 for Unalaska, in which vicinity the former participated in the patrol until July 1, and the latter until July 15. Work there was carried on to the end of the season by the patrol boat *Alert*, which sailed from Ketchikan on June 20 and based at Unalaska until October 1, and by the *Daphne*, which proceeded north from San Francisco on July 1.

BUREAU OF FISHERIES

Three vessels of the Bureau of Fisheries were engaged in seal-patrol duty in the spring of 1936 off the northwest coast of Washington and in the vicinity of Sitka, Alaska, where pelagic sealing is carried on during the northward migration of the fur-seal herd. With base at Neah Bay, Wash., the *Brant* carried on the patrol from March 29 to April 14, and the *Crane* from April 19 to May 9. The *Kittiwake* patrolled near Sitka, Alaska, during part of May.

A representative of the Bureau was stationed, as in past years, at La Push, Wash., to observe sealing activities and secure compliance with treaty provisions and the law giving effect thereto in respect to the prohibition of the use of motorboats and firearms in the taking of fur seals by aborigines. The Bureau's representative was at La Push from April 1 to May 30. There appeared to be no incentive for the Indians to hunt seals, other than to get a few animals for food, as several skins from the previous year's catch remained unsold. Moreover, the weather was unfavorable, and sealing trips were made only twice during the season. Seventeen seals were killed, all rather small and mostly females.

SEALING PRIVILEGES ACCORDED ABORIGINES

Under the provisions of the North Pacific Sealing Convention of July 7, 1911, Indians and other aborigines dwelling on the coasts of the waters designated by the convention may take fur-seal skins under limited conditions. In 1936 there were taken and duly authenticated

by officials of the respective Governments 1,927 fur-seal skins, of which 39 were taken by Indians under the jurisdiction of the United States and 1,888 by Indians of Canada. Reports have been received, also, of the authentication of 5 additional skins, 1 from a male seal and 4 from females, taken in 1935, by Indians of the State of Washington. These, together with the number previously reported, make a total of 139 skins taken in that year by Indians under the jurisdiction of the United States. The details for 1936 are as follows:

Washington.—Twenty-eight sealskins taken by Indians of Washington were authenticated. Of these, 2 were from male and 26 from female seals. The skins were taken by Indians of La Push and Neah Bay in the month of April and were authenticated by A. M. Rafn, special agent of the Bureau, and by N. O. Nicholson, superintendent of the Taholah Indian Agency, Hoquiam, Wash.

Alaska.—Eleven sealskins taken by natives of Sitka in April were authenticated by Warden Donald S. Haley. Of these skins, 4 were from males and 7 from females.

British Columbia.—Indians along the British Columbia coast took 1,888 fur-seal skins in 1936, according to an official report.

JAPANESE SEALSKINS DELIVERED TO THE UNITED STATES

In accordance with provisions of the fur-seal treaty of 1911 there were allotted to the United States 214 Japanese fur-seal skins, or 10 percent of the number taken by Japan on Robben Island in 1936. These skins were received by the Department's selling agents at St. Louis, Mo., on March 15, 1937.

COMPUTATION OF FUR SEALS, PRIBILOF ISLANDS, 1936

By HARRY J. CHRISTOFFERS

The total number of killable male seals that appeared at the Pribilof Islands during the season of 1936 was a keen disappointment to all concerned. There were several possible reasons for the shortage. Probably the most important was the weather that prevailed at the Pribilof Islands and throughout the coastal waters of Alaska. During the entire season it was abnormally warm, with continual heavy rains, neither of which is favorable for the hauling out of seals. Often when weather at the islands is unfavorable the seals will go into the water and remain there until conditions improve, thereby causing a shortage in the kill. It was not merely local weather conditions, however, that prevented the seals from hauling out, as the animals were not at or in the vicinity of the islands.

Reports were received of large numbers of seals seen between the Pribilofs and Bristol Bay, in the Gulf of Alaska, and in the waters below the Aleutian Islands at a time when the bachelors should have been arriving at the Pribilofs in large numbers. Most of these seals undoubtedly were bachelors, and although it is impossible to say in which age class they belonged, a fair percentage must have been 3-year-olds. With this in mind, it was felt that commercial killings could safely be continued until the last of July and still leave sufficient animals of the killable class for breeding requirements.

There is no particular reason why young males should return to the Pribilofs. They are not capable of breeding, and it is the sexual instinct which principally accounts for their continuing to return to the islands. It is therefore possible that when weather conditions are very favorable in more distant waters they will not return. There may be also some natural instinct which prevents them from coming to the islands when the climatic conditions are not particularly to their liking.

The above-mentioned reasons for killable seals not returning to the Pribilofs this season give the optimistic viewpoint. If none of the reasons given caused this year's shortage of 3-year-old males, then the death rate at sea for young animals has increased with the increase in size of the herd. It is possible that natural enemies or disease may increase at a more rapid rate than the herd increases, or it may be that natural enemies were more abundant than usual during the life cycle of this year's generation of 3-year-old males. The more congested the rookeries become, the greater the death rate among the pups on the rookeries; but this fractional increase in the death rate should not cause any extreme shortage of seals.

In order to provide for a maximum increase in the size of the herd it is essential to provide sufficient breeding males. To do this it is necessary to kill only from a particular age class. It does not make any difference which age class is reserved, but it is essential to reserve all that are older than the age class selected.

When the Government assumed direct control over killings, the 3-year-old class was selected as the most desirable to kill, principally because there would be more killable animals on account of the death rate between the 3-year-old and 4-year-old classes. It is understood that during the leasing period the lessees preferred the skins from 4-year-old males, as they brought better prices than the skins from

3-year-olds, owing to their larger size. The opinion is held by some, however, that skins from 4-year-old seals are not as uniform in quality as those from 3-year-olds.

Aside from the question of quality, it is felt that many advantages would be gained if 4-year-olds were killed instead of 3-year-olds. The skin of a 4-year-old is, on the average, a more valuable skin; 4-year-olds arrive much earlier in the season, which would permit killings to be discontinued considerably earlier than at present, as these animals would practically all arrive before July 20 and certainly before July 25; and a larger proportion of 4-year-olds visit the islands than 3-year-olds.

The discontinuing of commercial killings about July 20 would prevent the taking of any quantity of stagey skins, and would be a very favorable factor in preserving and increasing the size of the herd. After July 20 large numbers of 2-year-olds and females are found in the drives.

Driving of females particularly should be avoided. Female seals have not the strength to withstand a long drive; they are heavy with milk and give out very quickly. Not many die on the drive, but the utter exhaustion which they undergo must do them considerable damage and be the direct cause of many later deaths. Proportionately more deaths result from the present large drives than occurred when the drives were small. On account of the increasingly large drives, the earlier in the season that killings are discontinued the better it will be for the cows and pups, and in fact all animals in the drives that are not of the killable class.

The driving of seals should not normally be continued after July 25, regardless of whether the proper number of animals have been killed, and preferably it should be discontinued earlier. This year killings were undertaken until the end of July, as it was considered safe and desirable to secure a greater number of animals than had appeared on the hauling grounds up to that time. It is not recommended, however, that driving occur again after July 25, because of the large number of cows and nonkillable males in the drives.

At one time it was deemed desirable to secure skins up to August 10, without giving consideration to the nonkillable animals in drives and to the possible inferiority of skins secured late in the season. This year it was noted particularly that too large a proportion of skins taken after July 25 were stagey. Therefore it is felt that it would not be desirable again to kill after this date, not only because of the poorer quality of the skins, but especially because of the damage to the herd from redriving of large numbers of animals, particularly females. As previously mentioned, this condition makes it desirable to change the age class of killable males from 3-year-olds to 4-year-olds. It would probably be necessary to kill from more than one age class for a year or two in making the readjustment.

Each of three of the 3-year-old males that were killed during the 1936 season had around its neck a very tight rubber band that had evidently been on for a long time. These bands, apparently cut from inner tubes of automobile tires, must have been placed around the necks of the seals by human hands.

BULLS

Owing to the clear weather prevailing at the time of counting harem and idle bulls on St. Paul Island, it was possible to obtain a very satisfactory estimate of the number of breeding males on hand.

The weather, however, was extremely warm. When counts were made on North and Staraya Artil rookeries on St. George Island the temperature was around 80° F.; as a result, harems were entirely broken up, and it was impossible to make a satisfactory count. The majority of the cows and bulls had taken to the water and the pups were mostly grouped at the edge of, or paddling in, the water. Pups usually do not take to the water until about August 10, but this year the majority had learned to swim by that time.

There were less than 300 bulls on Staraya Artil rookery proper when count was made, as compared with the normal number of approximately 600 harem bulls. The rookery area, however, had expanded considerably, and as harems were reported to have been as highly congested as previously the usual increase was credited to the rookery. This same condition applied to a lesser extent on all St. George rookeries, and estimates were therefore based according to conditions involved.

At the close of the season there was a shortage of mature bulls on the rookeries and hauling grounds of both islands. Many of the bulls that had taken to the water because of the warm weather evidently did not return. It is therefore impossible to state definitely that there were sufficient bulls to take care of all virgin females and late arriving cows. The shortage may result in a lower birth rate next season.

A number of strong vigorous harem bulls that were iron branded in 1923 were observed at various rookeries. These bulls are now 16 years old.

The albino bull noted in 1935 was not observed during the season.

Because of the early breaking up of harems it was necessary to make more than the usual number of estimates of harem and idle bulls.

Estimated number of harem and idle bulls, approximate ratio of idle bulls to harem bulls, and average harem, 1936

Rookery	Date	Harem bulls	Idle bulls	Total	Approximate ratio of idle bulls to harem bulls	Average harem
St. Paul Island:						
Kitovi	July 19	427	83	510	1:5	40.82
Lukanin	...do	193	32	225	1:6	43.66
Gorbatch	July 20	961	187	1,148	1:5	46.05
Ardiguen	...do	93	13	106	1:7	45.01
Reef	...do	1,780	452	2,232	1:4	49.94
Sivutch	...do	435	85	520	1:5	62.54
Lagoon	July 19	1		1		59.00
Tolstoi	...do	1,165	287	1,452	1:4	44.92
Zapadni	July 18	1,050	258	1,308	1:4	47.90
Little Zapadni	...do	546	87	633	1:6	46.95
Zapadni Reef	...do	59	26	85	1:2	15.07
Polovina	...do	420	102	522	1:4	43.03
Polovina Cliffs	...do	320	87	407	1:4	30.92
Little Polovina	...do	112	44	156	1:3	32.18
Morjovi	July 17	308	81	389	1:4	21.03
Vostochni	...do	2,185	429	2,614	1:5	33.00
Total		10,055	2,253	12,308	1:4	42.74
St. George Island:						
North	July 21	790	86	876	1:9	44.39
Staraya Artil	...do	600	185	785	1:3	44.04
Zapadni	July 22	186	61	247	1:3	20.05
South	...do	139	9	148	1:15	6.29
East Reef	July 21	163	41	204	1:4	49.30
East Cliffs	...do	388	98	486	1:4	59.14
Total		2,266	480	2,746	1:5	42.84
Total (both islands)		12,321	2,733	15,054	1:4	42.76

AVERAGE HAREM

The average harem for the season of 1936 appeared to be slightly higher than usual. The estimated average harem for St. Paul Island was 42.74 and for St. George Island 42.84. This is an increase of 0.60 over the average in the preceding year for St. Paul Island and 0.10 for St. George Island. Although the average harem has been increasing slightly in the last few years it is still at a fair size. The fact that there is an increase, however, indicates that the reserve of bulls has not been larger than necessary. There is not a constant decrease in the average harem with an increase of breeders. A large surplus for breeding stock apparently causes a larger percentage of increase in the number of animals born and therefore makes available later a greater number of killable seals.

In 1923, 10,017 3-year-old male seals were marked for a breeding reserve; and in 1924, 8,572 3-year-old males. Further reserves were made in subsequent years until 1932, when a much smaller number than usual were marked, as the work was interrupted by the arrival and unloading of the supply vessel. Since 1932 no animals have been marked, but the number of 3-year-old males remaining at the close of the killing season was deemed ample to take care of breeding requirements.

The reserved seals of 1923 became fully matured breeders 3 or 4 years later, and their progeny were of a killable age in another 3 years. The killings increased from 29,276 3-year-old males in 1928 to 38,845 3-year-olds in 1929, and 47,767 3-year-olds in 1931. This clearly indicates that a larger breeding reserve will result in a greater increase in the percentage of 3-year-olds available for killing. It seems desirable, therefore, again to create a larger breeding reserve. The marking of seals at the beginning of the season is not advisable, as it would mean redriving them several times during the killing period. The same result may be obtained by discontinuing sealing a few days earlier than usual.

Computation of breeding cows, based on annual increase of 8 percent, and of average harem, in 1936

Rookery	Breeding cows		Harem bulls, 1936	Average harem		
	1935	1936		1936	1935	Increase or decrease in 1936 from 1935
St. Paul Island:						
Kitovi	16,139	17,430	427	40.82	39.65	+1.17
Lukanin	7,803	8,427	193	43.66	41.28	+2.38
Gorbatch	40,978	44,256	961	46.05	45.89	+.16
Ardiguen	3,876	4,186	93	45.01	44.04	+.97
Reef	82,310	88,895	1,780	49.94	49.26	+.68
Sivutch	25,188	27,203	435	62.54	59.13	+3.41
Lagoon (actual count pups)	115	59	1	59.00	38.33	+20.67
Tolstoi	48,454	52,330	1,165	44.92	45.75	−.83
Zapadni	46,566	50,291	1,050	47.90	49.43	−1.53
Little Zapadni	23,736	25,635	546	46.95	46.82	+.13
Zapadni Reef	823	889	59	15.07	14.44	+.63
Polovina	16,735	18,074	420	43.03	43.81	−.78
Polovina Cliffs	9,163	9,896	320	30.92	29.09	+1.83
Little Polovina	3,337	3,604	112	32.18	31.19	+.99
Morjovi	5,998	6,478	308	21.03	18.92	+2.11
Vostochni	66,772	72,114	2,185	33.00	32.09	+.91
Total	397,993	429,767	10,055	42.74	42.14	+.60
St. George Island:						
North	32,473	35,071	790	44.39	45.29	−.90
Staraya Artil	24,468	26,425	600	44.04	43.15	+.89
Zapadni	3,453	3,729	186	20.05	18.87	+1.18
South	810	875	139	6.29	6.09	+.20
East Reef	7,441	8,036	163	49.30	55.53	−6.23
East Cliffs	21,245	22,945	388	59.14	57.57	+1.57
Total	89,890	97,081	2,266	42.84	42.74	+.10
Total (both islands)	487,883	526,848	12,321	42.76	42.25	+.51

PUPS AND COWS

There were no indications of a shortage in the number of cows returning to the islands this season. Rookery areas continued to expand to such an extent that it seemed probable that the estimated number of cows had returned. A considerable expansion of areas, however, does not necessarily mean that any greatly increased number of cows has appeared. Newly expanded areas cover a large ground, but these areas are not as thickly populated as the main portions of the rookery.

Inasmuch as it is now impracticable to make a count of the pups on all rookeries, it is necessary in this computation to continue to use the average rate of increase of 8 percent in the number of cows and pups, as determined by actual counts from 1917 to 1922, inclusive. This method gives a fairly accurate estimate of the growth of the herd, although it now appears likely that the rate of increase may be smaller as the size of the herd as a whole increases. It would seem, also, that there may be a considerable increase in the proportion of dead to living pups as the herd increases and rookery areas expand and become more congested.

This season the pups were paddling in the water and learning to swim several weeks earlier than usual. Apparently they were affected by the hot weather. Although they were not as large or strong as they ordinarily are when learning to swim, there was probably no increase in death rate because of this, as there were no heavy storms at the time.

Inasmuch as most of the cows have but one pup, the number of cows on the rookeries is the same as the number of pups.

Distribution of pups on the Pribilof Islands, Aug. 10, 1936, and comparison with distribution in 1935

Rookery	1936				1935	1936
	Living pups	Dead pups	Total pups	Percent dead pups	Total pups	Increase
St. Paul Island:						
Kitovi	17,174	256	17,430	1.47	16,139	1,291
Lukanin	8,244	183	8,427	2.17	7,803	624
Gorbatch	43,875	381	44,256	.86	40,978	3,278
Ardiguen	4,086	100	4,186	2.39	3,876	310
Reef	87,597	1,298	88,895	1.46	82,310	6,585
Sivutch	26,539	664	27,203	2.44	25,188	2,015
Lagoon (actual count)	59		59		115	−56
Tolstoi	51,603	727	52,330	1.39	48,454	3,876
Zapadni	49,426	865	50,291	1.72	46,566	3,725
Little Zapadni	24,994	641	25,635	2.50	23,736	1,899
Zapadni Reef	882	7	889	.80	823	66
Polovina	17,797	277	18,074	1.53	16,735	1,339
Polovina Cliffs	9,713	183	9,896	1.85	9,163	733
Little Polovina	3,514	90	3,604	2.51	3,337	267
Morjovi	6,347	131	6,478	2.02	5,998	480
Vostochni	70,614	1,500	72,114	2.08	66,772	5,342
Total	422,464	7,303	429,767	1.70	397,993	31,774
St. George Island:						
North	34,580	491	35,071	1.40	32,473	2,598
Staraya Artil	25,743	682	26,425	2.58	24,468	1,957
Zapadni	3,687	42	3,729	1.12	3,453	276
South	860	15	875	1.72	810	65
East Reef	7,915	121	8,036	1.51	7,441	595
East Cliffs	22,603	342	22,945	1.49	21,245	1,700
Total	95,388	1,693	97,081	1.74	89,890	7,191
Total (both islands)	517,852	8,996	526,848	1.71	487,883	38,965

MORTALITY OF SEALS AT SEA

There are some indications that mortality rates of seals at sea should be increased. The rates naturally fluctuate considerably from year to year. For several years there has not been as large an increase in the number of killable seals as was to be expected on the basis of using the present mortality rates. If this continues it will be an indication that with the growth of the herd natural enemies, diseases, or unfavorable conditions at sea increase faster than the seals increase, and larger mortality rates will be necessary.

COMPLETE COMPUTATION

The following summary shows the number of the various classes of animals in the Pribilof Islands herd in 1936. The methods used to compute the number of animals in each class are also shown. The total number of seals of all classes is estimated to be 1,689,743. This is an increase of 8.95 percent over the preceding year. The larger percentage increase than in former recent years is due to the smaller take of 3-year-old males, which naturally leaves a greater percentage of living animals of this class. The estimate, of course, is based on the assumption that the usual percentage of 3-year-olds survived but did not return to the islands.

Complete computation of fur seals, Pribilof Islands, as of Aug. 10, 1936

Class	St. Paul Island	St. George Island	Total
Pups, estimated	429,767	97,081	526,848
Breeding cows, 3-years old and over, by inference	429,767	97,081	526,848
Harem bulls, counted	10,055	2,266	12,321
Idle bulls, counted	2,253	480	2,733
Yearlings, male and female, estimated:			
Females born in 1935	198,996	44,945	243,941
Natural mortality, 40 percent	79,598	17,978	97,576
Yearling females, Aug. 10, 1936	119,398	26,967	146,365
Males born in 1935	198,997	44,945	243,942
Natural mortality, 40 percent	79,599	17,978	97,577
Yearling males, Aug. 10, 1936	119,398	26,967	146,365
2-year-olds, male and female, estimated:			
Yearling females, Aug. 10, 1935	110,556	24,970	135,526
Natural mortality, 15 percent	16,583	3,746	20,329
2-year-old females, Aug. 10, 1936	93,973	21,224	115,197
Yearling males, Aug. 10, 1935	110,555	24,970	135,525
Natural mortality, 17.5 percent	19,347	4,370	23,717
2-year-old males beginning 1936	91,208	20,600	111,808
2-year-old males killed in 1936	923	380	1,303
2-year-old males, Aug. 10, 1936	90,285	20,220	110,505
3-year-old males, estimated:			
2-year-old males, Aug. 10, 1935	83,575	18,980	102,555
Natural mortality, 12.5 percent	10,447	2,372	12,819
3-year-old males beginning 1936	73,128	16,608	89,736
3-year-old males killed in 1936	41,394	8,172	49,566
3-year-old males, Aug. 10, 1936	31,734	8,436	40,170

Complete computation of fur seals, Pribilof Islands, as of Aug. 10, 1936—Continued

Class	St. Paul Island	St. George Island	Total
4-year-old males, estimated:			
3-year-old males, Aug. 10, 1935	24,088	4,077	28,165
Natural mortality, 10 percent	2,409	408	2,817
4-year-old males beginning 1936	21,679	3,669	25,348
4-year-old males killed in 1936	1,045	312	1,357
4-year-old males, Aug. 10, 1936	20,634	3,357	23,991
5-year-old males, estimated:			
4-year-old males, Aug. 10, 1935	17,599	3,497	21,096
Natural mortality, 10 percent	1,760	350	2,110
5-year-old males beginning 1936	15,839	3,147	18,986
5-year-old males killed in 1936	1		1
5-year-old males, Aug. 10, 1936	15,838	3,147	18,985
6-year-old males, estimated:			
5-year-old males, Aug. 10, 1935	11,606	2,670	14,276
Natural mortality, 20 percent	2,321	534	2,855
6-year-old males, Aug. 10, 1936	9,285	2,136	11,421
Surplus bulls, 7 years old and over, estimated:			
6-year-old males, Aug. 10, 1935	9,647	1,470	11,117
Natural mortality, 20 percent	1,929	294	2,223
7-year-old males, Aug. 10, 1936	7,718	1,176	8,894
Surplus bulls, Aug. 10, 1935	(1)	(1)	6,139
Natural mortality, 30 percent			1,842
Remaining surplus for 1936			4,297
Breeding bulls of 1935	11,526	2,556	14,082
Natural mortality, 30 percent	3,458	767	4,225
1935 bulls remaining in 1936	8,068	1,789	9,857
Breeding bulls of 1936	12,308	2,746	15,054
1935 bulls remaining, deducted	8,068	1,789	9,857
Increment of new bulls in 1936	4,240	957	5,197
7-year-old males computed for 1936	7,718	1,176	8,894
Surplus bulls computed for 1936			4,297
Total theoretical bull stock for 1936			13,191
New increment of breeding bulls deducted			5,197
Surplus bulls, Aug. 10, 1936			7,994

[1] Estimates have been worked out, insofar as possible, to show approximate number of seals of each class which should be credited to each island. Seals do not, however, haul out in accordance with figures given. Seals born on either island frequent the other island. They travel promiscuously between and haul out on either of the 2 islands. The total for both islands, however, is approximately correct.

RECAPITULATION

Class	Total	Class	Total
Pups	526,848	5-year-old males	18,985
Cows	526,848	6-year-old males	11,421
Harem bulls	12,321	Surplus bulls	7,994
Idle bulls	2,733		
Yearling females	146,365	Total, 1936	1,689,743
Yearling males	146,365	Total, 1935	1,550,913
2-year-old females	115,197		
2-year-old males	110,505	Numerical increase, 1936	138,830
3-year-old males	40,170	Percent increase, 1936	8.95
4-year-old males	23,991		

U. S. DEPARTMENT OF COMMERCE
DANIEL C. ROPER, Secretary
BUREAU OF FISHERIES
FRANK T. BELL, Commissioner

Administrative Report No. 29

PROGRESS IN BIOLOGICAL INQUIRIES 1936

By ELMER HIGGINS

APPENDIX III TO REPORT OF COMMISSIONER OF FISHERIES
FOR THE FISCAL YEAR 1937

UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON : 1938

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ADMINISTRATIVE REPORT SERIES

Since the beginning of the Administrative Report Series, considerable confusion has arisen concerning the system of numbering the separates composing it. Inasmuch as the Reports of the Divisions vary in order from year to year, many have found their designations as "Appendix No. I, II, III, or IV" very confusing. To relieve this, it has been decided to number them as "Administrative Report No. —." Inasmuch as 20 separates had already been printed in this series before starting the numbers, it was deemed advisable to begin the numbering with Administrative Report No. 21. Of course, numbers cannot be printed on those already off the press, but for the information of those who wish to know what the first 25 were, they are numbered for filing purposes as follows:

No. 1. Report, Commissioner of Fisheries, 1931.
No. 2. Alaska Fishery and Fur-Seal Industries, 1930.
No. 3. Fishery Industries of the United States, 1930.
No. 4. Progress in Biological Inquiries, 1930.
No. 5. Propagation and Distribution of Food Fishes, 1931.
No. 6. Report, Commissioner of Fisheries, 1932.
No. 7. Alaska Fishery and Fur-Seal Industries, 1931.
No. 8. Fishery Industries of the United States, 1931.
No. 9. Progress in Biological Inquiries, 1931.
No. 10. Propagation and Distribution of Food Fishes, 1932.
No. 11. Alaska Fishery and Fur-Seal Industries, 1932.
No. 12. Progress in Biological Inquiries, 1932.
No. 13. Fishery Industries of the United States, 1932.
No. 14. Propagation and Distribution of Food Fishes, 1933.
No. 15. Fishery Industries of the United States, 1933.
No. 16. Alaska Fishery and Fur-Seal Industries, 1933.
No. 17. Progress in Biological Inquiries, 1933.
No. 18. Propagation and Distribution of Food Fishes, 1934.
No. 19. Alaska Fishery and Fur-Seal Industries, 1934.
No. 20. Fishery Industries of the United States, 1934.
No. 21. Progress in Biological Inquiries, 1934.
No. 22. Propagation and Distribution of Food Fishes, 1935.
No. 23. Alaska Fishery and Fur-Seal Industries, 1935.
No. 24. Fishery Industries of the United States, 1935.
No. 25. Propagation and Distribution of Food Fishes, 1936.

Note that the last Commissioner's Report was for 1932. Since then its place has been taken by a reprint from the Report of the Secretary of Commerce under the title "Bureau of Fisheries." Inasmuch as it is no longer a Bureau publication, it is not numbered; but it will be supplied to any who request the Report of the Commissioner for any year since 1932.

PROGRESS IN BIOLOGICAL INQUIRIES, 1936 [1]

By ELMER HIGGINS, *Chief, Division of Scientific Inquiry*

[With the collaboration of investigators]

CONTENTS

[1] Administrative Report No. 29, Appendix 3 to Report of the U. S. Commissioner of Fisheries for 1937. Approved for publication Oct. 22, 1937.

INTRODUCTION

The mastery and utilization of the forces of nature depend first of all upon an understanding of natural laws. With such a knowledge these forces can be harnessed, controlled, and directed to economic advantage in some cases or, if they are uncontrollable, human activities can be ordered in accordance therewith. The scientific studies of the Bureau of Fisheries provide a body of facts of permanent value regarding the natural history of fishes upon which commercial and sport fishing depends. Such contributions to our knowledge are therefore permanent contributions to social progress even though opportunities for practical application may not have been realized completely as yet by business enterprise, nor in Governmental organization.

The following illustrations show ways in which these facts are being turned to practical advantage in fishery management. The annual runs of salmon on the Pacific coast and in Alaska are managed by regulating commercial fishing in such a way that ample natural reproduction is assured to sustain the supply and at the same time to provide ever increasing quantities of nutritious food.

Knowledge of the variations in natural reproduction, growth, movements, and local concentrations of the haddock, mackerel, squeteague, and other fishes on the Atlantic and Gulf coasts permits prediction of annual yields of some species to promote orderly and efficient marketing of the catch, directs the way to better utilization of the fish supply through avoiding the waste of immature and unmarketable fish, and demonstrates the necessity of protecting the breeding and nursery grounds of migratory coastal fishes by unified State action throughout the range of the fishery.

A knowledge of the reproduction, growth, and natural requirements of the oyster recently obtained has laid the foundation for a great expansion of oyster farming in our coastal waters that may be relied upon to restore production of this valuable food product to its former high levels when economic conditions permit.

In interior waters, studies of stream pollution have made permanent contribution to the restoration of recreational resources. Through this work an understanding of the effects of domestic sewage, industrial wastes, and other pollutants on aquatic life has been acquired. Future efforts toward the purification of streams and the restoration of angling waters may therefore proceed along intelligently directed lines.

As an outgrowth of these studies there has been developing a definite trend in public thought toward international and interstate cooperation in the conservation of fishery resources.

In the interest of properly administering an extensive program of scientific investigations concerning the fundamental problems of conservation, and application of the knowledge acquired to the problems of practical fishery management, the Division of Scientific Inquiry is organized into eight separate sections each with a responsible experienced fishery biologist in charge who reports direct to the Washington office. Such organization provides a desirable degree of decentralization of administrative control and permits direct attack upon the problems of major importance in each district.

In the field of commercial fishery investigation the North and Middle Atlantic section, with headquarters at the Harvard Biological Laboratories, Cambridge, Mass., is concerned with the marine fisheries of New England and the coastal fisheries of the Middle Atlantic States. The South Atlantic and Gulf section, with headquarters at New Orleans, La., is engaged at the present time in a study of the great shrimp fishery from North Carolina to Texas. The Pacific coast and Alaska section, with headquarters at the United States Fisheries Biological Laboratory, Seattle, Wash., is engaged in a study of the fisheries of the Columbia River, Puget Sound, and Alaska. The Great Lakes section maintains headquarters at the University of Michigan, Ann Arbor, and has been engaged for several years in a comprehensive study of the commercial fisheries of the Great Lakes. These units cover the major regions of the United States where important commercial fisheries are prosecuted, with the exception of the southern Pacific coastal area.

The fields of marine shellfisheries and fishery problems in interior waters are not organized upon a regional basis. The section on marine shellfish investigations is concerned primarily with oyster culture and incidentally with clam culture and related problems. Headquarters are maintained in Washington but field laboratories are established at Milford, Conn., and Beaufort, N. C. Temporary laboratories were maintained at Apalachicola, Fla., and during the early part of the year at Olympia, Wash.

Studies of interior fisheries are conducted by the sections on aquicultural investigations and on investigations in interior waters. The former is concerned primarily with the problems of artificial propagation of fishes and the successful stocking of food and game fishes in streams and lakes. The latter is concerned primarily with the study of pollution in interior waters and with mussel propagation in the Mississippi drainage. Headquarters for aquicultural investigations are maintained in Washington but field activities are conducted at experimental hatcheries at Pittsford, Vt., and Leetown, W. Va. Nutrition studies are conducted in cooperation with Cornell University and the State of New York at Ithaca and Cortland, N. Y. A pathological laboratory is maintained in the fisheries laboratory at Seattle, Wash., and other field studies are conducted at the Bureau's fish-cultural stations, particularly in the Southern States. Investigators in interior waters have excellent laboratory and office facilities at the University of Missouri in Columbia.

The section on ichthyological investigations is housed in the laboratories of the Bureau of Fisheries at Washington, where extensive reference collections of fishes are stored and where the excellent ichthyological collections of the United States National Museum are readily available.

Progress reports of the investigations conducted by the various sections, prepared in the main by the section heads, are given in the following pages.

COOPERATION

In previous reports of the Division of Scientific Inquiry it has been a pleasure to acknowledge extensive cooperation in fishery investigations on the part of many agencies throughout the country. Cordial

cooperation of the same sort has continued during the past year, reflecting in a measure the growing appreciation of the need for more exact knowledge regarding the resource we seek to conserve. Cooperation with various agencies of the Federal Government has been effective; the most outstanding services have been rendered by the United States Forest Service. As a result of a cooperative agreement between the two organizations, the Bureau of Fisheries has assumed responsibility for conducting investigations in forest waters, looking to the perfection of a rational system of stocking and management of supplies of game fishes, improvement of streams to increase productivity, and the regulation of angling. Vested with extensive administrative authority, the Forest Service has actively engaged in stream-improvement construction, preliminary stream surveys, the stocking of forest waters along plans devised by the Bureau of Fisheries, and the regulation of the catch of anglers. Detailed plans for experimental management in various national forests have been developed which materially extend the facilities of this Bureau in acquiring necessary knowledge in this field.

Numerous States have likewise cooperated with the Bureau of Fisheries in investigative work. These include Georgia, Louisiana, and Texas, in connection with the shrimp investigations; Michigan, Ohio, and New York in the collection of detailed statistics for the biological analysis of varying yields of Great Lakes fishes; Connecticut, Virginia, Alabama, and Washington in oyster investigations; and Vermont and California in aquicultural studies. Misisssippi has assisted in an ichthyological survey of its State waters.

Various private agencies have also rendered valuable aid to this Division. Notable among them is the Woods Hole Oceanographic Institution, which has furnished its research vessel *Atlantis* for collections in the offshore New England waters in connection with the study of the haddock and mackerel. Laboratory, office, and library facilities for various sections have been provided by many universities as noted above.

In a somewhat different category from the above type of cooperation, which has included in some cases the furnishing of personnel, boats, laboratory quarters, or services directly concerned with fishery investigations, is the work of the U. S. Corps of Engineers, War Department, which forwarded the study of problems of fish protection at Bonneville Dam on the Columbia River. These studies were originally undertaken by the Bureau of Fisheries under a grant of funds from the War Department, as reviewed in previous annual reports. Because of budgetary limitation, however, it became necessary for the War Department to undertake on its own part the designing of fish protective works and the supervision of their construction. Harlan B. Holmes, Associate Aquatic Biologist of the Bureau of Fisheries, was detailed to the War Department under an extended leave of absence and has been placed in charge of this work. He has conducted the necessary detailed investigations with additional assistants furnished by the Corps of Engineers and reports direct to the District Engineer. The Bureau of Fisheries has maintained close contact with the entire problem, however, reviewing all plans for fish protection and assisting in various other ways with helpful advice and suggestions.

PUBLICATIONS

Owing to the curtailment of funds for printing, the number of publications resulting from investigations of the staff or conducted under the supervision of the Division has been reduced. The list of papers published by the Bureau during 1936 follows:

BIGELOW, HENRY B., and WILLIAM C. SCHROEDER.
Supplemental notes on fishes of the Gulf of Maine. Bulletin No. 20, 24 pp.

DAVIDSON, FREDERICK A., and O. EUGENE SHOSTROM.
Physical and chemical changes in the pink salmon during the spawning migration. Investigational Report No. 33, 37 pp., 15 figs.

DAVIS, H. S.
Care and diseases of trout. Investigational Report No. 35, 76 pp., 15 figs. (Revision of Document No. 1061 and Investigational Report No. 22.)

HERRINGTON, WILLIAM C.
Decline in haddock abundance on Georges Bank and a practical remedy. Fishery Circular No. 23, 22 pp., 15 figs.

HIGGINS, ELMER.
Progress in biological inquiries, 1935. Administrative Report No. 26, 72 pp.

HILE, RALPH.
Age and growth of the cisco *Leucichthys artedi* (LeSueur) in the lakes of the northeastern highlands, Wisconsin. Bulletin No. 19, 107 pp., 11 figs.

HOPKINS, A. E.
Adaptation of the feeding mechanism of the oyster (*Ostrea gigas*) to changes in salinity. Bulletin No. 21, 19 pp., 11 figs.

The following papers were published by members of the staff of the Division of Scientific Inquiry or cooperating investigators during the year 1936 outside of the Bureau of Fisheries series:

AHLSTROM, ELBERT H.
The deep-water plankton of Lake Michigan, exclusive of the crustacea. Transactions, American Microscopical Society, vol. 55, No. 3, pp. 286–299.

BURROWS, R. B.
Parasitism in the starfish. Science, vol. 84, No. 2180, October 9, p. 329.

DAHLGREN, EDWIN H.
Further developments in the tagging of the Pacific herring, *Clupea pallasii*. Journal du Conseil International pour l'Exploration de la Mer, vol. 11, No. 2.
Research shows many herring groups on coast. Annual fisheries edition Ketchikan Chronicle, September 6.

DAVIDSON, FREDERICK A.
How fishing districts are determined. Annual fisheries edition Ketchikan Chronicle, September 6.

DAVIS, H. S.
Steam improvement in national forests. Proceedings, North American Wildlife Conference, pp. 447–453.

EGGLETON, FRANK E.
The deep-water bottom fauna of Lake Michigan. Papers of the Michigan Academy of Science, Arts, and Letters, vol. 21, 1935 (1936), pp. 599–612.
Productivity of the profundal benthic zone in Lake Michigan. Papers of the Michigan Academy of Science, Arts, and Letters, vol. 22, 1936 (1937).

ELLIS, M. M.
Erosion silt as a factor in aquatic environments. Ecology, 17, pp. 29–42.
Effects of pollution on fish. Wyoming Wildlife, vol. 1, No. 8, pp. 15–18.
Effects of pollution on fish. North American Wildlife Conference. Senate Committee Print, 74th Cong., 2d sess., pp. 564–567.
Effects of pollution on fish. Illinois Conservation, vol. 1, No. 4, pp. 10–12.
Some fisheries problems in impounded waters. Transactions American Fisheries Society, vol. 66, pp. 63–71.

ELLIS, M. M. and D. B. CALVIN.
Glycogen content of fresh-water mussels during prolonged starvation. Proceedings of the Society for Experimental Biology and Medicine, vol. 34, pp. 222–225.

FIRTH, F. E.
Gephyroberyx darwinii (Johnson), a berycoid fish new to the North American fauna. Copeia, No. 2 (1936), p. 126.

FIRTH, F. E., and E. W. GUDGER.
Three partially ambicolorate four-spotted flounders, *Paralichthys oblongus*, two each with a hooked dorsal fin and a partially rotated eye. American Museum Novitates, No. 885.

FIRTH, F. E., and J. T. NICHOLS.
A new triacanthid fish and other species from deep water off Virginia. American Museum Novitates, No. 883.

GALTSOFF, PAUL A.
Oil pollution in coastal waters. Proceedings, North American Wildlife Conference, pp. 550–555.

HIGGINS, ELMER.
Research facilities of the U. S. Bureau of Fisheries. Collecting Net, vol. 11, No. 9–10, December, pp. 217 and 252–256.
The importance of conservation. Fishing Gazette, vol. 53, No. 10, p. 13.

HILE, RALPH.
Low production may not mean depletion. The Fisherman, vol. 5, No. 2, pp. 1–2.
Summary of investigations on the morphometry of the cisco, *Leucichthys artedi* (LeSueur), in the lakes of the northeastern highlands, Wisconsin. Papers of the Michigan Academy of Science, Arts, and Letters, vol. 21, pp. 619–634.
Age determination of fish from scales; method and application to fish cultural problems. The Progressive Fish Culturist, No. 23, October, pp. 1–5.
The increase in the abundance of the yellow pike-perch, *Stizostedion vitreum* (Mitchill), in relation to the artificial propagation of the species. Transactions, American Fisheries Society, vol. 66, pp. 143–159.

HILDEBRAND, SAMUEL F.
The tarpon in the Panama Canal. Scientific Monthly, vol. 44, March, pp. 239–248.

HOPKINS, A. E.
Ecological observations on spawning and early larval development in the Olympia oyster (*Ostrea lurida*). Ecology, vol. 17, pp. 551–565.
Pulsating blood vessels in the oyster. Science, vol. 83, June 12, p. 581.
Pulsation of blood vessels in oysters, *Ostrea lurida* and *O. gigas*. Biological Bulletin, vol. 70, pp. 413–425.

LINDNER, MILTON J.
Suggestions for the Louisiana shrimp industry. 12th Biennial Report of the Department of Conservation of the State of Louisiana, pp. 151–167.
Shrimp. Jefferson Parish Yearbook, pp. 31–39.
A discussion of the shrimp trawl-fish problem. Louisiana Conservation Review, vol. 5, No. 4, pp. 12–17 and 51.

LORD, RUSSELL F.
The "test stream" and fish management. Proceedings, North American Wildlife Conference, pp. 317–322.

NEEDHAM, P. R.
Stream improvement in arid regions. Proceedings, North American Wildlife Conference, pp. 453–460.
The Hot Creek rearing ponds. California Fish and Game, vol. 22. pp. 118–125.

SHAPAVALOV, LEO.
Food of the striped bass. California Fish and Game, vol. 22, pp. 261–271.

SURBER, E. W.
Rainbow trout and bottom fauna production in one mile of stream. Transactions, American Fisheries Society, vol. 66, pp. 193–202.

TAFT, A. C.
The Waddell Creek experimental station for trout and salmon studies. California Fish and Game, vol. 22, pp. 99–104.

VAN OOSTEN, JOHN.
A new immigrant comes to Michigan. The Fisherman, vol. 5, No. 6, pp. 1 and 3.
The mortality of fish in Lake Erie. Great Lakes Fisherman, vol. 1, No. 3, August, pp. 2 and 10; No. 4, September, pp. 2–3. Also in Biennial Rept., Board of Fish Commissioners of Pennsylvania, 1937.

VAN OSTEN, JOHN—Continued.
Lake fisheries facing extermination. The Fisherman, vol. 5, No. 11, pp. 1 and 3. (Also under title "Are fisheries facing extermination?" Great Lakes Fisherman, vol. 1, No. 7, December, p. 3.)
The age and growth of the Lake Superior longjaw (*Leucichthys zenithicus* Jordan and Evermann). Papers Michigan Academy of Science, Arts, and Letters, vol. 22.
The Great Lakes fisheries; their proper management for sustained yields. Transactions American Fisheries Society, vol. 66, pp. 131–138.
The dispersal of smelt, *Osmerus mordax* (Mitchill), in the Great Lakes region. Transactions American Fisheries Society, vol. 66, pp. 160–170.
WALFORD, L. A.
Current fishery research in America. Collecting Net, vol. 11, No. 8, August 29.

MULTIGRAPHED PUBLICATIONS

U. S. BUREAU OF FISHERIES (Division of Scientific Inquiry).
The Progressive Fish Culturist. Memorandum I–131, issued monthly.
Fish and Shellfish of the Middle and South Atlantic States. Memorandum I–134–b.
Fish and Shellfish of the Gulf States. Memorandum I–134–c.
VAN OOSTEN, JOHN.
Fishing Industry of the Great Lakes. Memorandum I–63.

NORTH AND MIDDLE ATLANTIC FISHERY INVESTIGATIONS

O. E. SETTE, *in charge*

The upward surge in fish prices and the increased activity in the fishing business which were noted in 1935 continued in 1936, with the result that New England fishery landings reached the highest figure in recent years. Although there was a decline in the landings of several of the staple species such as mackerel, haddock, and cod, this decline was more than offset by increases in the landings of rosefish from 17 to 66.6 million pounds, and in vessel-caught whiting from less than 2 to nearly 18 million pounds. The fishing fleet operated at nearly full capacity throughout the year and experienced its first major expansion since predepression years with the addition of more than a dozen new boats to its numbers. Six of these were large otter trawlers averaging 120 feet in length and 500 horsepower.

The productivity of the various species in general remained satisfactory, although the mackerel catch declined 24 percent from the previous year, owing to a lowered abundance of mackerel as a result of poor survival from the spawning of 1935. However, the catch remained considerably above the average for the present decade.

The haddock fishery on Georges Bank continued to improve from the low level of 1930–31, but remained far below the 1925–29 level. On the Nova Scotian Banks the average productivity was less than during the preceding year owing to the scarcity of haddock spawned since 1929.

Biological investigations were confined to a few of the more important New England and Middle Atlantic fisheries problems. Many others could not be covered because of limited personnel and facilities. Among these was rosefish, which has reached the proportions of a major fishery and about which little is known. The cod population has been subject to increasing exploitation as the haddock supply has diminished, but it is not known what effect the increased strain has had upon its abundance. The yield of flounders has de-

creased considerably during the past decade in spite of the increased utilization of species formerly discarded as trash. Neither the cause of the decline nor the effectiveness of restrictive flounder-fishing legislation in force in some States is known. The fishery for whiting has experienced a great expansion in the past year, giving rise to considerable controversy between trap fishermen and vessel fishermen over the question of whether the increased exploitation is endangering the resource. In this, as in other similar cases, no recommendations could be made owing to the lack of knowledge of the distribution and biology of the species.

Although excellent progress was made during the year in the investigation of the several species receiving special study, certain phases were either entirely neglected or only superficially covered owing to lack of personnel or facilities for work at sea. The mackerel work needs hydrographic and plankton observations to further unravel the mystery of spawning failures so as to foresee the crop of yearling mackerel. The haddock work also requires facilities for deep-sea otter trawling and assistants for tagging and clerical work to extend the catch analysis to supplementary species such as cod and pollock and thus determine what effect their greater exploitation has on the catch of haddock.

The improved method of reporting the landings of the New England vessel fishery, placed in operation at the beginning of 1936, has already demonstrated its value through the enhanced usefulness of the catch records to the biological study of the fisheries. This method was worked out in conjunction with the Division of Fishery Industries and was designed to provide an accurate record of the catch from each fishing area. The areas used were delineated in cooperation with members of the North American Council on Fishery Investigations and it is hoped that eventually the statistics of the various countries will be reported according to this uniform scheme of statistical areas.

Another interesting development during the past year was the exploratory shrimp trawling in the Gulf of Maine. The first cruises were sponsored by Prof. Johan Hjort of Norway and the Woods Hole Oceanographic Institution. After the early work on the *Atlantis* had demonstrated the presence of the shrimp *Pandalus borealis* in considerable quantities, two organizations, Federated Fishing Boats of New England and New York, Inc. and Fisherman's Relief Corporation of Portland, Me., supplied the boat and funds for further exploration. Results indicate that this species may be sufficiently abundant to support a small-boat fishery during certain seasons of the year.

Works Progress Administration Project No. 65–14–1833, begun in June 1936, was continued through the year under the supervision of Messrs. Sette, Herrington, and Nesbit. This project included the compilation of published statistics of New England fisheries, tabulation and analysis of statistical records of the haddock, mackerel, and shore fisheries, and the mounting of an extensive series of haddock, cod, and weakfish scales using the recently developed celluloid impression method.

The headquarters of the North Atlantic staff has remained in the Harvard Biological Laboratories where Harvard University has gen-

erously provided space and facilities for the work. The cooperation of the Woods Hole Oceanographic Institution is gratefully acknowledged, especially the assignment of the research vessel *Atlantis* for haddock trawling cruises, and the personal advice and interest of Prof. Henry B. Bigelow. The assistance and cooperation of fishermen and fish dealers in permitting the use of their records and in other ways is also acknowledged with pleasure.

HADDOCK

The great New England otter-trawl fishery, a development of the past two decades, has depended to a large extent on the extensive haddock populations found on Georges and the Nova Scotian Banks. The increasing catch of haddock roughly paralleled the increase in the number of boats until 1929, when the total catch began to decline despite the increased fishing effort. In the fall of 1930 the Bureau inaugurated an investigation of the haddock fishery to determine the basic causes for the declining catch. The program of investigation was designed to obtain an accurate measure of the extent and cause of changes in the abundance of haddock and to develop a practical plan of management that would maintain the fishery at maximum productiveness.

Owing to the extent and variability of the fishery, the objectives required the establishment of a long-period program of observation and study. This program has produced results that are encouraging although progress has been slow because of limited personnel and facilities for work at sea. It has now been shown that the haddock populations on the New England and Nova Scotian Banks are subject to wide fluctuations in abundance not only from year to year, but to an even greater extent over periods of years. Since 1922 the greatest increase in abundance in successive years (as shown by average catch per unit of fishing effort) was about 40 percent, while the greatest decrease was between 40 and 50 percent. However, over a period of years the range of variation has been much greater, with increases running as high as 220 percent and decreases to the extent of 80 percent. Furthermore, analysis shows that since 1914 there have been two long-period cycles in haddock abundance on Georges Bank and adjacent areas. Minima in the abundance curve occurred during 1914–16, 1923, and 1930–31; while maxima appeared during 1918–19 and 1927. Since 1931, there has been a third upswing which by 1936 had increased the apparent abundance of marketable fish to nearly twice the 1931 minimum. Even with this increase, however, the present peak still is little more than one-third as high as the previous peak in 1927.

The direct cause of both long- and short-period fluctuations in abundance appears to be the success of year-class survival; i. e., the number of young of any single brood which reach commercial size during any year or period of years. It has been demonstrated that since 1923, when the records first began listing scrod haddock (1½- to 2½-pound fish) separately, increases in the level of abundance invariably have been accompanied or immediately preceded by increases in the catch of scrod; while decreases in the level of abundance have been accompanied or preceded by decreases in the scrod

catch. For example, the very poor fishing in 1930–31 was preceded by 3 years of very low scrod catches.

The commercial fishery does not appear to be the basic factor in fluctuations; it serves rather to accelerate the mortality rate and thereby to rapidly decimate a year class once it has reached a size that can be captured by the commercial otter trawls. Such a condition obtained during the 1924–29 period, when the annual landings from Georges Bank increased from 70 to about 220 million pounds. This intensive fishery, combined with a series of poor spawning seasons from 1926 to 1928, resulted in a precipitous decline from peak abundance in 1927 to the low point reached in 1931. Since 1931 there has been a gradual improvement on Georges Bank, due to the relatively successful spawning seasons in 1929, 1931, 1932, 1933, and 1934, and to the fact that the commercial fishery on Georges Bank has been much reduced, averaging for 1932–36 about 72 million pounds, compared to 170 million for the 1927–31 period.

The Nova Scotian Banks (Area XXI) remain the least understood of our major fishing grounds. Practically nothing is known about the distribution or abundance of young haddock below commercial size in this area. There appear to be considerable differences between the populations in the eastern (Banquereau), central (Sable Island and Emerald), and western (Browns) parts of the area, at least for the scrod sizes. Variations in abundance of the Browns Bank population appear to be determined by different factors from those that control the population about Sable Island. For instance, in 1933 when scrod became so abundant in the latter region, they were found in but moderate numbers on Browns Bank. Later, in 1935–36, the average catch per unit of effort of all haddock gradually declined in the Sable Island region while on Browns Bank it experienced a marked increase.

Area XXI was not extensively fished by the New England otter-trawl fleet until 1933 and 1934 when the abundant year class of 1929 reached commercial size and caused an eightfold increase in the scrod catch. In 1935 and 1936 the scrod catch rapidly declined, while the catch of large haddock increased 70 percent as the 1929 class grew from scrod to large haddock. The rapid decline in the scrod catch indicates that the year classes of 1930, 1931, and 1932 were all poor or failures in this area, in contrast to Georges Bank where the classes of 1931 and 1932 were relatively abundant.

Observations and study of the fishery were continued during 1936 under the direction of W. C. Herrington assisted by J. R. Webster and H. M. Bearse. Field observations consisted of work on the Boston Fish Pier and one trawling trip on the *Atlantis* in April to Georges Bank, South Channel, and the southwestern part of Browns Bank. The Fish Pier detail was covered principally by H. M. Bearse who obtained data providing an accurate record of fishing time, position, and other relevant information on all groundfish trips landed at that port, as well as length and scale samples from the haddock catches. Observations include 2,900 interviews, 87,000 length measurements, and 3,339 scale samples. The *Atlantis* trawling trip was made to obtain material for the study of abundance, distribution, and growth of 1-, 2-, and 3-year-old haddock which are below marketable size and cannot be obtained from the commercial catch. On this trip 107 hauls

were made, distributed over the area from South Channel to Browns Bank, and extensive haddock material was obtained, consisting of 5,654 length measurements, 3,358 scale samples, samples of stomach contents, and other data. In addition, considerable material was obtained on other species, and water temperatures for surface, bottom, and intermediate depths were recorded for all stations.

The *Atlantis* trip provided excellent data on the age and distribution of haddock in the Georges Bank region as well as more limited material for the southern part of Browns Bank. In the former area the largest numbers of haddock of commercial sizes (3-year fish and older) were found on central and northeastern Georges; 2-year fish were most abundant on the central part; and 1-year fish were found along the eastern and southeastern edge of the bank out to 60 fathoms. As a general rule, 1-year fish occurred in deeper water than the older fish. On the southern part of the bank, 1-year fish averaged 4 cm longer than those on the northeastern part. Material from Browns Bank indicates that this area may be a nursery ground for a considerable population of young fish. Of 910 haddock taken in 12 complete hauls, 52 percent were 1-year, 36 percent were 2-year, and the remainder mainly 3- and 4-year fish. The growth rate was found to be much slower than on Georges Bank. One-year haddock averaged 16.5 cm long compared to 20.7 cm for Georges Bank; 2-year fish, 24.4 cm compared to 36.8 cm; and 3-year fish, 35.2 cm compared to 46.6 cm.

Georges Bank and adjacent areas.—Analysis of the catch records of two groups of commercial trawlers for 1936 showed that the average daily catch per unit of fishing effort on the New England Banks (Area XXII—South, consisting of Georges Bank, South Channel, and Nantucket Shoals) was about 5 percent higher than in 1935, making 1936 the third successive year of the present upward trend. The improvement was due to the highest abundance of scrod in 10 years, which more than offset a slight decline in the abundance of large haddock. The high scrod catch resulted from exceptionally good year classes spawned in 1933 and 1934. In the fall and winter of the year there also was a considerable concentration of fishing activity on schools of small haddock of the 1935 class. These fish were less than 2 years old and averaged about 14 inches in length and 1 pound in weight.

As a result of the improved catches in Area XXII—South and somewhat reduced catches on the Nova Scotian Banks, the shift of fishing activities to the former area continued. Whereas, in 1935, 63 million pounds of haddock (40 percent of the total) came from Area XXII–South, in 1936 75 million pounds (about 53 percent) came from this area. A substantial increase in the total catch of these banks had been predicted in Progress in Biological Inquiries for 1935.

In previous reports it has been stated that the success of the fishery on the New England Banks is dependent on two factors: First, the rate at which the commercial stock declines as the result of catch and natural mortality; and second, the contribution to the commercial stock from the young haddock spawned 3 years earlier. Results from 1936 indicate that for the future the second part must be amended to include haddock spawned 2 years earlier, for during the summer and fall of 1936 a large part of the scrod catch was made up of 1934-class haddock.

It seems probable that the activities of the New England fleet will be concentrated in Area XXII—South to a somewhat greater extent in 1937 than in 1936, resulting in an increase in the first factor, "total mortality." The second factor—contribution of young fish to the commercial stock—will be supplied by the 1934 and 1935 year classes. Results of the *Atlantis* trips in 1935 and 1936 indicate that in Area XXII—South the 1934 class is somewhat less abundant than that of 1933, while the 1935 class is better than that of 1934. Conclusions from the *Atlantis* trips must be used with caution, however, until later evidence from the commercial fishery demonstrates that this relatively limited data constitutes a representative sample of the Georges Bank population.

If, however, we assume that the year-class rating from the *Atlantis* trawling is correct and that the fishing strain will be somewhat greater than in 1936, then on the New England Banks the catch per unit of effort of large haddock should be considerably less in 1937 than in 1936, while the scrod catch should be considerably less during the spring and early summer and equal or greater during the fall and winter of 1937 than during corresponding periods of 1936. Combined, these results will give an average catch of all haddock per unit of effort somewhat lower than in 1936, while, owing to the expected increase in fishing activity, the total landings should be somewhat greater. The validity of these conclusions is, of course, dependent on the valuation given the 1935 year class, which admittedly is subject to some question.

Nova Scotian Banks.—On the Nova Scotian Banks (Area XXI), the average catch per unit of effort declined about 5 percent under the previous year. This decline was characterized by a rapid falling off in the catch of scrod and an increase in that of large haddock. Although the average for 1936 was but 10 percent below the peak year of 1934, there is some evidence to indicate that the actual abundance has declined more drastically. These data have not yet been sufficiently examined to be considered at this time.

As a result of the decline in average yield and shift of fishing effort to the New England Banks and the rosefish fishery, the total haddock catch from Area XXI declined from 91 million pounds in 1935 to 65 million in 1936.

Because of limited material, predictions for the 1937 season for this area can be but tentative. Figures for catch per unit of effort include data from the whole area although more detailed analysis has indicated that the trends in abundance in the eastern and western parts of the area are dissimilar. The catch per unit (omitting Browns and La Have) has been declining around 10 percent annually since 1934. It seems probable that this decline will be continued or accelerated in 1937 unless the 1933 class proves to have been relatively successful in this region. At the present time no data are available on this question. The 1933 class was abundant in Area XXII—South, but so also were those of 1931 and 1932, and neither of the latter were of any importance in Area XXI except possibly on Browns Bank.

Browns Bank apparently must be considered independently from the remainder of Area XXI. Changes in catch per unit in this region do not appear to show any particular correlation with the abundance of scrod, as on the other banks, or with the population changes either

in Area XXII—South or in the remainder of Area XXI. At the present stage there does not appear to be any consistent basis for conclusions as to the 1937 trend on Browns Bank which, however, plays a relatively minor role in the Area XXI fishery. Tentative conclusions are that in 1937 the average catch per unit for Area XXI as a whole will be considerably below that of the previous year, and that this declining catching rate, combined with the resulting decrease in fishing intensity, will produce a considerable decline in haddock landings from this area.

Savings gear.—Recent developments continue to emphasize the importance of measures designed to reduce the destruction of small haddock. To an increasing extent the fishery in Area XXII—South is dependent on the catch of the smaller sizes (scrod) with the result that the trawlers are doing more fishing in areas where young haddock concentrate during the first 3 years. Furthermore, during 1936 there was an increasing trend toward the catching and sale of small haddock down to three-fourths pound and less in weight. In Area XXII—South these fish are less than 2 years old and usually are highly concentrated on certain parts of the bank. Consequently, when an abundant year-class reaches this age, the young fish can be caught up in great numbers. This practice is unfortunate, for should it increase it appears possible that the trawling fleet could nearly wipe out an entire year-class before it reaches an age of 2 years. These small fish bring a very low price on the market owing to their size. If left in the ocean another year, they would average twice as heavy and, belonging to a more valuable market category, would individually be worth nearly four times as much to the fisherman. In 2 years they would treble in weight and have about nine times the value.

Of the various measures designed to decrease the destruction and capture of undersized haddock, the most effective and practical is the establishment of a minimum mesh size for otter trawls. As the result of extensive field experiments in 1931 and 1932, the Bureau of Fisheries recommended that New England operators establish a minimum mesh size of 4¾ inches for use in all otter trawls. These recommendations, together with a full description of the experiments, were published in 1935 in Investigational Report No. 24. Little action resulted notwithstanding the clear evidence in favor of the larger mesh.

A nontechnical description of the savings gear work and of the importance of saving undersized fish was published in 1936 in Fisheries Circular No. 23. This publication, supplemented by considerable discussion between the Bureau's representatives and the various New England otter-trawl operators, finally resulted in voluntary action on the part of the trawling industry. In November 1936, the Board of Directors of Federated Fishing Boats of New England and New York, Inc., an organization including practically all of the New England operators of large- and medium-sized otter trawlers, unanimously voted that members of the Federation should begin the use of large-meshed otter trawls recommended by the United States Bureau of Fisheries, to begin early in 1937 and continue for a period of 6 months, unless terminated at an earlier date by vote of the Board of Directors. The agreement was to apply to all boats with an overall length of more than 70 feet, catching fish other than rosefish and whiting landed at Maine and Massachusetts ports.

MACKEREL

During 1936 the abundance of mackerel remained at a fairly high level although the total catch, 40,173,400 pounds, represented a decrease of 24 percent as compared with the previous year. This decrease was due to lowered abundance of mackerel in the areas fished by the fleet as a result of poor survival of young from the spawning of 1935. This year-class furnished so few new recruits that they failed to offset more than one-sixth of the losses sustained through the ordinary mortality of the previously existing stock. Though the abundance has been materially lowered, it still remains well above the average for the present decade.

In order to afford opportunity to prepare for publication results of the previous years of mackerel investigations, field work during 1936 was limited to the minimum necessary to provide continuous understanding of current changes in the condition of this resource. As in previous years, this investigation has been under the direction of Oscar E. Sette, who was assisted in the field work by Frank E. Firth. Statistics on the daily landings of each vessel in the fleet were obtained from 12 ports, principally Cape May, N. J., New York, N. Y., New Bedford, Boston, and Gloucester, Mass. Interviews with the fishermen covered 1,017 out of 2,188 fishing trips, and 669 samples were taken from 647 fares landed. The lengths of 44,843 individuals in the samples were recorded and scales were collected from 1,040 mackerel.

Early in the season of 1936 there was issued a prediction of the probable conditions of abundance during the current year. At that time it was evident that the stock of mackerel present in 1935 was such as to provide a 1936 level of abundance 20 percent below that of the previous year. This estimate was exclusive of any mackerel which might be provided by the class of 1935 which was due to make its appearance in the commercial fishery in 1936. Actually the yield of the fishery in 1936, exclusive of the new-year class, was 38,000,000 pounds or within 29 percent of the previous year. The class of 1935 provided 2,000,000 pounds of mackerel, making the net decline 24 percent.

Continuation of research on the natural history and the fluctuations in abundance of the mackerel provided more definite information than has been available heretofore on seasonal movements, location of important spawning grounds, rate of growth during larval, juvenile, and adult existence, fluctuations in annual birth rate (or survival of the young), and the attendant effects on the commercial stock available to the fishery. Continued studies have also provided additional insight into the migratory, spawning, feeding, and schooling habits of the mackerel. Progress has been made in discovering relationship between the southern and northern subdivisions of the stock which have been found to have an important bearing on the availability to our fishermen. These and related subjects are being incorporated in a report intended for publication.

SHORE FISHES OF THE MIDDLE ATLANTIC STATES

Responsible leaders of the fishing industry and of angler organizations recognize that a comprehensive conservation policy is urgently

needed for the Middle Atlantic region. They recognize further that because of the migratory habits of the fish, the division of jurisdiction among many States, and the interstate traffic in the products of the fishery, the problem is far beyond the scope of the conservation organizations of the several States. Commercial fishermen and sportsmen have, therefore, united in urging that the Bureau undertake at once the scientific and economic studies necessary for formulation of a conservation policy designed to correct the evident and increasing depletion of several important species.

The increase in fishing activity in response to improved general economic conditions, and the continued growth of the winter fishery with its attendant additional strain on the stocks of several species, make the situation even more critical. Since several years will be required to complete the necessary investigations, it is urgent that facilities be provided promptly.

Squeteague.—R. A. Nesbit, assisted by W. C. Neville, continued analysis of data collected from 1927 to 1935, inclusive, and brought a comprehensive manuscript on the problems of squeteague conservation nearly to completion. The principal results of the investigation were summarized in Progress in Biological Inquiries for 1935.

Scup.—In 1936 investigation of this species was confined to observations and analysis of landings of the southern winter trawl fishery to determine the yield, the size and age composition of the catch, and the extent of destruction by discarding at sea of small-sized fish. These field observations were made by Frank E. Firth, and the compilation and analysis was, as in former years, continued by William C. Neville. In addition, Mr. Neville made considerable progress on a detailed report on the life history of the species, with special reference to the causes of fluctuations in yield.

The yield of scup of the offshore winter trawl fishery in 1936 rose to a record high level (4,979,000 pounds), and again constituted an important part of the total yield of this fishery, accounting for approximately 26 percent of the total landings of important food fishes (scup, sea bass, croakers, fluke, squeteague). The causes of this increase cannot be definitely stated, for the yield is influenced not only by abundance but by variations from year to year in availability due to changes in hydrography, and by market conditions affecting the amount of fishing effort. In spite of the intensity of the fishery, there is no reason to suspect any decrease in abundance as compared with other recent years. As in the preceding four winters, the landed catch consisted principally of small- and medium-sized scup (¼- to ¾-pound) representing fish 2 to 4 years of age.

Discarding of smaller sizes of scup (7 inches and less) was continued during the winter of 1936. Although accurate information is not available as to the exact quantity, it is believed that considerably fewer of these fish were thrown overboard than in 1934, when the amount of discarding constituted approximately 20 percent by weight and 40 percent by number of the total catch of scup. The discarded scup usually include all of the yearlings and approximately half of the 2-year-olds. Since no observations have been made in the past 4 years in the summer pound-net fishery, where better estimates of the abundance of these sizes can be obtained, it is not known whether the

diminished catch by the 1936 winter fishery of these smaller sizes of scup represents an actual decrease in relative abundance, or lesser availability than in previous winters.

Gear experiments to determine whether or not it is possible to release these small sizes of fish in good condition appear to be necessary despite the relative decrease in this practice during the past winter, since it is known that the smaller sizes of other species, in addition to scup, are being discarded or marketed, probably to the disadvantage of the industry both from the standpoint of conservation and of marketing.

WINTER FLOUNDER

The winter flounder, *Pseudopleuronectes americanus*, plays an important role in salt-water angling in New York and along the southern New England coast. From autumn to late spring when other salt-water game fishes are not present it frequents shallow bays and may be caught from rowboats as well as from more pretentious vessels. It is thus available to many fishermen who cannot afford more expensive transportation.

In response to general complaint of depletion, the Bureau is beginning investigations of the life history and conservation needs of this species. Because of limited funds, the investigation cannot be undertaken on a scale large enough to permit studies over the whole range, and for the present, work must be confined to New York, Connecticut, and Rhode Island.

R. A. Nesbit visited fishing localities in New York to arrange for a tagging experiment in the spring of 1937 and arrangements were made for cooperation with the Rhode Island Division of Fish and Game in tagging experiments in Narragansett Bay.

FISHERY INVESTIGATIONS OF THE SOUTH ATLANTIC AND GULF COASTS

MILTON J. LINDNER, *in charge*

SHRIMP

The shrimp investigations have continued under the direction of Milton J. Lindner, and in cooperation with the Louisiana Department of Conservation, the Texas Game, Fish, and Oyster Commission, and the Georgia Tidewater Department. Laboratory and office space have been furnished by the Louisiana Department of Conservation, the Georgia Tidewater Department, and the San Patricio Canning Co. of Aransas Pass, Tex. The *Pelican*, a 78-foot wooden-hulled Diesel-powered ship, was transferred during the year from the Division of Fish Culture to the Division of Scientific Inquiry for offshore shrimp work in the South Atlantic and Gulf area. Extensive remodeling was necessary to equip the *Pelican* for trawling and hydrographic purposes.

A cooperative program has been arranged with Dr. A. E. Parr of the Bingham Oceanographic Institute and Dr. H. B. Bigelow of the Woods Hole Oceanographic Institute for conducting investigations in the Gulf of Mexico in which the *Pelican* and the research vessel *Atlantis* of the Woods Hole Oceanographic Institute will be operated.

The shrimp fishery is undergoing a stage of continued expansion with the addition of new and improved boats, particularly on the South Atlantic coast. This circumstance is due primarily to the rapid rise in the raw headless shrimp trade. It is a matter of extreme importance that the total catch of shrimp has not increased in proportion to the increase in effort. It appears probable that the shrimp fishery is nearing the limit of productivity under the prevailing fishing methods.

From the present knowledge of the life history of the shrimp we should expect that the first signs of a heavy drain on the fishery would appear during the spring season. The spring fishery is composed of shrimp that have escaped the summer, fall, and winter fisheries, consequently a pronounced reduction of the shrimp population by the fishery during these periods would be evidenced by a scarcity of shrimp the following spring. During the springs of 1935 and 1936 there has been a distinctly noticeable reduction in the take of shrimp throughout the entire commercial range. In both these years the spring fishery was very sporadic and when the runs appeared they were of but short duration.

The trend of the fishery as gathered from the total catch appears to indicate that it will not be possible to materially increase the poundage of shrimp taken under the present methods of operating. Shrimp have a rapid rate of growth, however, and it is highly probable that better protection of the young shrimp would result in a larger annual take.

All attempts to analyze the cycles of abundance have met with little success, as it has been impossible to secure the catch records required for such analysis with the staff and funds available. It is necessary to rely upon the States for securing proper catch statistics, and at present Texas is the only State that is gathering fishery statistics in a manner that will permit their use for abundance analysis. In September 1936, the Texas Game, Fish and Oyster Commission put into effect a new system of collecting fishery statistics which should prove very useful in the future. The daily catches and the locality of fishing are recorded for each boat fishing in Texas waters. It is hoped that more States can be induced to follow this procedure.

Dr. James S. Gutsell, upon completion of a manuscript pertaining to the ovarian development and spawning of the shrimp, was transferred from the shrimp staff in July. Doctor Gutsell found that in the Beaufort, N. C., region the common shrimp in many instances spawn more than once in a spawning season. Definite histological criteria were found for mature and spent ovaries.

Experiments in hatching the planktonic eggs and rearing the larvae of several species of penaeid shrimps, including *Penaeus setiferus*, were conducted at St. Augustine, Fla., during the spring and summer of 1936 by John C. Pearson. Considerable success was obtained in this direction with the result that comprehensive series of the eggs and larvae of four species of Penaeidae are now available for comparison and description. The preparation of a manuscript, including many detailed illustrations of the complicated larval development of the penaeid shrimps, was begun during the past year. Special emphasis is being placed upon the commercial southern shrimps, *Penaeus setiferus* and *Penaeus brasiliensis*.

Although considerable material on the early stages of the commercial shrimps has been obtained during the past 5 years from many areas off the coasts of Louisiana, Florida, and Georgia, it is now evident that future studies on the early life histories must be concentrated in more offshore waters than has hitherto been possible through limited cruising facilities. With recognition characters of the eggs and larvae of at least four species of common littoral penaeid shrimps of our South Atlantic and Gulf coasts now available, analysis of penaeid plankton from offshore areas should be simplified. The availability of offshore plankton seems promised through future activities of the research vessel *Pelican*.

At Aransas Pass, Tex., Kenneth H. Mosher continued the sampling of the commercial catch on a restricted basis. Length measurements and sexual maturity determinations were made on 6,310 shrimp. Of this number 1,715 were from Galveston and the remainder from Aransas Pass. In addition to length measurements, individual weights were recorded on 3,400 shrimp. The weight-length relationship data show that interseasonal differences occur in this relationship.

In the Aransas Pass-Corpus Christi area there occurs during the winter a general disappearance of shrimp from the customary fishing grounds. This winter exodus appears to be associated with temperature. It is highly probable that the movements are offshore rather than coastwise, as the Texas fishery does not show any of the indications of coastal movement that are obvious in the South Atlantic fishery where a coastwise winter migration is known to occur. The length frequency distributions indicate the probability of a return movement to inshore waters in the spring. Before definite reliance can be placed upon the observations, however, a comprehensive tagging program must be undertaken.

During September and early October Mr. Lindner and Mr. Mosher, with the assistance of Mr. Albert Collier of the Texas Game, Fish and Oyster Commission, released approximately 2,500 tagged shrimp in central Texas waters. The Texas Game, Fish and Oyster Commission furnished their laboratory boat *K. T.* for the entire course of the tagging operations. Releases were made in Corpus Christi, Aransas, Copano, San Antonio, Matagorda, and Lavaca Bays. By the end of December the returns on tagged shrimp from Matagorda, Lavaca, San Antonio, and Copano Bays were few, but those from Aransas and Corpus Christi Bays were considerable. More than 10 percent of the total number tagged were returned by December 31 and more than 23 percent of those released in Corpus Christi Bay were recaptured. These returns corroborate the conclusions drawn from the length frequency data that the shrimp move from the bay waters to the waters of the Gulf as the season progresses. A more comprehensive tagging program is planned for the coming year to gain additional information on migrations, growth rate, and fishing intensity.

The tagging program that was initiated along the South Atlantic coast in the fall of 1935 proved to be highly satisfactory and in consequence was extended in 1936 to cover the major portion of the entire South Atlantic fishery. At Cape Canaveral, Fla., and New Smyrna, Fla., 750 tagged shrimp were released during January and February. This central Florida area may be considered the southern

limit of the commercial fishery on the South Atlantic coast. Shrimp are taken in quantities in this region only through the winter months, with January the peak month. The 1935 tagging campaign in Georgia and northern Florida showed that shrimp from the South Carolina, Georgia, and northern Florida area move south to the central Florida coast during the winter.

The releases of tagged shrimp at Cape Canaveral and New Smyrna in January and February 1936 were for the purpose of learning whether there is a return movement to the Georgia coast in the spring, as was indicated by length frequency data. Of 399 releases at Cape Canaveral in January over 41 percent were returned, and the majority of recaptures were made in the vicinity of the Cape within 2 weeks from the date of release. A large proportion of the tagged shrimp undoubtedly succumbed directly or indirectly from the handling received in the tagging process, consequently the above returns indicate that the majority of the successfully tagged shrimp were recaptured near the point of release and in a very short period of time. The numbers of marked individuals that escaped the Cape Canaveral fishery and were recaptured in the northern fishery were insufficient to prove that a return movement to the north occurs in the spring. Nevertheless, the combined evidence of these returns and the length frequency distributions suggest that such a movement may occur. More intensive tagging will be done during the coming winter.

In September Mr. Lindner and Mr. Anderson tagged 3,045 shrimp from Cape Romain, South Carolina, to Brunswick, Ga. The returns indicate that at least a few shrimp from as far north as Cape Romain, S. C., migrate to Florida waters in the winter. The greatest distance between points of release and point of recapture was recorded for a shrimp released near the west end of Bull Creek Island, S. C., on September 6 and recaptured on December 19 off the mouth of Ponce de Leon Inlet, Fla. The distance traveled was well over 300 miles. At the time of tagging this shrimp was 15 cm in length and at recapture had grown to 17 cms.

PACIFIC COAST AND ALASKA FISHERY INVESTIGATIONS

DR. FREDERICK A. DAVIDSON, *in charge*

The Pacific coast and Alaska fishery investigations with headquarters in the Bureau of Fisheries Biological Station at Seattle, Wash., are confined mainly to the solution of problems concerning the maintenance and rehabilitation of the salmon and herring fisheries of Alaska and the salmon fisheries of Puget Sound and the Columbia River. All of the major investigations in progress in 1935 were continued in 1936.

COLUMBIA RIVER SALMON FISHERIES

Investigations relative to the maintenance and rehabilitation of the fisheries of the Columbia River were continued during the year 1936 by J. A. Craig, assisted by A. J. Suomela. The major projects of this investigation include:

1. An analysis of the condition and trend of the commercial fishery in the lower estuary of the river to determine whether or not

depletion of the supply is occurring from overfishing, and to establish a basis for proper regulation of the fishery to permit an adequate escapement of adult fish for spawning.

2. A stream survey of the Columbia River system to determine the extent of available spawning areas; to discover barriers to fish migration and to provide for their removal or modification to permit passage of fish; to locate unscreened irrigation outlets; and to determine the productive capacity of the various streams with respect to quantities of fish food and the physical and chemical conditions favoring or hindering the development of young salmon.

3. Research into the history and development of the fisheries of the Columbia and studies of parallel development in other natural resources, such as water power, agriculture, lumbering, and mining, which may have either directly or indirectly influenced the fisheries.

4. Studies of the migrations of salmon by means of tagging experiments.

The collection and analysis of catch records during recent years and currently is being undertaken for comparison with historical records to show the extent to which the fishery resources have declined and the part overfishing may play in reducing the total population. During 1936 a considerable amount of routine work on tabulating the original catch records collected in 1935 was accomplished. The extensive data which include records of the fishery from 1897 to 1935 are now ready for the final analysis which will indicate annual and seasonal fluctuations in abundance of the commercially important species comprising the catch of the Columbia River fisheries. Summaries and tabulations have been completed for the records of chinook, blueback, and silver salmon; and the greater part of the steelhead fishery records have also been summarized. The major portion of the work during 1936 has dealt with fish other than the chinook salmon, because the compilation of catch records for that species was virtually completed in 1935.

The final report on the history and development of the Columbia River fisheries is nearing completion. This study demonstrates the importance and extent of the Indian fishery before the advent of white men on the Columbia and shows the fishing methods employed by the Indians. It also traces the growth of the salmon fishery from its early beginning when explorers and settlers salted a few fish to the great canning industry of the present day. The evolution and operation of each type of gear in use on the Columbia, canning methods, and the development of markets for the finished product have also been investigated.

A tagging experiment was conducted for the purpose of obtaining data concerning the fall run of chinook salmon which passes through the commercial fishery in the Columbia in the latter part of August and during September. The results of this experiment provide data relative to the speed of migration of this run after it enters the river, the minimum distances which the fish travel upstream, the proportion of the run which returns to hatcheries and possibly some measure of the intensity of the commercial fishery above the point of tagging.

This is the second tagging experiment that has been conducted on the fall run of chinooks in the Columbia River. The first was

carried out in 1908 in the same general locality as that of the present experiment. In the earlier work, a total of 59 fish were tagged in a single experiment, of which 25 were chinooks, 16 were silvers, and 18 were steelheads.

The tagging this season consisted of nine experiments carried on from August 16 to September 2, inclusive, in which a total of 1,059 chinooks were tagged and liberated. The experiments were conducted at one location, about 4¾ miles upstream from the mouth of the river.

Of the fish tagged, 220, or 20.8 percent, were recovered. Six, or 0.6 percent, of the recoveries were taken outside the mouth of the river, 5 of which were caught by troll in the vicinity of the Columbia River lightship, while 1 tag was secured from a fish which had migrated north to Willapa Harbor and was taken in the Nasel River by a gill net. A total of 30 tags, or 2.83 percent, were recovered at hatcheries on the Columbia River system. By considering this percentage in relation to the total number of fish entering the hatcheries, it is possible to estimate the total escapement and thus the percentage of the migrants that return to hatcheries. The remainder of the tagged fish were caught in the main Columbia River from near the point of tagging to Celilo Falls, 190 miles upstream. The results of this experiment will be set forth in a report for publication.

Further information on the size and seasonal occurrence of the runs of migratory fish in the upper Columbia River was obtained by means of counting weirs placed in the fish ladders of the Rock Island Dam of the Puget Sound Power & Light Co., located about 14 miles southeast of Wenatchee, Wash. Weirs were placed in all three fishways and men were employed to count the fish passing through at all times that the counting gates were open. A complete count of all fish passing upstream and over the dam was therefore made during the period from May 6, 1936 to September 29, 1936, inclusive. These counts were made as a cooperative effort of the Washington Game Commission, the Washington Fisheries Department, the United States Reclamation Service, and the United States Bureau of Fisheries. During the period of time mentioned above, 7,301 chinook salmon, 16,501 blueback salmon, and 2,374 steelhead trout passed through the ladders. These counts represent the entire run of bluebacks passing Rock Island, because the period of time during which the counting was done included all of the time when bluebacks are present in the river. The total given for chinooks includes the major portion but not all of the run, because some of these fish passed the dam before and after the counts were made. For the same reason it is probably true that the greater part of the steelhead run is not represented in the count. These observations are of value not only because they indicate the dates of the migratory runs in the upper Columbia and furnish an index of the number of each species, but also because they provide important data relating to the problem of fish protection at the Grand Coulee Dam, which is being constructed about 170 miles above the Rock Island Dam.

In order to obtain information on the number of blueback salmon spawning in tributaries of the upper Columbia, weirs were built and counts made of the fish ascending the Wenatchee and Okanogan Riv-

ers. The weir on the Wenatchee River was located at the Tumwater Dam of the Puget Sound Power & Light Co. and was operated from June 16 to September 26, inclusive. During that time, which included the entire duration of the blueback run in the Wenatchee River, 29 blueback salmon, 5 chinook salmon, and 1 steelhead trout were counted. The weir in the Okanogan River was placed at Oroville, Wash., and counts were made from July 9 to October 2. This counting also covered the entire blueback run in that tributary and resulted in the recording of 905 blueback salmon and 4 chinook salmon at the weir. Because of the unusually small size of the Okanogan bluebacks during 1936 and the fact that some of the pickets in the weir were spaced slightly too far apart, some of these fish penetrated the weir and were not counted for a few days' time. Therefore, the actual number of fish passing the weir might have been somewhat more than the total given. These counts not only provide data on the number of bluebacks spawning in the two river systems where the weirs were operated, but also furnish a means of computing the number of bluebacks which normally pass the site of the Grand Coulee Dam. Since there are no other known spawning grounds for bluebacks between Rock Island and Grand Coulee it follows that the difference between the sum of the Wenatchee and Okanogan River bluebacks and the Rock Island bluebacks represents the number which go past Grand Coulee, and which must therefore be provided for in any plan for fish protection in connection with that structure.

Stream survey activities for the season were principally confined within the boundaries of the State of Washington. A total of 743 miles of streams were surveyed during the year. Examinations of the tributary streams of the Columbia in southwestern Washington were undertaken during the fall months. Satisfactory progress was made in the survey in this section. The streams on which surveys have been completed in this area are: Coal Creek, Abernathy Creek, Mill Creek, Skamokawa Creek, Salmon Creek, Lewis River, Tilton River, and Ostrander Creek. Other creeks in southwestern Washington on which additional work must be done to complete the surveys are: Grays River, Alochoman Creek and Kalama River emptying into the main Columbia, and tributaries of the Cowlitz such as Cowieman Creek, Toutle River, and the Cispus River. In the south central area of the State surveys have been completed of Wind River, Rock Creek, and Little White Salmon River. Most of the streams in central Washington had been surveyed previously. The work during the year consisted of surveys of the tributaries of the Yakima River system. The completed surveys are as follows: Teanaway River, Swauk Creek, Taneum Creek, Manastash Creek, Umptanum Creek, and Ahtanum Creek, all of which are tributaries of the main Yakima, and the Little Naches River, Rattlesnake and Cowiche Creeks, tributaries of the Naches River. There remain only 26 miles of survey work for the completion of the main Yakima River. In north central Washington the examination of the Wenatchee River, Entiat River, and Okanogan River systems was finished. The stream surveys in southeastern Washington were completed when Asotin Creek and the Walla Walla River were examined to their headwaters.

PUGET SOUND SALMON FISHERIES

Chief attention during the year has been given to the preparation of a report entitled, "The Salmon and Salmon Fisheries of Swiftsure Bank, Puget Sound and the Fraser River." This report has been prepared to show, in a general way, the history and development of these fisheries, the changes in the various forms of gear, the shifting in intensity and location of the fishing, and the effect that these factors have had on the abundance of the five species of salmon of this region. These fisheries at present yield about 115,000,000 pounds of raw salmon per year, valued at between 10½ and 11½ millions of dollars. The sections dealing with the history and development of the gill-net fishery of the Fraser River, the trap fishery of Puget Sound, and the life history and abundance of the sockeye, pink, and chum salmon were prepared by Dr. George A. Rounsefell. Those dealing with the purse seine and troll fisheries and with the coho and king salmon were prepared by George B. Kelez.

Sockeye.—The Puget Sound sockeye investigation, which is primarily concerned with studies of the causes and extent of the decline in abundance of sockeye salmon in the Puget Sound-Fraser River region, was continued under the direction of Dr. Rounsefell. The commercial catch was again sampled for size and age composition, but owing to the curtailment of the 1936 fishing season by strikes, data from only 1,200 sockeyes in 24 samples were obtained during the period from July 29 to August 31 and no chums could be measured. No pink salmon were sampled, as they are absent from Puget Sound in even-numbered years. Extensive collections of daily catches by traps, purse seines, and gill nets have been made from these data, curves are being constructed for each year to show the seasonal abundance of sockeye in the various forms of gear in each area. When completed, these data will yield valuable information on the routes of migration, the changes in abundance in different portions of the season, and the effect of one form of gear on the catches of another.

Coho.—Coho salmon in Washington have declined markedly in abundance during recent years. Experimental work has therefore been undertaken with the double purpose of providing information relating to rebuilding individual populations through artificial propagation and transplantation of fingerlings, and of furnishing statistical studies of the fishery. Marking experiments have been undertaken with special reference to the success of liberation of hatchery-produced fingerlings of different sizes and to the value of transplanting fish to "foreign" stream systems. These experiments also provide information on the life history of the species. Analyses are being made of the relative contribution of various districts of the region to the commercial fisheries. This work has continued under the direction of Mr. Kelez during the past year.

Returns of adult fish from the Samish River marking experiments appeared this year. In these experiments, conducted in 1934, 26,000 fry hatched at the Samish station in February were marked and liberated in May in Friday Creek, a tributary of the Samish River. Another portion of the Samish fry were held in ponds until November, at which time 26,000 more were marked and liberated.

The comparative returns from these experiments were expected to show whether or not the additional period of pond rearing contributed materially to the resistance of fingerlings to disease and natural enemies. In another experiment, 10,000 fry from the Skykomish station (on an independent stream system) were moved to the Samish station, where they were marked and liberated to determine the effect of such transplantation upon the homing instinct.

Although the returns will not be complete until the cessation of the spawning run in March, 222 marked fish were recovered during 1936. Of these, 6 were from the 26,000 fish liberated in May at a length of approximately 46 mm (1¾ inches), 207 were from the 26,000 fish liberated in November at a length of approximately 102 mm (4 inches), and 9 were from the fish transferred from the Skykomish River and liberated in May at a length of approximately 49 mm (2 inches).

Recoveries were reduced by the loss of the hatchery rack on the Samish River during flood conditions shortly after the run began. This loss could not be repaired for a period of 2 weeks. A number of the marked fish which passed the rack during this time were recovered in Friday Creek, and three others from the tributaries above Friday Creek. Accurate calculations of total returns to the river are thus impossible, but on the basis of recoveries to date, it is evident that the larger Samish fingerlings produced a return approximately 35 times greater than did the smaller ones, and the Skykomish fish, although transplanted from a different river system, produced a return approximately four times better than did the smaller Samish fingerlings.

Collections of scale samples and of length and weight data from the commercial fisheries were continued during the summer fishing season, but were seriously curtailed during the fall season when fishing was interrupted because of price disagreements between fishermen and operators. These data were supplemented by collection from the sport fisheries.

KARLUK RIVER RED SALMON

Studies of the Karluk River red-salmon runs, which were begun in 1921, were continued during 1936 under the direction of J. T. Barnaby. Because it combines the advantages of being situated in the center of a large red-salmon producing area and of having its commercial fishery confined to the vicinity of the river mouth, Karluk River was selected for this long-term study of the ratio between spawning escapement and the return from that escapement, the fluctuations occurring in these ratios from year to year, and the causes for such fluctuations. These studies provide essential information on the number of salmon that should be permitted to escape the commercial fishery in order to provide a spawning reserve sufficient to maintain the fishery at a maximum level of productivity.

A review of returns from the escapements during the period from 1921 to 1928 shows no correction between the size of the escapement and the return; the smallest escapement yielded the largest return per spawning fish (5.6 to 1), while the largest escapement yielded the smallest return (0.6 to 1). To determine what return may be expected from any given escapement, it is necessary to under-

stand the causes of these large fluctuations in the ratios between escapement and return. Recent studies are suggestive of a positive correlation between the growth of migrants during their stay in the lake and the returns from escapements. In reviewing the returns from the escapements from 1921 to 1931, we find that those from the escapements of 1921, 1922, and 1923 were good, those from the next 3 years poor, and those from the following 4 years fair, with an upward trend in the ratio of return to escapement. The small returns from 2 of the 3 years which produced very poor returns were caused, at least in part, by overcrowding on the spawning grounds due to large numbers of fish and relatively dry weather. However, on examining the data of the average length of the seaward migrants resulting from eggs laid in the gravels during the years 1922 to 1933, inclusive, it is quite apparent that there was a downward trend to the average size of the migrants for the first 3 years, that the average size remained constant for the next 4 years, and that there has been an upward trend in the size of the migrants since that time. If such a correlation between growth rate of fingerlings and their survival does exist, we may expect an even larger run of adult reds to the Karluk River in 1937 than was experienced in 1936, when the run amounted to approximately 2,400,000 fish, the largest run to the Karluk River during the past decade. These fish were, for the most part, the progeny from the spawning of 1931 when the escapement amounted to 873,428.

Conditions favorable to the growth of fingerlings while in the lake would be expected to act favorably on their survival and thus to result in an increase in the number of adult fish surviving. Such an expectation is supported by marking experiments which have shown the survival value of the larger seaward migrants to be greater than that of the smaller individuals. Numerous factors affect the growth of the fingerlings, as, for example, their abundance, for in years when the lake contains a large population of fingerlings there is undoubtedly competition for food.

Chemical analyses of the lake and stream waters made during the season were in close agreement with those made during 1935. Phosphorus and silica were the two main limiting factors in the growth of phytoplankton in the lake. The phosphorus and silica brought to the lake by its affluents were taken up during the summer months by the plants as rapidly as they became available. As most of the phosphorus introduced into the lake comes from the bodies of spawning fish, the number of fish in the escapements must have a profound effect on the growth of plankton. Unfortunately, the opportunity for artificially fertilizing a red-salmon lake has never been realized. While at first glance the cost of adequately fertilizing a large lake might appear prohibitive, the resulting increase in its productivity might make such a venture worth while.

Two marking experiments were initiated during the season; 26,700 seaward migrants were marked by the excision of the right ventral and adipose fins and a like number were marked by the amputation of both ventrals and the adipose fin. These experiments, in addition to furnishing information on the survival value of these fish during their stay in the ocean, will furnish data on the relative value of these two marks. In the past it has been considered that they were of equal value, although the assumption has never been tested.

On sampling the run for the presence of fish marked in previous years, 268,000 fish were examined and 1,598 marked fish were found, or approximately 25 percent of the fingerlings marked. The consistently large returns from the marking of Karluk River migrants, which, incidentally, are far greater than have been experienced from other similar marking experiments, fulfill the prediction made by Gilbert and Rich in 1927: "They (the seaward migrants) can well be expected to give a good account of themselves during their life at sea and should escape their enemies in larger measure than do the smaller fingerlings of many other streams." Though the Karluk fingerlings attain their larger size, for the most part, by staying an additional year in fresh water, where they are subject to the depredations of enemies in the lake, they benefit by having a higher survival value during their stay in the ocean.

It has been impossible to determine the mortality rate between the fry stage and the seaward migrant stage owing to the difficulties involved in collecting adequate samples of fingerlings. During this period of their life fingerlings are ordinarily subject to various diseases and parasites, and are preyed upon by their natural enemies, such as trout and birds. Samples of fingerlings collected at Karluk have always been composed of extremely healthy individuals. Birds do not prey to any great extent on the Karluk fingerlings and the stomachs of trout taken in the lake during the past season and previous seasons indicate that the trout feed very sparingly on them, possibly because other forms of food are more easily obtainable. It would appear, therefore, that the habit of spending an extra year in the lake has a salutary effect on the survival value.

PINK SALMON

The activities of the pink-salmon investigation in 1936 as in past years were confined mainly to studies of the pink salmon populations of southeastern Alaska, where the bulk of the pack of this species is made each season. Both the marine and fresh water environments in southeastern Alaska are so varied that they represent practically all the biological conditions that may be found in the habitats of pink salmon throughout the entire range of its distribution, hence it is believed that the fundamental facts secured from the study of the fishery in this section may be applied generally throughout Alaska. A field station is maintained at Little Port Walter on Baranof Island where the greater part of the biological studies are carried on by Dr. F. A. Davidson and S. J. Hutchinson.

The collection of data for racial studies was continued for the purpose of determining the homogeneity or heterogeneity that exists in the various populations in any one season and the racial differences prevalent in the odd- and even-year groups. By operating a counting weir in the stream, a total count of each year's population is made. The fish returning to the stream in 1936 from the 1934 spawning gave the first returns from a known spawning population in this stream. In 1934 the run into the stream consisted of 6,952 pinks, which resulted in the return of 5,164 spawners to the stream in 1936. A study is being made to determine the factors responsible for the inability of the 1934 population to reproduce itself. Of the number passing through the weir, 52 percent were females and 48 percent were

males. A sexing device so constructed that it was possible to observe and record the sex of each individual as it passed through the weir on its way to the spawning grounds showed that males were in excess during the first half of the run, but by the end of the season had reached a normal balance. Egg counts were also made to determine the number of eggs deposited by a female of this season's run. The average number of eggs produced per individual in 1936 was 2,227 eggs. These data furnish a means of determining the year's seeding possibilities in the stream.

A cooperative United States Weather Bureau Station was installed at Little Port Walter during the summer. A number of recording instruments are now in constant operation the year round and furnish a record of the climatic conditions prevailing at the station. Data thus collected will increase the scope of our knowledge regarding weather conditions and their effects upon salmon during the period spent in fresh water. It is known that rainfall directly affects stream conditions during spawning, a shortage of rainfall being detrimental to the eggs producing future populations.

In cooperation with the National Canners Association of Seattle, Wash., a study of the physical and chemical changes that take place within the pink salmon during their period of spawning migration was again carried on at Little Port Walter. A small trap was built and set in the outer bay for the purpose of collecting samples with which to carry out the experiment. A number of salmon were tagged and released from the trap to determine the progress of migration through the bay and into the stream. From those fish taken in the trap and canned for the experiment, a chemical analysis will be made to determine seasonal changes in fat composition and quality of the fish from the opening of the season to the closing date. This information will aid the packers in formulating a standard gage by which salmon may be packed and graded.

Throughout the season a number of samples of fish heads and muscular tissues were taken and preserved for future study. The heads, taken for brain samples which may show changes in the pituitary gland and its effect upon the individual during the onset of sexual maturity, were forwarded for study to Dr. B. M. Allen of the University of California. Tissue samples were taken for the determination of casual factors governing flesh coloration. Color is also being determined in the samples of canned salmon to indicate the color changes in the flesh throughout the season.

A second series of pink-salmon tagging experiments was carried on in the Clarence Strait region of southeastern Alaska in the summer of 1936. On July 18 and 25, and August 1 and 15, 2,000 salmon were tagged from a trap located at McClean Point, about 7 miles north of the south entrance into Clarence Strait. On August 16, 500 salmon were tagged at a trap located at Point Colpoys, which is just outside the north entrance into Clarence Strait. These tagging experiments concluded the 2-year tagging program of consecutive weekly taggings in the Clarence Strait region. By means of this program a detailed analysis has been made of the migratory routes of pink salmon in Clarence Strait and adjacent channels during various times in the migrating season. The results indicate that the pink salmon entering Clarence Strait during the first part of the season are bound for

the spawning grounds farthest removed from the entrances to the Strait, while those entering during the latter part of the season are bound for spawning grounds just beyond the entrances.

The native and exotic distribution of the Pacific salmon has been investigated during the past year and a complete report is being written. This study was originally confined to the pink salmon, but was later extended to include all species of Pacific salmon. Information has been received from virtually every State and country receiving shipments of eggs from 1873 to the present date. The success or failure of plantings to develop sea-run populations is known and charts of the world have been prepared to indicate the range of the native distribution, the foreign localities where the transplants have been successful, and the localities where transplants have failed. Included with this information are data on currents, temperatures, and salinities of the oceans throughout the distributions. Each factor in the native habitat has been compared with those existing in the exotic habitat. It appears that where conditions similar to those found in the native distribution prevail in the exotic distribution, the plantings have usually been successful, but where dissimilar conditions are encountered, the introduction has failed. Hence, in all future distribution of eggs or fry to new environments, the environmental factors in the new habitat should be similar to those within the native range.

ALASKA SALMON STATISTICS

The collection, tabulation, and statistical analysis of all catch statistics of the Alaska salmon fisheries was originated in 1935 and continued in 1936 through a cooperative arrangement between the Alaska Division, the Division of Scientific Inquiry, and the Division of Fishery Industries. Its purposes are several: First, to collect all available records of the daily catch of salmon in Alaska from each form of gear; second, to add to those early records the current data as they become available each year; third, to index and segregate these data by area, species, and type of gear; fourth, to tabulate these data into form for statistical analysis for the study of specific problems. L. S. Christey conducted these activities.

The investigation was continued during 1936 along lines similar to those followed in 1935 and described in Progress in Biological Inquiries, 1935. The current year's data were collected and are in the process of tabulation. The chum-salmon data for all years in southeastern Alaska have been collected. The canvass for records of the Prince William Sound area has been completed, and the data tabulated for two species, the pink and chum salmon. The catch records collected from this district cover only the years from 1917 to date. While there are on hand some records for Cook Inlet covering the period from 1912 to date, a more complete canvass of this area is being made. In addition to the above material, some records have been acquired from other districts. As yet, however, time limitations have precluded a complete systematic survey of these areas.

Plans for the future call for the extension of the survey to the remaining areas, the continued collection of current records, and the completion of the tabulation. It should be emphasized that the collection of these data is of paramount importance not only because of its present value, but because every year sees more of the early

records lost or destroyed. Data which may be urgently needed by some future investigation may at present be readily accessible; when needed, they may be impossible to obtain.

HERRING

The herring investigation, under the direction of E. H. Dahlgren, was again confined to southeastern Alaska, where the most intensive fishing has been carried on. Efforts were made to extend knowledge concerning the various populations which contribute to the fishery, as well as to search for the causes of observed fluctuations in abundance of these populations.

To summarize the findings to date, it has been demonstrated that the stocks of herring which contribute to this fishery, instead of being a homogeneous unit, consist of a series of independent populations, or "races," each with its own limited range. The delineation of the areas frequented by the various races, first undertaken by the analysis of biometrical measurements on a large number of individuals, has been made more definite by the development of a method of tagging. Early tagging experiments have established the fact that the most important single population on which the fishery draws is that which spawns in the vicinity of Sitka on Baranof Island, with a summer feeding area in the region of Cape Ommaney; that the population of next importance is that which spawns in the vicinity of Craig, on Prince of Wales Island, with its feeding area in the Iphigenia Bay region. It has also been demonstrated that the spawning population from the Juneau area does not contribute to the summer fishery in either of these areas, and that there is considerable intermingling between the Sitka and Craig population in the Iphigenia Bay region.

An extension of the tagging program to include areas for which no data are yet available was undertaken during the year. Failure to locate the spawning herring in areas from which they have been reported as formerly abundant limited the scope of the proposed operations. However, besides tagging 10,784 individuals on the Sitka spawning grounds and 4,880 at Craig in order to obtain further data on the migration and mortality of these two important populations, 5,020 tags were affixed at Rose Inlet, about 50 miles south of Craig, in order to delimit the range of the Craig population, and 9,700 fish were tagged at Auke Bay, in the Juneau spawning area, to obtain information on the migrations of these fish, which comprise one of the major populations of the southeastern district.

The recovery of 1,647 tags during the fishing season leads to the conclusions that: 1, The Sitka population supports the fishery not only of the Cape Ommaney area, but also of the east shore of Baranof Island at least as far north as Red Bluff Bay; 2, the Craig population intermingles with the Sitka population to a greater extent than has hitherto been supposed, not only in the Iphigenia Bay region but also at Cape Ommaney; 3, the two populations of Craig and Sitka, which support the fishery in the Iphigenia Bay region, also appear later in the season in the Tebenkof area on the west coast of Kuiu Island, to support that run. The recovery of tags affixed to the Auke Bay spawners in the Douglas Island fishery proves that this area is dependent on the Juneau spawning area for its support; the

recovery of only a few of these tags from the Icy Strait fishery demonstrated that there is some intermingling between the Juneau spawners and an unknown population which supports this fishery. The failure to recover any of the Juneau tags in the lower Chatham Straits-Iphigenia Bay area confirms the former findings that established the independence of these populations. The failure to recover more than a few tags from the Rose Inlet tagging demonstrated that this population, although it intermingles to a slight extent with that of Craig, contributes no appreciable part to the commercial catch in the areas at present being fished.

A consideration of major importance is the fact that certain factors, in addition to the inroads made on the stocks by man's fishing, influence the abundance of each of the populations whose existence has been demonstrated. Of these factors, the most important appears to be the survival rate of the offspring from a given spawning. The result of particularly propitious spawning conditions is the appearance of a "dominant" year class; that of particularly adverse conditions is a virtual failure of that brood to appear in the catch. All degrees between these two extremes appear. The dominant year classes which result from a successful spawning have been demonstrated to be one of the major causes for the fluctuations in abundance which are observed to occur. The system of bi-weekly samples to show the size and age composition of the catch from the more important fishing areas is therefore maintained to determine the status of the various brood years which make up the stocks of herring. This analysis has disclosed that the Cape Ommaney fishery has been maintained for the past 3 years by the offspring from the 1931 spawning, which entered the catch for the first time as 3-year-olds in 1934, continued to dominate as 4-year-olds in 1935 and as 5-year-olds in 1936. There was evidently a virtual failure of the 1932 and 1933 spawnings. This has led to a relatively low abundance as reflected in a low catch per unit of gear in this area, despite a reduction in the amount of fishing effort. A 6-week closed season was imposed on this area during the year to afford this population the necessary protection.

GREAT LAKES FISHERY INVESTIGATIONS

DR. JOHN VAN OOSTEN, *in charge*

No field work was conducted on the Great Lakes during the calendar year 1936. This enabled the staff, under the direction of Dr. John Van Oosten, to make excellent progress in the compilation of data collected during earlier investigations in the field. During the year 18 papers dealing with the Great Lakes were written for publication by members of the Great Lakes staff and cooperating associates. The manuscript on the deep-water trap net in relation to the whitefish of Lake Huron and Lake Michigan was completely revised for publication, as was the manuscript entitled, "A Limnological Survey of Western Lake Erie with Special Reference to Pollution."

The Great Lakes staff continued its cordial relations and active cooperation with the various States fronting the Great Lakes, as well as with the fishing industry of these lakes. A large number of memoranda to be used as a basis for uniform fisheries legislation

were drawn up for the Conservation Departments of several States. Special effort has been put forth to introduce the flexible steel rule developed by the National Bureau of Standards and the Bureau of Fisheries for the measurement of mesh in gill nets. It is believed that with the uniform adoption of this flexible rule many of the controversies concerning the size of mesh in gill nets will be definitely settled.

Little progress has been made in the enactment of uniform fishery legislation on the various lakes, although three conferences, at each of which the Bureau was represented, were held during the year with that objective in view. The first of these conferences was held at Chicago, Ill., on January 6–7, 1936, when members of the National Planning Council of Commercial and Game Fish Commissioners of the North Central Zone discussed the adoption of uniform laws for the commercial fisheries of Lake Michigan and Lake Superior. On February 4 and 6, 1936, representatives of the Province of Ontario and of the States fronting Lake Erie conferred at Washington, D. C., reaching the conclusion that control by an international commission governed by a treaty with Canada offers the only practicable means of saving the fisheries. A method of procedure to obtain this international control was adopted, but no concrete results have followed. At a conference held on March 16 and 17, 1936, at Toronto, Ontario, between the Province of Ontario and the State of Michigan, uniform regulations of the commercial fisheries of Lake Huron were discussed and a tentative agreement was reached regarding the size of mesh in gill nets used for chubs and the size limit of yellow perch. At all of these conferences the various representatives reached a common understanding on the need of uniform regulations on each of the Great Lakes and on the more important legislation that should be adopted. The various State legislatures, however, have consistently failed to enact into law the recommendations that have resulted from such conferences.

Grateful acknowledgment is made to the authorities of the University of Michigan for laboratory space provided and for many other courtesies extended to the staff at Ann Arbor.

FISHERY STATISTICS

The detailed analysis of commercial fishery statistics of the Great Lakes waters under the jurisdiction of the State of Michigan was continued through 1936. The most important items of progress were the completion of summaries for Lake Superior, 1929–34; the tabulation of basic data and the preparation of summaries for all areas, 1935; the completion of the study of the relationship between fishing time and size of lift; the development of more concise methods of measuring and expressing fluctuations in abundance and production of fish and in the intensity of the fishery; and the application of statistical data on the yellow pike-perch to the question of the effectiveness of artificial propagation of the species.

In Progress in Biological Inquiries, 1935, it was suggested that it might prove unnecessary to include a consideration of the fishing time of stationary gear in the preparation of statistical data for the estimation of fluctuations in abundance of commercial species in

Great Lakes waters. Continued study has supported this earlier suggestion. In a series of comparisons, no significant differences could be found between abundance curves prepared from data that ignored the time element and curves prepared from data that included consideration of fishing time. The knowledge that the consideration of fishing time need not enter in the computation of fluctuations in abundance has made possible a great simplification of statistical procedure.

Methods have been developed whereby fluctuations in the abundance and production of fish and in the intensity of the fishery may be expressed in terms of simple index numbers. These indexes of abundance, production, and fishing intensity are all computed with reference to average conditions over the 6-year period, 1929–34. A convenient feature of the method lies in the fact that the basic data for the different statistical districts can be combined readily by a simple process of summation.

Statistical data on the fluctuations in abundance and production of the yellow pike-perch have proved of great value in connection with problems concerning the effectiveness of artificial propagation of the species. For the past several years yellow pike-perch have been exceptionally plentiful in Saginaw Bay, the chief production center of the species in Michigan waters. Many fishermen believe this increase in abundance to be the result of the intensive artificial propagation that was begun in 1924. However, the fluctuations in abundance and production of yellow pike-perch in Saginaw Bay over the period 1929–35 showed no correlation with the variations in the numbers of fry planted in earlier years. Statistical data for other areas revealed that the abundance of pike-perch increased simultaneously throughout the State of Michigan waters of Lake Huron and Lake Michigan. Although no fry were planted in southern Lake Huron, southern Lake Michigan, nor Green Bay, the relative increase in the abundance of yellow pike-perch was as great in each of these areas as in Saginaw Bay. A report of this study appears in the 1936 Transactions of the American Fisheries Society.

PIKE-PERCHES OF LAKE ERIE

A manuscript entitled, "Morphometric and Life History Studies of the Pike-Perches (*Stizostedion*) of Lake Erie," was completed by Dr. H. J. Deason during 1936. Most of the conclusions of these studies have been presented in Progress in Biological Inquiries for 1933, 1934, and 1935. There are, however, two additional major conclusions, not previously reported. In order to determine the relation between age and growth rate and various characters and body proportions of the blue and yellow pike-perches, ages were determined from the scales of specimens employed for the taxonomic study. Within a single population the morphometric characters varied according to age and growth rate. The differences in age or rate of growth between the yellow and the blue pike-perch of Lake Erie, however, could be only partially responsible for the observed differences in the average values of certain morphometric characters. Because of the fact that the ranges of variation of the characters of the blue and yellow pike-perch overlap to a considerable extent, that the habitats are not mutually exclusive, and that individuals inter-

mediate in growth rate and character ratios occur, the designation of the blue pike-perch of Lake Erie as a distinct species (*Stizostedion glaucum* Hubbs) does not appear to be warranted. The blue pike-perch of Lake Erie has, therefore, been reduced to subspecific standing, *S. vitreum glaucum* Hubbs. The yellow pike-perch accordingly becomes the type subspecies, *S. vitreum vitreum* (Mitchill). The so-called blue pike-perch of Lake Ontario cannot, according to available information, be regarded as subspecifically identical with the Lake Erie form. Subsequent study may suggest the desirability of placing the Lake Ontario "blue" in a new, and as yet undescribed, subspecies.

Growth compensation was demonstrated for the Lake Erie pike-perches. Calculated lengths at the end of each year of life showed that the fish which were longest at the end of the first year of life were almost invariably the longest throughout life. But fish with larger growth increments during the first year of life had smaller growth increments during subsequent years of life, and vice versa.

FOOD STUDIES

During the course of the Lake Michigan chub-net investigation in the years 1930, 1931, and 1932, the stomachs of approximately 6,000 lake trout (*Cristivomer namaycush*) and lawyers (*Lota maculosa*) were preserved. These fish were captured in experimental gill nets of five mesh sizes. A qualitative and volumetric analysis of the stomach contents was partially completed during 1936. No conclusions can be drawn until the data have been tabulated and summarized but it appears that both trout and lawyers feed to a greater extent than popularly supposed upon small noncommercial species. The results of this investigation will provide pertinent information on the following controversial questions: To what extent does the lake trout depend upon the chubs (*Leucichthys* spp.) for food? Is the intensive commercial fishery for chubs detrimental to the more valuable lake trout fishery through the reduction of the potential food supply of the trout? Is the lawyer, a fish of little commercial value, a serious food competitor of the lake trout? In addition the stomach contents will yield valuable data on the distribution of the smaller species of fishes which cannot be captured, at least in appreciable numbers, by any commercial fishing gear now employed.

LAKE ERIE GILL NETS

Considerable progress has been made in the compilation of data on the selectivity of gill-net meshes with respect to the yellow perch and blue pike of Lake Erie. The experimental fishing was carried on from September 1927 to December 1928. The results of this investigation are of particular interest at the present time (February 1937) since they may be the deciding factors in the disputes now being waged on Lake Erie concerning the proper size mesh to be legalized for gill nets employed in the catching of yellow perch and blue pike.

The Great Lakes program continues to emphasize the practical phases of scientific research; i. e., the conservation of the fisheries. This has been made an urgent necessity by the fact that the more im-

portant species, such as the whitefish, yellow perch, and the several species of chubs, are following the trail of the Lake Erie cisco and are definitely on their way to commercial extinction.

SHELLFISH INVESTIGATIONS

DR. PAUL S. GALTSOFF, *in charge*

The shellfish investigations during the year 1936 consisted in the continuation and completion of several projects initiated during the preceding year for the improvement of methods of oyster culture and the protection of the oyster against various pests. This work included studies on the metabolism and fattening of the oyster; sex changes in oysters and clams; the biology and control of such parasites of the oyster as starfish, drills (*Urosalpinx*), and borers (*Thais*); and the effect of pulp-mill pollution on oysters. These investigations were carried out at the Bureau's stations and laboratories at Woods Hole, Mass.; Milford, Conn.; Washington, D. C.; Beaufort, N. C.; and Apalachicola, Fla. The laboratory at Olympia, Wash., was closed and all the work on the Pacific coast was discontinued in May, when the State Department of Fisheries found it impossible to continue its financial support of this work. Dr. A. E. Hopkins, in charge of the investigations at Olympia, Wash., was transferred to Apalachicola, Fla. An additional P. W. A. grant permitted the continuation of the studies of the effect of pulp-mill wastes on oysters in the York River, Va., which were begun in 1935. At the request of the War Department a detailed program was prepared for experimental and field studies of the effect of dredging operations on oysters in the vicinity of the Intercoastal Waterways in South Carolina. At the recommendation of the Bureau, the War Department appointed G. Robert Lunz, Jr., who worked according to plans prepared by Dr. Galtsoff and under his supervision.

PHYSIOLOGY AND CULTIVATION OF OYSTERS

The production of oysters of high nutritive value is at present the principal problem of oyster culture in the Northern States. Good oysters are characterized by the storage of a large amount of glycogen in their tissues and by the presence of sufficient quantities of metals, especially iron and copper which are essential for a balanced diet. In order to determine the seasonal fluctuations in the chemical composition of oysters kept under known natural conditions, a large amount of material collected in 1934 and 1935 was analyzed for iron, copper, manganese, and zinc by Dr. Galtsoff and Charles D. Weber.

The results of the analyses show considerable fluctuations in the amount of these metals. Thus, iron varied from 103 to 914 mg per kilo; copper, from 669 to 3,000 mg; manganese from 5.10 to 7.92 mg; and zinc from 4,130 to 13,700 mg per kilo of dry weight. There were noticeable seasonal changes in the metal contents, especially in the manganese which was consistently higher during the summer months, probably owing to the accumulation of this metal by the ovaries, which showed a much greater manganese content than other tissues. In the ripe specimens there was from 51 to 59.6 mg per kilo of manganese in the ovaries as compared with 4.4 and 4.6 mg in the testes;

the muscles, gills, and the rest of the tissues showed a manganese content varying from 5 to 38 mg per kilo. A study of the localization of other metals in various organs revealed the interesting fact that the gills and mantle accumulate much larger quantities of metals than other parts of the oyster. In one experiment the mantle and gills were found to contain respectively 22,000 and 19,400 mg of zinc per kilo as compared with 14,300 mg in the visceral mass, and only 1,590 in the muscles.

The possibility of increasing the iron content of the northern oyster which, as has been established by the work of Coulson, is lower in this metal than the oysters from the South Atlantic States, has been tested in the laboratory and in outdoor tanks at Milford. Oysters kept in the laboratory and fed various iron salts showed only very slight increase in iron content in spite of the fact that they easily ingested the suspended iron oxide particles. The experimental work at Milford was undertaken with the cooperation of the Department of Physiological Chemistry of Yale University, which granted laboratory facilities for the chemical analyses. Two large concrete outdoor tanks, in which the water could be changed by the tides whenever desirable, were selected in order to keep the oysters in as nearly natural a condition as possible. Iron in the form of rusty nails was added to one tank and the other kept normal as a control. Initial samples for iron analysis were taken of oyster meats and sea water before the addition of any iron, and thereafter samples were taken from each tank at regular intervals. The nails added to the tank became quite rusty but apparently the rust formed is insoluble in sea water for no increase in soluble iron could be detected in 6 weeks. The experiment is being continued with iron added in the form of copperas, a cheap technical iron salt, and the indications are that this method will be successful.

PROPAGATION OF OYSTERS

Problems of the propagation of oysters were studied at Woods Hole where Dr. Galtsoff began an experiment on sex reversal in adult oysters and at the Milford Laboratory where Dr. V. L. Loosanoff followed the development of gonads in adult oysters of Long Island Sound.

The problem of sex reversal in adult American oysters is little understood. An experiment was therefore undertaken in an attempt to determine the factors involved in this phenomenon. To avoid the possible effect of injury, the sex of 202 adult oysters was determined by stimulating spawning, examining the discharged material and obtaining a kymograph record of the spawning reaction. Each oyster was then marked by cutting a number in its shell. Early in September all the oysters thus treated were brought to Milford and placed in the experimental tanks in five groups: Females only; males only; males and females in the ratio 2 to 10; and two groups containing both sexes in equal proportions. The purpose of the experiment was to determine whether the association of individuals of different sexes is one of the factors involved in sex reversal, as has been claimed by some investigators.

For the study of gonad development samples of oysters were collected from Charles Island oyster beds at biweekly intervals throughout the year. After the completion of spawning, the gonad follicles of oysters begin to shrink very rapidly, at the end of August occupy-

ing approximately one-sixth of the space between the liver and the body wall, while in the prespawning period virtually all of this space is occupied by gonad tissue. The shrinkage of the gonad follicles continues through September, when the gonads, upon superficial examination, appear to be in a wintering state. A more detailed study, however, reveals that only by the end of October, when the water temperature is still about 15° C., is the shrinkage completed. Histological studies show that the follicles are few in number and small in size and are scattered in the form of small islands through the connective tissue between the body wall and the digestive gland. Most of the follicles are confined to the portion of connective tissue lying immediately behind the body wall, but a few are found near the liver. The gonads remain in this state until spring. The sexes are distinguishable throughout the winter for the female follicles, besides having indifferent cells, always possess a large number of small young oöcytes. The male gonads containing gonia and a few spermatocytes are characteristically different in appearance from the female gonads.

Although changes occur in oyster gonads during the winter, it cannot be stated that the gametogenetic activities of the oyster are entirely suspended until the following spring, because in March when the water temperatures of Long Island Sound are at or near the freezing point, a slight increase in the size of the follicles and in the number of cells can be noticed. During April and the early part of May the follicles in many cases shown some increase in size parallel with the increase in the number of sex cells. In the middle of May, when the water temperatures reach about 10° C., apparently ripe spermatozoa may be found in some males. From this date on, very rapid changes occur. Simultaneously with the marked increase in gametogenetic activities, the follicles begin to proliferate and expand in all directions, but largely toward the liver. During the first week of June (water temperature 14°–15° C.) the expansion of the gonad follicles is so rapid that in a few days almost the entire space available for the gonad tissue is occupied, and the gonad follicles extend from the body wall to the boundaries of the digestive gland. The production of spermatozoa and ova enters its final stage and in a few weeks spawning follows.

BIOLOGY OF THE HARD CLAM

In an investigation of the life history of the hard clam, or quahog (*Venus mercenaria*), Dr. Loosanoff found that young clams possess distinctly bisexual gonads with a very strong predominance of males. A special study was therefore made of the sexual phases and development of the gonads of this mollusk. Observations showed that hard clams spawn in the laboratory at temperatures ranging from 23° to 30.2° C., the largest number of males spawning at 25°–26° C., while the females require a higher temperature of 29° C.

OYSTER PESTS

Biology and control of starfish.—The work on starfish was continued at the Milford Laboratory and in Long Island Sound by Dr. Loosanoff with the assistance of Dr. Robert Burrows.

Results obtained during three extensive surveys of the entire Long Island Sound in 1935 had indicated that the relative density of the starfish population at different depths and in different areas remains the same throughout the year. Therefore, it was quite apparent that no general migration of starfish occurs at any particular time during the annual cycle. To obtain further evidence on this problem, however, systematic observations were made on the starfish population of a specific area. Twenty sampling stations were established in the region between Stratford Point and Welch's Point. These stations were arranged in four rows of five stations each, corresponding to four selected depths of 10, 20, 30, and 40 feet. Observations were made once or twice a month throughout the year.

Analysis of data thus obtained indicates the stability of the starfish population over the 20-square-mile area under observation. Of the 13 surveys made, 9 showed the largest number of animals at the 20-foot level, 2 at the 30-foot, and 2 at the 40-foot levels. Predominance of starfish at certain depths cannot be correlated with any seasonal changes. On two occasions at different seasons of the year they were found more abundant at the 40-foot level than at other depths, once in March and once in the middle of July. Starfish were never found in predominating numbers at the 10-foot level. This significant fact disproves the idea that normally a regular inshore migration occurs during the prespawning time. In general, the observations in the chosen area corroborate the conclusions reached during the three extensive surveys of the entire Long Island Sound; namely, that the starfish are usually most numerous at the 20-foot depth, and that there is no definite inshore or offshore migration during different seasons of the year.

In addition to the regular surveys, a new method of studying the movements of the starfish population by releasing large numbers of stained animals was applied. It has been found that specimens dipped for a minute in a 1 percent solution of nile-blue sulphate acquire a distinct blue color which is retained for more than 9 months. In November 1935, about 12,000 stained starfish were liberated on an oyster bed in approximately 15 feet of water. Arrangements were made with local oystermen to report the finding of every blue starfish with the date and exact location of recovery. By the end of August 1936, the Bureau and the oystermen, chiefly the Connecticut Oyster Farms Co., had recovered 287 blue starfish.

Reports show that the farthest distance traveled by any of the animals was approximately 5,000 feet, or less than 1 nautical mile, and that they have a tendency to stay in more or less the same depth of water, apparently preferring 15 to 25 feet. As disclosed by these observations the movements of the starfish take place in all directions and appear to be irregular and reversible. The speed of migration is probably controlled by the abundance or scarcity of food, being more rapid when food is scarce.

These and previous studies indicate that starfish distribution is correlated with the presence of food. Starfish show no apparent preference for any particular species of mollusks, but seem to be equally satisfied with oysters, any of several species of clams, mussels, or other mollusks. The inequality of the starfish populations of the eastern and western parts of the Sound is immediately comprehen-

sible if the abundance or lack of food supply of these two areas is taken into consideration, for only those areas of bottom which contain living mollusks or their shells are suitable for starfish. Dead shells, while not contributing directly to the starfish food supply, provide favorable conditions for attachment, growth, and multiplication of many low forms of marine animals which constitute an important part of the diet of young starfish.

Spawning of starfish in Long Island Sound begins about the end of June when the temperature of the water approaches 20° C. and continues until the latter part of August. The free-swimming period lasts 3 weeks, after which the starfish larva sets on the bottom and undergoes metamorphosis. As very little was known of the setting of starfish in the Sound, a study of this problem undertaken in 1935 was continued in 1936. Results of this study may be summarized as follows:

1. In both years setting occurred at all depths ranging from mean low-water mark to 70 feet.

2. In 1935 the most intense setting occurred at a depth of 10 feet, whereas in 1936 the setting star-fish were more or less evenly distributed between 5 and 25 feet.

3. Setting continued from July 15, to September 9, 1935, and from July 27, until September 3, 1936. The most intense setting occurred on or about August 5, 1935, and on July 27, 1936. The survival of young starfish depends largely on their environmental conditions. Those that set on soft bottom usually die from lack of food. A hard bottom covered with dead shells offers more favorable growing conditions.

These studies of the distribution, movements, and propagation of starfish provide much needed information on which to base methods of control and eradication of the pest. It is evident that, inasmuch as there is no general well-defined seasonal migration of starfish, their movements usually originate from the areas of highest concentration. These dispersal centers are found in the western part of the Sound and in some places along the Connecticut shore. Such large congregations of starfish should also be considered centers of starfish propagation as the spawn produced by adult animals is probably carried by currents for a considerable distance. Larvae developed from the eggs discharged by starfish set on new oyster grounds and after transforming into starfish begin to attack young oysters and other mollusks. The elimination of such centers will materially reduce the starfish in Long Island Sound.

It is evident that the eradication of starfish cannot be very efficiently carried on as long as oystermen protect only their own grounds, for numerous unleased and uncultivated areas of bottom will then continue to serve as centers of starfish propagation and dispersal. The only effective method is to combine the efforts of individual oystermen in an attack on the areas of highest concentration.

During the summer of 1936, studies were continued on *Orchitophyra stellarum* Cépède, a gonad parasite of the starfish *Asterias forbesi*. Although this parasite is found generally in males, it occurs occasionally in females. Of 326 males examined microscopically, 43, or 13.2 percent, contained *Orchitophyra*, whereas only 5, or 1.1 percent of the 382 females were parasitized. The incidence of parasitism in

this species is much lower than that found by Smith in *A. vulgaris* and much higher than that found by Cépède in *A. rubens*. In Long Island Sound the percentage of parasitized males varies according to the locality, being as high as about 22 percent in the region of Stratford Point and as low as approximately 1 percent around New Haven.

The fact that no parasites were found in recently metamorphosed starfish taken from a region where parasitism is common, and the fact that infected larvae develop more slowly than normal ones, may indicate that all parasitized larvae die before metamorphosis and that the parasite does not remain quiescent until maturity. If such is the case, the method of parasitism in the adult starfish is yet to be discovered.

Experiments to determine the attraction of starfish to various foods and the factors that control their movements were undertaken by Dr. Loosanoff in the Milford Laboratory, using one of the large tide-refilling tanks containing about 10,000 gallons of water. In carrying out this work care was exercised to eliminate the effects of light, rapid changes in temperature, currents, and other factors which may direct the behavior of starfish. While the work has not been completed, the results obtained thus far can be summarized as follows: Starfish display but little preference for certain foods and because of poorly developed sense organs are unable to detect the presence of food until they come in contact with it. A preference for small mollusks rather than adults was evident.

Oyster drill studies.—Field studies of the drill population on representative tidal flat areas on the Eastern Shore region in Virginia carried out by Dr. H. F. Prytherch and William Hagen indicate that there are over 35,000,000 of these pests on the public oyster beds from Chincoteague to Cape Charles. On the private beds in Chincoteague Bay, where a considerable number of drills are removed each year by dredging and cleaning operations, there still remains a population of over 4,630,000 drills on approximately 4,000 acres of leased bottom, as judged by the results of experimental trapping operations. From the results of experiments on the rate of feeding of drills conducted under natural conditions in Bradfords Bay, in which medium-size drills were placed on areas planted with oysters of three different ages, it is estimated that the drill population on the Eastern Shore may destroy during one summer season approximately 500,000,000 seed and adult oysters. Records of 20 of the largest planters in Chincoteague Bay and vicinity show losses of marketable oysters ranging from 42 to 100 percent over a period of 3 to 20 months on beds where drills were abundant. On various public beds, located on the tidal flats, the destruction of adult oysters by drills ranged from 25 to 56 percent during the summer months.

A brief summary of methods of drill control was given in Progress in Biological Inquiries, 1935. A detailed outline of procedure for reducing the numbers of these pests on oyster bottoms along the Atlantic coast has since been given in a report entitled "Natural History and Methods of Controlling the Common Oyster Drills (*Urosalpinx cinerea* Say and *Eupleura caudata* Say)," which was prepared for publication during 1936.

Sporozoan parasite of the oyster.—Studies of the life cycle and method of distribution of a sporozoan parasite of the oyster, con-

ducted jointly by Dr. Prytherch and Dr. R. R. Kudo, show that part of the development of this micro-organism takes place in the intestine of the mud crabs, *Panopeus herbsti* and *Eurypanopeus depressus*, and part in the gills, muscle, mantle, and other tissues of the oyster. The mud crabs, which are abundant on oyster beds, feed on the infected tissues of dead oysters from which millions of spores of the parasite may be obtained. The developmental stages of the parasite in both of its hosts have been followed and the complete life history outlined. The sporozoan is apparently a new species of the genus *Porospora* and is similar to the form *Porospora portunidarum* found on the French coast which has an alternation of hosts between crabs of the genus *Portunus* and the mollusk *Cardium edule*.

Observations on the oyster borer, Thais.—Previous investigations have shown the destructiveness of the conch or borer, *Thais floridana*, to oysters; hence some means of control was sought by R. O. Smith at Apalachicola, Fla. The Louisiana method of trapping spawners on stakes appeared feasible; therefore on April 18, 1936, 75 stakes were planted on a selected part of a bar in St. Vincent Sound where large numbers of conchs were present. This method is based on the tendency of spawning females to climb before depositing egg capsules. Green gumwood poles, 2 to 3 inches in diameter and 12 feet long, were wrapped with fresh palmetto leaves from the bottom to the water line and firmly planted along the oyster bar in depths varying from 4 to 7 feet at low tide. It was found that the palmetto leaves served no purpose other than to expedite removal of conchs and egg capsules and the leaf wrappings were discontinued.

Capsules were first taken on May 25, the last previous examination having been made May 15. Bottom temperature on the bar on May 26 was 24.2° C. The stakes were increased to 120 and were lifted every other day, weather permitting. The average daily take of capsules was 100 in June, 200 in July, and 1,340 during the second week of August, after which spawning ended abruptly. In all, 20,000 capsules were removed from the stakes and destroyed. Observations on the correlation between salinity and deposition of capsules showed that a drop in salinity is regularly accompanied by reduction in number of capsules deposited.

In the laboratory 50 adult *Thais* were kept in a large tank for experiments and six were placed separately in battery jars, running sea water being supplied to all. The average number of eggs laid in a season by a full grown female of 8.0 cm (3⅛ inches) total length is approximately 200. The average number of eggs per capsule, as observed in capsules from five different females, was approximately 4,000 each. Total egg production per female per season is therefore around 800,000.

What is believed to be a chemotropism was discovered in sexually mature females. If capsules are placed in a jar with a mature female she will deposit her capsules next to them. If she lays more than once the second group is placed near the first, and in the mass experiment, only rarely were capsules scattered about the tank. The bulk of the spawning by all females was done in close proximity to other capsules and this was observed throughout the summer both in the field and in the laboratory. It has long been believed that the heavy deposition of capsules in one area is the result of a group mi-

gration to a definite spawning area. The observations made here, however, point to the theory of specific chemical attraction.

With an average temperature of 28° C. and salinity ranging from 25 to 35 parts per thousand, the eggs begin to hatch 20 days after the capsules are deposited. The length of the free-swimming period is unknown since efforts to keep the newly-hatched larvae in special jars have been unsuccessful.

Several experiments were made to determine the effect of decreasing salinities on survival of *Thais* embryos in capsules. It was found that the salinity could be dropped suddenly from 27 to 13 parts per thousand and allowed to remain there for several days without ill effect. A sudden drop from 27 to 4 parts per thousand kills all embryos within 20 minutes. However, if the salinity is lowered slowly, it may be reduced from 27 to 3 parts per thousand before mortality begins. These experiments were made at temperatures between 26° and 31° C.

No young *Thais* were taken in the field from the end of the spawning season until October 26, at which time the average length of those taken was 21.1 mm. On December 15 the average length was 26.9 mm. It is interesting to observe that the average length of young oysters eaten by young *Thais*, as of December 15, was 22.2 mm. Although young *Thais* prefer oysters they also consume mussels and barnacles.

AUTONARCOSIS IN THE OYSTER AND ITS INDUSTRIAL APPLICATION

It is well known that oysters in the shell can live out of water for several days, permitting their transplantation to selected growing areas or shipment to inland markets. Recent studies conducted by Dr. Prytherch, at the Beaufort laboratory, show that the ability of the oyster to survive outside of its natural environment is due to the fact that it puts itself into a state of suspended animation or narcosis soon after the shell is closed. In very young stages of *Ostrea virginica*, the functioning of many internal organs can be clearly seen through the transparent shell. Soon after shell closure there is complete cessation of heart action, blood circulation, ciliary movement, and a general inhibition of all metabolic activities, accompanied by a rapid increase in the hydrogen-ion concentration of the liquor.

Experiments have shown that the tissues of the oyster are narcotized by carbon dioxide generated principally by the gills, and that this condition is due primarily to the rapid development of a high carbon dioxide tension within the shell rather than to an increased hydrogen-ion concentration. Carbonic acid is particularly suitable for conserving the energy and prolonging the life of the oyster outside of its natural environment, as it readily penetrates and leaves the tissues without producing injury or the noticeable after-effects which result from most narcotizing substances.

In commercial operations approximately 60 percent of the oysters are shucked and washed before marketing. It was found that the meats are rarely killed by shucking and will survive washing in fresh water up to 3 minutes. If then placed in the usual airtight tin containers they will generate sufficient carbon dioxide to produce narcosis and reach the market alive and in as good condition as when shipped in the shell. Under these circumstances the oyster

liquor becomes a slightly acid medium in which the growth of bacteria and spoilage organisms is considerably retarded. A small amount of dry ice or gaseous carbon dioxide can be introduced into the containers if necessary to improve the keeping qualities of the meats during shipment.

HURRICANE DAMAGE TO OYSTER INDUSTRY ON THE EASTERN SHORE OF VIRGINIA

At the request of Congressman S. O. Bland a survey was made by Dr. Prytherch of the situation on the Eastern Shore of Virginia to determine the amount of destruction of shellfish by the hurricane of September 17, and the most practical procedure for rehabilitating the oyster industry of that section. In Chincoteague Bay and vicinity it was found that the crops of oysters and clams on private beds had been almost totally destroyed as a result of severe wave action and smothering by mud and sand. These losses, estimated at $125,000, were not only an immediate and serious misfortune for the planters during a particularly favorable marketing season but were also responsible for the closing of two large oyster-shucking plants which ordinarily provided employment for several hundred men during the winter months. It was found that 350 to 450 men in the Chincoteague region would be deprived of their customary employment because of hurricane damage to private and public shellfish producing areas.

In the vicinity of Hog Island and Willis Wharf the oysters were swept off most of the private beds and killed by "sanding" or by being buried under heavy deposits of mud and sand. The natural or public beds also suffered severe damage chiefly from the shifting of large volumes of soft mud from the tidal marshes which smothered the oysters with a thick layer of this material. In this region the labor situation was found to be less critical than at Chincoteague and involved creating employment for approximately 20 to 50 oystermen after the first of December.

OYSTER REEFS IN MOBILE BAY, ALA.

At the request of I. T. Quinn, State Commissioner of Conservation, and A. J. Bride, Chief Enforcement Officer of the Alabama Oyster Commission, the Bureau detailed James B. Engle, temporary assistant, to make a survey of the oyster bottoms in Mobile Bay with the view of assisting the State authorities in the rehabilitation of depleted oyster beds. After making a careful study of conditions on every oyster-producing reef in the bay, detailed recommendations were submitted to the Alabama Oyster Commission indicating the necessary amount of shell and seed oysters that should be planted on each reef. The recommendations also comprised more general suggestions for the preservation of the present reefs and specifically mentioned the dangers of using long-toothed dredges which cause serious damage to the reefs. Dredging with short-toothed dredges can be permitted on some of the hard and deeper reefs but only when it is necessary to thin out the very dense growth of oysters. Further recommendations include procuring of seed by the State; greater return of shells to the bottom; and a more liberal policy in leasing of the State-owned bottoms to private oyster growers.

OBSERVATIONS ON OYSTER BARS IN APALACHICOLA BAY, FLA.

During the year hydrographic surveys were made by R. O. Smith from January 16 to September 3, covering 45 stations in St. Vincent Sound, Apalachicola Bay, and St. George Sound. Nineteen of these stations are located on oyster bars. The surveys were undertaken with the view of obtaining a better understanding of the correlations between fluctuations in temperature, salinity, and turbidity of the water and the productivity of the oyster bars.

It has been found that most abundant setting occurs in the zone where large fluctuations in salinity occur, but that market oysters of the best quality are taken from areas of relatively high salinity. The northern ends of St. Vincent, Cat Point, Peanut Patch, and Bulkhead Bars, where salinity variations are greatest, are the most heavily populated but seldom produce oysters of large size, good shape, or desirable fatness of meats. On the other hand, Porters Bar in St. George Sound and bars in the western end of St. Vincent Sound are regularly fished out as they produce the best quality meats in this region.

In summarizing the condition of the bars in 1935 it was stated that unless additional areas can be brought into production, the present rate of fishing on producing bars will result in a steady decline in size and quality of the shell stock. This prediction has been realized during the present season, when the oysters were small (400 to 700 per gallon), and of poor quality. Planting of oysters and cultch is still urgently needed and adequate supplies of seed are available from Platform Bar.

OYSTER INVESTIGATIONS ON THE PACIFIC COAST

After 5 years of intensive investigation of the history of the native oyster of the Pacific coast at Olympia, Wash., by Dr. A. E. Hopkins, a report summarizing the significant results was prepared for publication and the work discontinued. The results of this work have already proven of definite value to the oyster growers and it is expected that they will be increasingly useful in the future. In the southern portion of Puget Sound where the average range of tide is 14 feet and the maximum range 20 feet, the grounds on which Olympia oysters are cultivated are located generally between the minus 2 foot and the plus 4 foot tide levels and are all exposed at extreme low tide. Most grounds are leveled and surrounded by dikes which retain a few inches of water over the oysters at low tide.

Market-sized Olympia oysters, which are hermaphroditic and viviparous, bear broods of 250,000 to 300,000 larvae. In general, the larger the oyster, the larger the number of larvae produced. Usually an oyster produces one brood each season, though in some years as many as 50 percent may bear second broods also. On the other hand, during some seasons only about 75 percent of adults bear broods.

Spawning of functional females begins in the spring when the minimum water temperature at high tide reaches 12.5° to 13° C. (critical temperature), and most broods are produced during a period of about 6 weeks at the beginning of the spawning season, although an occasional gravid individual may be found as late as October. An average period of 10 days is required for the larvae to develop within the maternal brood chamber from eggs of 100μ to 105μ in

diameter to active veliger larvae 180μ in length, at which stage they are discharged.

The free-swimming period of the larvae is 30 or more days, permitting wide dispersal and large mortality. It was found that mature larvae attach, or set, most frequently to the under side of horizontal surfaces, and as the angle of the surface departs from the horizontal fewer spat are caught. Several closely-connected bays were studied for the purpose of finding when the most profuse setting takes place. In all bays except one the typical setting season consists of two distinct periods, 6 to 8 weeks apart, which fall within periods of spring tides when tidal range is greatest. Secondary setting periods may occur between these two or after the second.

Further observations were made on the circulatory system of oysters following discovery of the "accessory hearts" which apparently pump blood from the excretory organs to the mantle. A description of these observations was published in a scientific journal.

A series of experiments on the effects of changes in salinity on the feeding activities of *O. gigas* was brought to a close and the results prepared for publication. Adaptation of the feeding mechanism to changes in salinity was studied by recording on the kymograph the degree of openness of the valves and the relative rate of flow of water pumped by the gills. Both the activity of the gills and that of the adductor muscle, which by controlling the position of the valves determines the size of the inhalant and exhalant apertures, are markedly affected by any considerable change in salinity. The initial effect of such change is to cause partial or complete contraction of the adductor muscle and slowing or cessation of the flow of water. Recovery, or adaptation, following a rise in salinity is very rapid as compared with adaptation following the same change in the opposite direction. The former may require a few hours, while several days may be necessary in the latter case.

Because of the great variability in activity of the gills and in degree of openness even under conditions of constant salinity and temperature, the results do not justify an exact statement of the optimum salinity. However, the optimum is probably not greatly different from that of ocean water, for salinities between about 25 and 39 parts per thousand appear to produce similar effects. The lower limit of tolerance, or the minimum salinity at which water is pumped effectively, is between 10.5 and 13 parts per thousand.

YORK RIVER INVESTIGATIONS

At Yorktown, Va., where a temporary laboratory has been established, work was carried forward throughout the year to determine the causes for the decline in quality and volume of production of oyster beds in the upper York River. Laboratory analyses and experiments were conducted by Dr. Walter A. Chipman, Jr., and Dr. Arthur D. Hasler under the direction of Dr. Galtsoff. The oyster-cultural aspects of the problem in the field were handled by James B. Engle. During the first few months of the year physiological experiments were also carried on by Dr. Nelson A. Wells. Laboratory assistance was furnished by Lloyd R. Garriss and Orlin K. Fletcher, Jr.

The decline of the York River oysters during the last 20 years has resulted in a serious loss to many depending upon this industry for a livelihood. Inasmuch as no similar changes in quality have been noted in the oysters of nearby rivers, it may be assumed that the decline of the York River oysters is the result of local conditions. To determine whether the complaints of oystermen were justified, healthy oysters were obtained from the James River and planted at seven stations in the York River for observation on the physical and chemical changes occurring. Oysters taken from areas of the York River where the oysters are poor were transplanted to other localities, and changes in their condition were carefully followed. The condition of the oysters found in the York River was observed throughout the year.

The oysters in the York River showed a gradation of condition. Those in the river below Claybank were healthy and marketable while those above that point were noticeably poor and unfit for market. The meats were watery and transparent and the majority of the oysters had spots of green on the body. The taste of these oysters was acrid and disagreeable. Food was found in the stomachs but apparently this material was not properly assimilated for the oysters had not fattened and were low in glycogen content. Shell growth was observed but there was no thickening and strengthening of the shell by calcareous material necessary for handling and shucking. The gonad development was slow and the spawning light.

The oysters taken from the Piankatank River, and used for comparison with those of the York River, presented an entirely different picture. These were healthy, showed a high glycogen content, and possessed strong shells.

Observations parallel to those made on the York River oysters were made on the James River experimental oysters planted in the York River. Those introduced into the lower river maintained a healthy growth, while those planted in the upper river became weakened and poor. Green spots appeared on the body and the meats became watery and emaciated. Four months after transplanting the healthy James River oysters to various sections of the York River they assayed almost the same percent of glycogen as the native oysters; i. e., the upper York planted oysters analyzed low and the lower York planted oysters analyzed high in glycogen.

A group of oysters was taken from a section of the York River where conditions were bad and transplanted to other waters. At the time of transplanting these oysters were unmarketable, being watery, emaciated, and containing spots of green material on their bodies. The shells were rotted and handling was almost impossible. In March 1936 several bushels of these oysters were transplanted to the lower York River and upper Piankatank River to see if replanting in an environment entirely apart from the harmful influence would better their condition. The results were very striking. The shells were improved, the meats "fattened," and the green disappeared. Eleven months after transplanting the glycogen content was double that of oysters remaining on the original beds.

One of the few remaining oyster planters of the York River transplanted oysters from the same area to a river several miles from the York. The transplanting was done in March 1936, and the oysters

were examined in September of the same year and found to be marketable. The meats were fat and filled the shell cavity and the shells were thickened by a deposit of white chalky nacre. Another planter replanted poor oysters from beds farther up the York River to the lower river and noted marked improvement. These examples offer conclusive proof that the upper York River environment contains harmful elements that are not found in the lower river and waters removed from the York.

Samples of oysters have been taken from various parts of the York River and from several places on the Piankatank River and examined by Dr. Galtsoff for the presence of the sporozoan parasite known to infest oyster tissues. The parasite was found in oysters from localities where conditions were good as well as from localities where they were poor, showing that infection with this sporozoan is not responsible for the poor quality of the upper York River oysters.

The relative spawning activities of the York and Piankatank River oysters can be judged by the abundance of free-swimming larvae and amount of setting when conditions are favorable. Examination of net plankton samples taken throughout the summer of 1936 disclosed zones of abundance or scarcity of the swimming stages. In general it can be said that the abundance decreases with the distance from the mouth of the river toward the head. In the lower York larvae were plentiful from the time the 1936 studies began in June until they ended in late October. The figures taken from counts of the net plankton samples arranged chronologically show two peaks of spawning, one in early July and the other in late September. The samples from the upper part of the river show a decidedly low count. The maximum of the upper-river spawning occurred during the last part of August and extended through the first week of September. An abrupt drop in average number of larvae per sample appeared in the vicinity of Purtan Bay and above. In the control river, the Piankatank, the same condition prevailed, spawning being heavier in the lower part of the river than in the upper. However, the differences between the upper and lower sections of the river were less marked than in the York River.

The setting of larvae followed the same line as the spawning figures with the lower part of the river receiving the heaviest set. There was an exception, however, in the York when a rather heavy set was recorded for the areas near and inside Purtan Bay. The set in the York River, except at station 20, was less than that noticed in the Piankatank River. The set was of commercial magnitude at several stations in the lower York and the lower-river station in the Piankatank.

A very complete program has been followed in obtaining a picture of the hydrographical conditions of the York and Piankatank Rivers through 1936. The examination of the water consisted of observations on temperature, salinity, pH, dissolved oxygen, phosphorous, turbidity, and net- and nanno-plankton content. Tidal cycles at Yorktown and at West Point were studied and the isohalines of the York and Piankatank Rivers were determined.

The percent saturation of the water with oxygen was found to be consistently low in the vicinity of West Point. A period of low oxygen occurred during the latter part of July at which time many

fish died in the river just below West Point. Tests made of the oxygen-consuming capacity of the waters showed a high value for areas below the pump mill at West Point. The effluent of this mill has many compounds which become oxidized readily in the river and thus tend to lower the dissolved oxygen of the water for a distance below the mill.

To determine whether or not there existed a normal plankton cycle in the York River biweekly samples were taken throughout the year and the quantity of available oyster food measured. A maximum plankton crop in the York River was observed at the usual vernal period, March to April. Slight increases were again noted in November and December. These fall increases did not exceed the spring maxima. Throughout the summer the amount of plankton remained comparatively low. There was a larger nanno-plankton crop in the upper York River than in the lower throughout the major part of the year. The average plankton in the York River appears to be normal and sufficient, and to constitute a greater amount of available food than is present in the Piankatank River where the oysters are, in general, fatter.

Since the chief source of pollution in the York River results from the effluent of a paper mill at West Point, studies were carried on testing the action of this polluting material on oysters and on oyster food.

Using the diatom *Nitzschia closterium* as a test organism for laboratory experiments in determining the effects of polluting materials from the pulp mill, tests were carried on at the Washington laboratory. The organisms were artificially cultured in a media of Miquel's solution and sea water. Pulp-mill effluent was diluted to various concentrations with the culture solution to determine the effect it had on the growth of this diatom. It was found that concentrations from 1:1,000 to 1:100,000 definitely stimulated growth. Concentrations greater than 1:500 inhibited growth. Concentrations less than 1:100,000 showed little or no stimulation when compared with control cultures.

In view of the fact that it is impossible for the oyster to feed during the time the shell is held closed, experiments were carried on testing the effect of pulp-mill effluent on the number of hours per day oysters were open. A total of 74 oysters were examined during the course of the experiment. Of this total, 50 oysters were exposed to concentrations of pulp-mill effluent in sea water ranging from 100 parts per thousand to 1 part in 10,000. Definite reductions in the number of hours the oysters were open occurred in concentrations down to 1 part of effluent in 5,000 parts of sea water. The results with weaker concentrations were less definite. This reduction occurred immediately after exposure in the stronger concentrations and after an exposure of 3 or 4 days in the weaker concentrations. A reduction in the number of hours open per day in a strength of 1 part in 10,000 occurred after an exposure of 23 days.

Using the carmine cone method developed by Dr. Galtsoff, experiments were carried on to determine the minimum dose of effluent that would cause a depression in the ciliary activity of oysters. Other studies were made using this method to test the recovery after treatment, tolerance, and sensitivity. The general results of 22 experi-

ments, in which 59 oysters were tested, showed a depression of ciliary activity in concentrations greater than 2.5 parts per thousand within 30 minutes after treatment was started. Concentrations below this were indefinite even after 24 hours of exposure. Full recovery of the ciliary activity did not return after treatment with 5 or 10 parts per thousand for 30 minutes.

Similar results were obtained by measuring the depression of ciliary activity by the drop-counting technique. Depression occurred in strengths greater than 2.5 parts of effluent per thousand parts of sea water.

Dr. Galtsoff's constant-level tank combined with the rubber apron method of Nelson (1935) was used for automatic simultaneous recording of the water output of experimental oysters subjected to pulp-mill effluent. Measurement of water filtration was made on 18 individuals, of which 7 were controls kept in unpolluted sea water and 11 were treated with various dilutions of pulp-mill effluent. Three oysters were treated with 5 parts per thousand of the effluent, 2 with 2.5 parts per thousand, and 5 with 1 part per thousand. Concentrations of 5 and 2.5 parts per thousand gave immediate and marked effects. The water output was depressed so that one oyster filtering 14.5 liters per hour for 2 days before treatment filtered 1 liter per hour during treatment with a solution of 5 parts per thousand. No recovery was evident the day after the treatment was stopped. Five oysters were treated with 1 part per thousand of pulp-mill effluent. Four out of the five responded with an altered behavior of muscle activity. Their water output was depressed within a week after treatment was started, e. g., the water output of one oyster was depressed 44 percent after 5 days of treatment, another 71 percent after 4 days. The controls remained unchanged in their rate of pumping.

It is important to note that under certain conditions of experiments in which the rate of filtration of water was reduced or stopped the shell of the oyster remained open and the shell closures were irregular. From this it would seem that the fact that the shell of the oyster is open and the adductor muscle shows activity does not necessarily indicate that the oyster is feeding.

Current measurements in the York River were carried on during the last few months of the year with the view of obtaining data which will allow calculation of the dilution of the pulp-mill effluent in the river. This activity will allow correlation of the laboratory findings with observations of conditions existing in the river.

All the evidence so far gathered indicates the existence in the upper part of the river of an environment decidedly harmful to oysters. Studies of the cycles of temperature, salinity, and plankton failed to demonstrate the existence of abnormal conditions which may be responsible for the pathological state of the oysters. On the contrary, the food supply in York River appears to be more abundant than in the Piankatank. On the other hand, direct evidence of the harmful effect of the pulp mill effluent is provided by the physiological experiments which prove the toxicity of the black liquor. Its deleterious action is manifested by its effect on the adductor muscle and on the complex pumping mechanism of the oyster. By decreasing the number of hours the oyster stays open the presence

of black liquor in the water cuts down the time normally used for feeding. The depression of the ciliary movement combined with the reduction in the periods of feeding results in the stunted growth of the oyster and its failure to accumulate reserve food material (glycogen). The experiments definitely show that the black liquor produces a general depressing effect inhibiting the principal functions of the organism.

AQUICULTURAL INVESTIGATIONS

DR. H. S. DAVIS, *in charge*

The increasing popularity of angling for sport and recreation has emphasized the urgent need of more information on the various factors which affect the development, growth, and well-being of our fresh-water game fishes. In view of the remarkable increase in the artificial propagation of trout and other game fishes during the past few years, it is surprising that so little attention has been paid to the life and activities of these fish after being liberated in natural waters. Yet the whole success of artificial stocking is dependent on a suitable environment and the ability of the fish to adjust themselves quickly to their new surroundings. For this reason special emphasis is being placed on field investigations to provide the basic information essential for the development of a comprehensive policy of scientific fish management.

TROUT CULTURE

Test waters.—The use of "test waters" in Vermont to obtain much needed information on the productive capacity of streams under intensive fishing and the best methods of maintaining maximum production was increased to the full extent allowed under the State law. These studies are under the direction of R. F. Lord, in charge of the Bureau's experimental hatchery at Pittsford, Vt., and were made possible by a law passed in 1935 by the Vermont State Legislature, authorizing the State Fish and Game Service to cooperate with the Bureau of Fisheries in collecting the desired information. Under the law a maximum of four test waters may be reserved for collecting angling statistics. The Bureau of Fisheries is to carry on the necessary stocking and field work while the State assumes responsibility for enforcing the regulations pertaining to test waters. Each angler must secure a special permit, issued without charge, and is required to report his daily catch on forms provided for the purpose.

Furnace Brook was the only stream operated as a test water in 1935, but in 1936 the program was expanded to include the South Branch of Middlebury River, and the West Branch of White River, both streams being representative trout waters. The selection of Chittenden Reservoir as a test water marks the first attempt in Vermont to obtain catch records from a lake.

The results from Furnace Brook are of special interest, since it is now possible to compare the total catch from this stream for two successive seasons. It is a clear-water stream about 25 feet in width throughout the test section, which includes about 4 miles of the upper reaches. A waterfall at the lower end acts as an effective barrier to prevent the ascent of fish from below the test section. Only brook

and rainbow trout are found above the falls. Furnace Brook is reputed to be one of the best trout streams in Rutland County, and being easily accessible, is very heavily fished.

During the 1935 season, 1,197 fishing reports were turned in, and during 1936, 1,107 reports were made. The total catch of legal trout was 8,589 in 1935 and 6,995 in 1936. Breaking down the reports by species we find that in 1935 the catch consisted of 5,645 brook trout and 2,942 rainbow trout; while in 1936 the catch of brook and rainbow was 4,371 and 2,624, respectively. The average catch per fishing effort was 7.2 trout in 1935 and 6.3 trout in 1936.

It will be noted that the decrease in the number of fish caught in 1936 as compared with 1935 was almost entirely due to a marked reduction in the number of brook trout, the decrease in the number of rainbows being too small to have significance. This result is even more remarkable in view of the fact that there has been no stocking of rainbows in Furnace Brook for several years, while large plants of brook trout, consisting of fingerling and yearling fish, have been made annually in September. It is evident, therefore, that not only are the rainbow trout in Furnace Brook self-sustaining, but they are able to maintain a fairly stable population without artificial aid even when subjected to intensive fishing.

Neither the South Branch of Middlebury River nor the West Branch of White River is as intensively fished as Furnace Brook and the total catch in these waters was much less. The average catch per fishing effort was 6.6 trout in the former stream and 4.6 trout in the latter. It is interesting to find that in Chittenden Reservoir the average catch per fishing effort was only 1.4 trout, but the fish were much larger than those taken in the streams, averaging about a pound in weight.

Collections of bottom samples in the three test streams during the summer of 1936 show an average of 1.167 grams of food organisms per square foot for Furnace Brook, 0.915 grams for South Branch of Middlebury River, and 0.732 grams for West Branch of White River. It is believed that these results are representative for mountain trout streams in this region.

Arrangements were completed with the United States Forest Service for the operation of four experimental streams in the White Mountain National Forest for the purpose of obtaining information on the relative value of trout of different sizes for stocking. The streams selected are Sabbaday, Downes, Oliverian, and Douglas Brooks, all tributaries of Swift River. These streams are very similar with respect to physical and chemical characteristics and abundance of food organisms. Each stream is to be stocked annually with brook trout of a certain size as follows: Unfed fry in Sabbaday Brook, 2-inch fingerlings in Douglas Brook, 4-inch fingerlings in Downes Brook, and yearling trout in Oliverian Brook. The Forest Service has assumed responsibility for obtaining a complete record of the numbers and sizes of trout taken from these streams each season, information that should be of great value in the development of plans for the proper management of streams in this region.

Big Levels Refuge.—Studies on trout streams in the Big Levels Refuge in the Natural Bridge Division of the George Washington National Forest in Virginia were continued under the direction of

E. W. Surber. Collections of bottom samples at several stations in St. Marys River and Kennedy Creek were made at monthly intervals, and data on all trout taken from these streams during the season were collected by the Forest Service. The primary purpose of the study is to obtain as complete information as possible on the results of artificial stocking.

Big Spring Creek, Va.—The trout production studies on Big Spring Creek near Leesburg, Va., were continued for the fourth consecutive year. The 1-mile section produced 30.2 pounds of trout per acre as compared with 29.7 in 1933, 27.7 in 1934, and 34.8 in 1935. Such uniformity in results over the 4-year period was unexpected and is the more remarkable because the stocking intensity was doubled in 1935, apparently without effect on production in 1936. It should be explained that trout grow very rapidly in this stream and practically all fish planted reach catchable size the following year.

Pisgah Forest project.—Through a cooperative agreement with the United States Forest Service arrangements have been made to utilize the streams of the Pisgah Division of the Pisgah National Forest, N. C., as an experimental and demonstration project of the value of scientific stream management as a means of improving angling conditions. The Forest Service has constructed a rearing station on the headwaters of the Davidson River which will be operated by the Bureau. In addition to rearing pools of various sizes, the station is provided with a residence, workshop, and laboratory. It is believed that this arrangement will provide an excellent opportunity for acquiring information essential to the development of a fish-management policy for streams of the southern Appalachian region.

Feeding experiments.—Owing to lack of funds, feeding experiments have been greatly curtailed during the past 3 or 4 years. However, several experiments were conducted at the Leetown hatchery with diets containing seal meal, salmon meal, preserved haddock, and "salmana." The chief interest in these diets centers around the use of seal meal because of its availability at low cost. This diet had previously given good results over a 3-month period but a duplicate experiment continued for a longer time resulted in heavy mortality, confirming results at other hatcheries where this product was fed for a considerable length of time.

Breeding experiments.—Fifty pairs of selected brook trout were mated at the Pittsford hatchery and the eggs incubated in individual lots. As usual, the better lots were reared separately through the summer. It is noticeable that the losses among selected fish from furunculosis have been decreasing each year and it is believed that a more resistant strain of trout is gradually being developed.

Similar experiments with brown and rainbow trout are being carried on at the Leetown hatchery.

Experiments with incubating eggs.—In an effort to determine the cause of the heavy losses suffered by brook trout eggs at the Leetown hatchery, duplicate lots of brook and rainbow eggs were incubated under varying conditions by E. W. Surber. Variations in the highly mineralized hatchery water were produced by adding very small quantities of iodine, by reducing the normal high free carbon dioxide

content and by lowering the temperature, which is normally about 54° F. Eggs were also incubated in aquaria supplied with circulating soft water.

The results were inconclusive and difficult to analyze, but apparently none of the variations in the normal water supply were particularly beneficial. Both brook and rainbow eggs in soft water high in oxygen gave the poorest results. Efforts to incubate brook trout eggs in brook water at lower temperatures failed on account of silt deposited on the eggs. On the whole, both eggs and fry in normal hatchery water did as well or better than the other experimental lots.

The failure to find any definite fault in the water supply indicates the desirability of investigations along other lines, and it is proposed to study the effect of environmental conditions and diet of brood stock on the developing eggs. That this may prove a fruitful field of research is indicated by the fact that eggs from hatchery trout that had lived several months in a large pond where they were dependent on natural food gave a much better hatch than the average.

California trout investigations.—Good progress was made during the year on the inland research projects of this unit. As noted previously, the work has proceeded along two major lines of effort; the Hot Creek brood stock experiments, and coastal stream steelhead studies. Personnel remained the same with Dr. P. R. Needham in charge of the field program, assisted by A. C. Taft. Two assistants, Leo Shapovalov and Leo Erkkila are assigned to the work by the California Division of Fish and Game as part of the joint cooperative program actively initiated in 1932.

Work at the Hot Creek station continued as planned and the first eggs were taken from the three select lots of fall-spawning rainbow on October 26, 1936. A total of over 800,000 rainbow eggs were taken, of which about 500,000 were eyed and hatched at Hot Creek. A considerable loss of both female and male adult brook rainbows was caused by furunculosis.

Experiments in rearing trout on natural food in ponds were continued for the fourth consecutive year at Hot Creek. This year only loch leven trout were planted in the four ponds available. The ponds were stocked in June and operated for approximately 3 months. An average survival of 72 percent was obtained, the best since these experiments were begun in 1932. In previous years' operation of the rearing ponds during the summer, the survival was only about 40 percent. The reason for the higher survival rate obtained in the summer of 1936 may lie in the fact that few predator birds fed in the ponds this season and but few of the large leeches, *Helobdella stagnalis*, abundant in the ponds in previous years, were present. The growth rate of the fish per month was about the same as that obtained in previous years, or approximately one-half inch per month.

Detailed records of anglers' catches were again taken during the open fishing season on Upper Angora and Convict Lakes. A series of gill-net sets were made in Upper Angora Lake after the fishing season had closed, to determine from samples of both marked and unmarked fish taken what age groups, species, and sizes of fish had survived. The complete data from catch records obtained over three fishing seasons are now being analyzed and prepared for publication.

Detailed plans were drawn up for the development of a major stream- and lake-management project on the Convict Creek drainage

basin in eastern California. This drainage basin contains over 12 lakes and 12 miles of stream lying at elevations from 7,000 to over 11,000 feet. It is proposed to place both the lakes and streams in this basin under a definite management plan concerned with stocking, returns from anglers, stream and lake improvements, and related matters. On the lower portion of Convict Creek an experimental stream, 4,000 feet in length and providing 33 sections divided by concrete flumes keyed for screens and flash boards, has been constructed in cooperation with the Forest Service. Experimental plantings of trout will be made here to determine the mortality of various sizes and species planted under varying environmental conditions.

At Scott and Waddell Creeks a census of the spawning runs is made each year in order to determine the basic facts in the life history of the steelhead and silver salmon and the return from known escapements. During the 1935–36 season the run and egg-take for steelhead at Scott Creek was the largest (882) in a number of years and, judging by the number of marked fish returning, was largely due to an unusually successful plant of yearlings during 1934–35. At Waddell Creek the run of steelhead was smaller than in 1934–35, but larger than during 1933–34. The run of silver salmon in both streams was considerably less than during the previous seasons. In the lagoon of Waddell Creek striped bass were found feeding on young trout and salmon during the height of the seaward migration of silver salmon and may possibly have had an influence on the diminished run of 1935–36.

A marked decrease was noted in size of the down-stream sculpin migrations passing through Waddell weir. If this decrease continues it seems likely that dams not high enough to bar the migration of steelhead and salmon could be installed in California streams to control the number of sculpins above such dams.

At both Waddell and Scott Creeks the losses due to furunculosis among adult steelhead and the young pondfish at Scott Creek were again heavy. Offspring from marked adult steelhead returning to Scott Creek were marked and planted in the stream in order to develop, if possible, a run of fish that would show resistance to this disease.

On the Klamath River 27,378 young steelhead were marked and planted in Beaver Creek during June. These fish were hatched from eggs obtained at Scott Creek. This is a continuation of the experiment to check, under somewhat different conditions, the results obtained at Waddell and Scott Creeks and to establish an annual run of marked fish which would give some indication of the varying intensity of fishing in the main Klamath River. King salmon to the number of 39,170 were marked and liberated in Fall Creek, another tributary of the Klamath, on August 15. On September 3 of the previous year 38,170 king salmon had been marked and liberated in the same stream.

As a part of the cooperation between the Forest Service and the Bureau of Fisheries, Dr. Needham assisted in a biological survey of the lakes of the Willamette National Forest in Oregon. Two biologists were employed for this work by the Forest Service, while the Bureau loaned most of the necessary field equipment and directed the work. A cooperative survey of High Sierra lakes for "check-dam" sites in the Sequoia National Forest in California was likewise carried out. Reports of both surveys have been presented to the agencies concerned.

POND-FISH CULTURE

Bass investigations.—In April 1936, experimental sections for the study of smallmouth black bass and associated fishes were established in two bass streams, the South Branch of the Potomac River near Romney, W. Va., and the Shenandoah River near Berryville, Va. Each section is approximately 4 miles long and the limits are plainly defined by appropriate signs. Anglers were requested to leave reports of each day's fishing in mail boxes set up at convenient points. These reports show that the average length of legal bass taken in the Shenandoah River was considerably greater than that of bass taken in the South Branch (13.3 and 11.9 inches respectively). Furthermore, the relative number of legal-sized bass was greater in the Shenandoah than in the South Branch (Shenandoah, 132 legal to 80 undersized; South Branch, 150 legal to 160 undersized).

The growth of the young bass was followed from the time the fry rose from the nests to the end of the growing season. It was found that in the Shenandoah, the larger stream, the bass reached an average length of about 4.25 inches at the end of the season, as compared with 2.75 inches in the South Branch. Other species of fish, including the stoneroller, common sucker, and fallfish, also grew more rapidly in the Shenandoah. The stonerollers, especially, grew too fast to be available as food for the average fingerling bass. The most desirable forage fish for fingerling bass appeared to be the blunt-nosed minnow, which had successive broods of young throughout the summer and thus provided fish small enough for the young bass to consume. Minnows in general appeared to be less abundant in the South Branch, while bass were far more abundant per unit area. The hatch of fry on the 4-mile section of the South Branch was estimated to have been at least 216,000. This fact, among others, raises the question of the need for stocking a stream such as this with hatchery-reared fish.

Growth studies showed that very few bass in the South Branch reach the legal length of 10 inches before their fourth year while in the Shenandoah nearly all bass reached that length in their third year. This rapid growth of the Shenandoah bass was made in spite of the fact that the river carried large quantities of silt throughout the summer.

Quantitative bottom samples were taken at regular intervals in the riffles of both rivers. The average number and weight of bottom animals was somewhat greater in the Shenandoah and there was a marked difference in the characteristic organisms in the two streams.

Fingerling bass from the two streams also showed differences in the extent of parasitism. The livers of nearly all fingerlings from the South Branch showed encysted trematodes (Strigeidae) while Shenandoah fingerlings were nearly free from parasites. In some instances the parasitized livers were so large as to affect the external appearance of the fish.

Pond culture.—Early in the year O. Lloyd Meehean was transferred to the Marion (Ala.) station from Natchitoches, La., where he had been conducting investigations in pond culture for several years. Unfortunately, conditions at Marion were found to be unsuitable for such studies and they were discontinued at the end of the season. The results at Marion confirmed findings of previous

years that production of food organisms is greater in ponds containing vegetation than in those without an appreciable growth of higher plants. In the former the average weight of food organisms per square meter was 13.68 g while in the latter is was only 6.48 g. The presence of forage fish (sunfish) in the ponds was found to increase the survival of bass fingerlings 12.3 percent over that in the same kind of ponds without forage fish. The ponds at Marion are new and at a low stage of ecological development. Consequently, they are much less productive than ponds that have been in use for some time. Mr. Meehean estimates that it will require about 3 years to develop an adequate permanent fauna in these ponds.

FISH DISEASES

A hitherto unrecognized form of gill disease broke out in May among smallmouth bass in a rearing pond at the Leetown station and caused considerable mortality before its true nature was discovered. The losses occurred among brood fish and fry at about the time the latter were rising from the nest. The trouble was traced to an infection of the gills with a protozoan belonging to the Dendrosomidae, a family of Suctoria. This organism occurs on the gills in enormous numbers and appears as a somewhat elongated or rounded body closely attached to the surface of the lamellae. The parasites are about 30μ to 40μ in diameter and usually show a distinct orange color. In heavily-infested bass the outer ends of the gill filaments become enlarged and club-shaped. Later the swollen ends become necrotic and fungus develops, forming a mat of felted fibers to which cling particles of silt and debris, giving the appearance of a dirty white mass attached to the ends of the gill filaments. Eventually a considerable area may become necrotic, resulting in the death of the fish. Later in the season the same parasite was found on the gills of bass which were suffering a heavy mortality at a hatchery in Maryland.

Investigations of diseases among salmon and trout were conducted by Dr. Frederic F. Fish at the recently established pathological laboratory at Seattle, Wash. Experiments to determine the effect on fish of the use of disinfecting solution at regular intervals were conducted at the Birdsview, Wash., and Clackamas, Oreg., hatcheries. It was found that certain concentrations of disinfectants could be safely used on salmon and trout from egg to fingerling stages without risk of incurring any greater mortality than was encountered in the untreated control lots. In some instances the loss on treated lots was definitely lower than on the untreated lots although no specific disease was present. The maximum safe concentrations for weekly applications under the conditions at these hatcheries was found to be: Malachite green, 1:450,000; sodium dichromate, 1:125,000; chlorazene, 1:150,000. Potassium permanganate, even as dilute as 1:400,000, appeared to be distinctly toxic and the effect appeared to be cumulative.

After 12 months of experimentation, the impracticability of performing experimental work at routine hatcheries became so obvious that further work was dropped pending the construction of a small experimental hatchery that could be entirely devoted to this purpose. With the cooperation and financial assistance of the Division of Fish

Culture, an experimental hatchery is under construction at the Quilcene, Wash., station. This unit is expected to be in operation early in 1937 when the studies on disease prevention and control will be resumed.

The apparatus for prolonged dipping, which consisted primarily of a calibrated floating siphon, has been materially simplified. The modified type of apparatus has been in regular use at two hatcheries for the past 7 months and the hatchery personnel report it to be far more satisfactory than the earlier type. Both hatcheries have been applying malachite green in a 1:450,000 concentration to all fish and report definite success although accurate figures are not available.

During the months of May, June, and July, various hatcheries in the intermountain district were visited to observe the conditions and equipment and to confer with hatcherymen on their disease problems.

Experiments on the susceptibility of *B. salmonicida* to common hatchery disinfectants and to moist heat showed that a 1:10,000 solution of potassium permanganate will kill the bacteria in less than 10 minutes. With copper sulphate at the same concentration between 30 and 60 minutes were required to accomplish the same result. The most efficient disinfectant was "HTH" which, in a 1:100,000 solution, killed the bacteria in less than 10 minutes. The bacteria were found to show little resistance to moist heat, being killed in less than 1 minute at 54° C. On the basis of these experiments it is recommended that hatchery equipment be sterilized by placing in hot water at 55° C. or, in the absence of considerable organic material, in a 1:100,000 solution of "HTH" for 10 minutes.

Field studies on the occurrence of furunculosis among loch leven trout in Lake Madison, Mont., were undertaken during November and December. Cultures were made from the kidneys of adult fish by Dr. C. J. D. Brown of Montana State College and forwarded to Seattle for identification. Of 77 cultures taken at the Lake Madison traps four were found to contain *B. salmonicida*. This indicates that furunculosis was not as prevalent during 1936 as it was reported to be during the previous year.

The disease service has proved very popular and a large number of specimens submitted by various State and bureau hatcheries and by private individuals were examined at both the Washington, D. C., and Seattle laboratories. Although in most cases the service is necessarily limited to the examination and diagnosis of preserved specimens it has proved very helpful in enabling fish culturists to adopt proper control measures.

INVESTIGATIONS IN INTERIOR WATERS

Dr. M. M. Ellis, *in charge*

POLLUTION STUDIES

During the past year investigations concerning the toxicity of industrial effluents on aquatic life have been continued in 22 States so that to date some 60 major groups of effluents representing over 200 kinds of industrial wastes have been studied, assayed, and their components standardized. For many of these substances detoxifying procedures have been devised and tested. From these data on

effluents and soil constituents the manuscript for the second part of the pollution series studies, Trade Wastes, Chemical Effluents, and Natural Pollutants, has been prepared and will be submitted for publication during 1937.

One of the striking findings in the investigations of natural pollutants has been the high toxicity of minute quantities of selenium to fish, as little as 0.05 mg. of selenium being sufficient to produce a peculiar "pop-eye" condition in catfish after some 7 days. This condition was usually fatal in less than 3 weeks and was attended with marked edema and other pathological changes of the internal organs. This work on selenium is particularly significant in view of recent surveys which show this element to be a widespread menace in several Western States.

Several other substances also found in small quantities in some natural waters and soils, as boron, fluorides, titanium, etc., have also been found to present previously unrecognized hazards to fish and other aquatic life.

The investigations on fish physiology as related to water conditions have been greatly extended during the past year with the perfection of new apparatus for studying fish respiration, heart action, and internal metabolic activities.

MUSSEL PROPAGATION

During the summer of 1936 approximately 40 million fresh-water mussels, about equally divided between the yellow sand shell, *Lampsilis anodontoides*, and the river mucket, *Actinonaias carinata*, were planted at definite stations in northern Arkansas where the success of these stockings can be followed for the next 5 years. A good supply of brood stock for the river mucket has been located and during the spring of 1937 it is anticipated that the plantings listed above will be doubled.

At Fort Worth, Tex., the long-time experiments on mussels in confined areas have been continued with satisfactory returns. These tests have confirmed the previous findings that the river mucket is the most promising species studied thus far for commercial propagation, and have given additional information on the survival of fresh-water mussels under adverse conditions.

ICHTHYOLOGICAL INVESTIGATIONS

DEVELOPMENT AND RATE OF GROWTH OF FISHES

The study of a collection of young fishes from the South Atlantic States, principally from Beaufort, N. C., was continued by Dr. Samuel F. Hildebrand, assisted by Louella E. Cable. A manuscript devoted to the description of the development of 17 teleosts from the egg to the adult, as far as material was available, was prepared and submitted for publication. The rate of growth during the first year for some of the species is shown, and other life history notes and data are included.

SURVEY OF THE FRESH WATERS OF MISSISSIPPI

The general survey of fresh-water fishes in the State of Mississippi, undertaken by Dr. Hildebrand in 1933, was continued in cooperation

with the State Game and Fish Commission during July 1936, when various waters in the Delta section of the State were examined in regard to their natural characteristics, and were sampled for the fish population and fish foods present. Excessively hot weather and an extensive drought prior to the investigation had resulted in the death of many fishes in some of the very shallow overheated lakes. It is evident that many of the lakes in the Delta, which consist mostly of deep holes in the beds of rivers that have changed their courses, are gradually filling up as a result of erosion since the clearing of the land for agriculture.

FISHES OF THE CANAL ZONE AND PANAMA

The study of specimens and data collected by Dr. Hildebrand in Panama and the Canal Zone in 1935 in cooperation with the Gorgas Memorial Laboratory, Panama City, was continued. A manuscript dealing with the use of the Gatun Locks as a habitat and passageway for fishes was completed. The study of the general collection made in various places in Panama has revealed several undescribed species, and the preparation of descriptions and illustrations has beeen undertaken.

A general study of the American anchovies was undertaken with the view of producing order out of the chaotic condition of the present classification of this family of fishes. Studies of Atlantic coast specimens of both North and South America that were available in Washington, and of others borrowed for study from museums outside of Washington, have been carried almost to completion.

MARINE FISHES OF THE GULF COAST

Systematic studies of the fishes of the Gulf coast were continued by Isaac Ginsburg. Special attention was given to the families Pleuronectidae, Cyprinodontidae, and Syngnathidae.

INDEPENDENT ACTIVITIES OF THE FISHERIES BIOLOGICAL LABORATORIES

WOODS HOLE, MASS.

Owing to lack of funds, the Woods Hole laboratory was not maintained on an operating basis in 1936. Although facilities were utilized in connection with the oyster investigations reported upon elsewhere, no independent activities were possible.

This condition not only retards progress in the Bureau's fishery investigations, but also represents the loss to the Bureau of advantages formerly gained from results obtained by independent investigators through use of the laboratory's facilities.

BEAUFORT, N. C.

Research.—The biological station at Beaufort, N. C., which was continued in operation during the entire year under the direction of Dr. H. F. Prytherch, provided facilities for the study of marine fishery problems of the South Atlantic region. The various investigations conducted here by the Bureau's staff, as reported in detail

elsewhere, dealt with the following problems: (1) The biology and control of the oyster drill, (2) the life cycle of a sporozoan parasite of the oyster, (3) autonarcosis in the oyster and its industrial application, (4) destruction of oysters by a hurricane on the Eastern Shore of Virginia, (5) spawning of the blue crab in North Carolina waters, and (6) reproduction and feeding of the commercial shrimp.

The Beaufort laboratory serves as headquarters for oyster investigations in the South Atlantic region and has cooperated with the conservation departments of the coastal States, the Works Progress Administration, and commercial fishing interests in the rehabilitation of public oyster beds, regulation of the clam and blue-crab fisheries, and continued advice to a cooperative fishermen's organization. At the request of the United States Engineer's Department an inspection was made of the field experiments and studies being conducted by them on the South Carolina coast to determine the possible damage to oysters by dredging operations in the Intracoastal Waterway. At meetings of the National Emergency Council in Raleigh and Durham, N. C., reports were presented describing the various activities conducted by the Beaufort laboratory for the conservation and development of the fish and shellfish resources of this State.

Laboratory facilities for marine research have been provided for 15 independent investigators from other institutions who were engaged in the following studies: Dr. H. V. Wilson, professor in the University of North Carolina, research begun at the laboratory the preceding summer dealing with the effects of certain narcotics on sponge syncytia; Dr. C. E. Tharaldsen, New York Homeopathic Medical College, the effect of cancer-producing substances on embryonic development of the sea urchin; Dr. Irene Bolich, Alabama College, influence of environmental conditions on cellular behavior; Greer J. Kimery, United States Department of Agriculture, process of decomposition in shrimp; J. Albert Fincher, University of North Carolina, early development and regeneration in the lower invertebrates; D. John O'Donnell, Illinois Natural History Survey, marine fauna of representative intertidal areas; Dr. Alan Boyden, Rutgers College, the blood relationship of animals; Gordon H. Tucker, University of North Carolina, regenerative powers of the cells of lower invertebrates; Dr. Hoyt S. Hopkins, New York University, effects of methylene blue on respiration and glycolysis in tissues of lamellibranchs; Dr. George E. Coghill, formerly of Wistar Institute, myogenic behavior in embryonic tissues of fishes; Dr. A. S. Pearse, Duke University, studies of the flatworm parasite of the oyster; George W. Wharton, Duke University, parasites of the intestinal tract of reptiles; Dr. R. H. Kudo, University of Illinois, sporozoan parasites of molluscs; Dr. E. Laurence Palmer, Cornell University, general natural history of seashore animals; Dr. Katherine V. Palmer, president of the Paleontological Research Institution, living and fossil molluscs.

Terrapin culture.—Artificial propagation of the diamond-back terrapin, conducted in cooperation with the Division of Fish Culture and under the immediate supervision of Charles Hatsel, yielded during the summer of 1936 a total hatch of 10,750 young terrapins. These were cared for and fed in the special rearing house for a period of approximately 2 months during the early fall after which they

were placed in the hibernating pens where they will remain until the following spring. Experiments are in progress to determine whether the young terrapins can be carried over the winter in the unheated rearing house by covering them with damp seaweed and maintaining a low even temperature by protection from direct sunlight. If this is possible it will eliminate considerable labor in transferring the young terrapins to and from the hibernating pens and will afford complete protection from rats and mice.

During May, 11,000 young terrapins of the 1935 brood which had been reared to an age of approximately 9 months were distributed throughout the coastal waters of the South Atlantic region as follows: Virginia, 3,000; North Carolina, 3,500; South Carolina, 3,000; and Georgia, 1,500. The actual planting of the young terrapins in brackish-water areas was carried out by the conservation departments of the several States and if continued and increased each year should help to maintain a supply of this valuable seafood. Progress is being made in the development of a cooperative program whereby the various States receiving terrapins will provide funds for continuing and increasing the artificial propagation of this species.

During the past 5 years the Beaufort laboratory has produced for distribution an average of 10,520 young terrapins per year. The cost of rearing these animals has ranged from 3½ to 5 cents per terrapin per year which includes the labor and expense of feeding the brood stock, repairing breeding pounds, collection and care of young, etc. Previous to 1931 the production of young terrapins over a 5-year period averaged approximately 5,000 animals per year. The reason for the increase since that time appears to be the purchase of additional brood stock during the spring of 1930, which included 540 adult females that began laying in 1931 and produced an increased yield of approximately 5,000 to 7,000 young per year. Previous terrapin-cultural experiments indicated that in general an average annual production of 12 eggs per female per year may be expected, a figure which is in agreement with results obtained in this work during the past 5 years.

The spawning of the blue crab.—At the request of the North Carolina Department of Conservation and members of the local crab industry, studies of the spawning of the blue crab were made at the Beaufort laboratory as a basis for regulation of the industry. The crab fishermen desired permission to catch and steam the female crabs which were carrying eggs or "sponge." A very high percentage of the crabs caught during the spring season were females, which the fishermen contended would spawn only once and die soon thereafter. Experiments conducted in laboratory tanks and outdoor pounds showed that each female crab developed and hatched 3 separate large batches of eggs during the period from May 26 to July 18. The period of hatching in each case ranged from 12 to 16 days. A short time after the third spawning all of the crabs died, apparently owing to termination of the life cycle after reproduction. The studies clearly indicate that protection of mature female crabs is advisable both before and after the first sponge is formed on the abdomen. Similar studies were undertaken in the late fall with crabs from winter dredging areas in Virginia, to determine what percentage of the crabs caught in this fishery are

mature females which will develop into sponge crabs during the following spring. This knowledge should be of practical use in future regulation of the crab industry, particularly during a period of scarcity when protection of potential spawners may be advisable.

APPROPRIATIONS

Funds for the work carried on by the Division of Scientific Inquiry in the calendar year 1936 were derived mainly from the appropriation, Inquiry Respecting Food Fishes, and approximately one-half of the appropriations for each of the fiscal years 1936 and 1937 was available for this work. The appropriation for the fiscal year 1936 was $164,700, an increase of 7½ percent over the preceding year. The appropriation for the fiscal year 1937 was $172,000 or a further increase of 4.4 percent over 1936. By means of these increases in appropriations it has been possible to reestablish several positions in the scientific field staff to take up investigations which had been discontinued previously because of repeated reductions in annual appropriations. A summary of the amounts available for the various major projects in each of the two fiscal years follows:

Project	1936	1937
Regular appropriations:		
Commercial fishery investigations	$109, 580	$113, 530
Oyster cultural investigations	15, 840	19, 200
Aquicultural investigations	34, 900	33, 845
Conserving fish by screens and ladders	2, 000	1, 550
Washington laboratory and administration	2, 380	3, 875
Total	164, 700	172, 000
Allotment for maintenance and operation of vessels	11, 400	26, 300
Special funds:		
York River pollution investigations	16, 740	17, 456
Bonneville fishway design	6, 564	
Shellfish pest control studies	100, 000	25, 000

In the fiscal year 1936 a special appropriation of $100,000 for shellfish investigations, available for use in the fiscal years 1935 and 1936 together with the subsequent appropriation of $25,000 for the same purpose for use in the fiscal year 1937, made possible the continuance of a large-scale survey of the distribution of shellfish pests and an investigation of the means of controlling them. An additional allotment of $10,000 was provided by the Public Works Administration for the continued investigation of the effects of pulp-mill wastes on oysters of the York River, Va. An increase in funds allotted for the operation of Atlantic coast vessels made possible extensive alterations and the recommissioning of the motor vessel *Pelican* for use in the shrimp investigations in the South Atlantic and Gulf coast regions.

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U. S. DEPARTMENT OF COMMERCE
DANIEL C. ROPER, Secretary
BUREAU OF FISHERIES
FRANK T. BELL, Commissioner

Administrative Report No. 33

PROPAGATION AND DISTRIBUTION OF FOOD FISHES

FISCAL YEAR 1937

By GLEN C. LEACH and M. C. JAMES

APPENDIX IV TO REPORT OF COMMISSIONER OF FISHERIES
FOR THE FISCAL YEAR 1937

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ADMINISTRATIVE REPORT SERIES

Since the advent of the Administrative Report Series, considerable confusion has arisen concerning its system of numbering the separates composing it. Inasmuch as the Reports of the Divisions vary in order from year to year, many have found their designations as "Appendix No. I, II, III, or IV" very confusing. To relieve this, it has been decided to number them as "Administrative Report No. —." Inasmuch as 20 separates had already been printed in this series before starting the numbers, it was deemed advisable to begin the numbering with Administrative Report No. 21. Of course, numbers cannot be printed on those already off the press, but for the information of those who wish to know what the first 20 were, they are numbered for filing purposes as follows:

No. 1. Report, Commissioner of Fisheries, 1931.
No. 2. Alaska Fishery and Fur-Seal Industries, 1930.
No. 3. Fishery Industries of the United States, 1930.
No. 4. Progress in Biological Inquiries, 1930.
No. 5. Propagation and Distribution of Food Fishes, 1931.
No. 6. Report Commissioner of Fisheries, 1932.
No. 7. Alaska Fishery and Fur-Seal Industries, 1931.
No. 8. Fishery Industries of the United States, 1931.
No. 9. Progress in Biological Inquiries, 1931.
No. 10. Propagation and Distribution of Food Fishes, 1932.
No. 11. Alaska Fishery and Fur-Seal Industries, 1932.
No. 12. Progress in Biological Inquiries, 1932.
No. 13. Fishery Industries of the United States, 1932.
No. 14. Propagation and Distribution of Food Fishes, 1933.
No. 15. Fishery Industries of the United States, 1933.
No. 16. Alaska Fishery and Fur-Seal Industries, 1933.
No. 17. Progress in Biological Inquiries, 1933.
No. 18. Propagation and Distribution of Food Fishes, 1934.
No. 19. Alaska Fishery and Fur-Seal Industries, 1934.
No. 20. Fishery Industries of the United States, 1934.

Note that the last Commissioner's Report was for 1932. Since then its place has been taken by a reprint from the Report of the Secretary of Commerce under the title "Bureau of Fisheries." Inasmuch as it is no longer a Bureau publication, it is not numbered; but it will be supplied to any who request the Report of the Commissioner for any year since 1932.

PROPAGATION AND DISTRIBUTION OF FOOD FISHES, FISCAL YEAR 1937 [1]

By GLEN C. LEACH, *Chief*, and M. C. JAMES, *Assistant Chief, Division of Fish Culture*

CONTENTS

INTRODUCTION

The record level of hatchery production attained during the fiscal year 1936 was subject to a slight recession in 1937. The decline from a total of 8,170,000,000 fish and eggs to 7,919,000,000 was relatively insignificant for an enterprise which is influenced by many outside factors and is consequently liable to noticeable fluctuation in production.

At the present time conservationists and sportsmen are greatly interested in the development of stream-improvement work and the conduct of stream surveys, both intended to provide a more rational policy of stocking the streams and lakes. These studies have resulted in detailed and elaborate stocking programs for thousands of miles of public waters. The promulgation of such programs emphasizes even more strongly the vital role of the hatcheries in maintaining sport fishing. The most carefully designed plan for fish stocking and conservation is utterly useless without the raw material in the form

[1] Administrative Report No. 33, Appendix IV to the Report of the U. S. Commissioner of Fisheries for 1937. Approved for publication Nov. 1, 1938.

of young fish, which must be derived from the hatcheries. An increasing percentage of the output of game fish from Federal hatcheries has gone to streams which have been studied, charted, and planned as to their carrying capacity, food resources, etc.

Hatchery policies have been frequently subjected to change throughout the past years, although the mechanics and technique of the propagation work itself has changed remarkably little.

A few years ago there was wide public acceptance of the belief that game fish should be planted at legal or adult size. It is now realized that in certain sections such practice is absolutely essential, whereas elsewhere the planting of smaller fingerlings will give thoroughly satisfactory results.

In the earlier days of hatchery operations strenuous effort was made to secure the greatest possible hatch of the various commercial species, both marine and fresh water. This did not stem depletion. In many instances the policy of hatching for the sake of hatching alone was abandoned. The modern conception of artificial propagation of commercial species is to obtain and hatch eggs which would otherwise be destroyed in prosecuting a commercial fishery. The fry resulting from these eggs are a byproduct recovery and the hatcheries do not reach further and attempt to secure eggs which would be hatched naturally and normally if the brood fish remained undisturbed.

The foregoing comments are made to illustrate the fact that the hatcheries, the original agencies of Federal fish conservation, are being kept in step with new developments and conditions.

It may also be pointed out that both sportsmen and commercial fishing interests frequently call for the establishment of new hatcheries, either by the States or by the Federal Government. It is incontestibly true that in certain sections additional hatching facilities are urgently needed. There are limits to the economic justification for an indiscriminate establishment of new hatcheries, however, and good policy requires that many requests for such hatcheries be discouraged. Fish should be propagated in areas where natural conditions afford the best facilities for successful hatchery work and also where the stream mileage, lake or pond acreage, and intensity of fishing presupposes a real need. In many instances what is needed is not a new hatchery but additional rearing facilities for a supply of fish which may be shipped in from existing hatcheries.

SPECIES PROPAGATED

The Federal hatcheries are distributing practically all of the game and pan fishes which are of importance to the angler. The list of commercial species of fish propagated is somewhat more restricted because of the fact that many of these forms have characteristics which render them unsuited for artificial propagation methods, at least as a practical economic measure. The propagation of commercial species must always be based upon an abundant egg supply which can be collected for incubation at a reasonable unit cost. During 1937, 45 separate species were handled at the hatcheries in comparison with 43 utilized during the previous year.

The most important change was the resumption of the hatching of striped bass in North Carolina, in cooperation with the North Carolina Fish and Game Department.

Glut herring and white perch were again hatched, this work being conducted according to the availability of eggs from season to season. The hatching of lobsters was also resumed, being carried on at three marine stations located in New England.

There follows a list of the species propagated, together with a more condensed summary of the numbers distributed:

CATFISHES (SILURIDAE):
- Catfish (*Leptops olivaris*).
- Spotted channel catfish (*Ictalurus punctatus*).
- Horned pout (*Ameiurus nebulosus*).

CARP (CYPRINIDAE): Common carp (*Cyprinus carpio*).

BUFFALOFISH (CATOSTOMIDAE): Common buffalo (*Ictiobus sp.*).

SHAD AND HERRING (CLUPEIDAE):
- Shad (*Alosa sapidissima*).
- Glut herring (*Pomolobus aestivalis*).

SALMONS, TROUTS, AND WHITEFISHES (SALMONIDAE):
- Common whitefish (*Coregonus clupeaformis*).
- Lake herring, cisco (*Leucichthys sp.*).
- Chinook, king or quinnat salmon (*Oncorhynchus tschawytscha*).
- Chum salmon (*Oncorhynchus keta*).
- Coho salmon, silver salmon (*Oncorhynchus kisutch*).
- Red salmon, sockeye, or blueback salmon (*Oncorhynchus nerka*).
- Steelhead trout (*Salmo gairdneri*).
- Atlantic salmon (*Salmo salar*).
- Landlocked salmon (*Salmo sebago*).
- Rainbow trout (*Salmo shasta*).
- Black-spotted trout, redthroat trout (*Salmo lewisi*).
- Brown or Loch Leven trout (*Salmo fario var.*).
- Lake trout, Mackinaw trout (*Cristivomer namaycush*).
- Brook trout (*Salvelinus fontinalis*).

GRAYLING (THYMALLIDAE): Montana grayling (*Thymallus montanus*).

PIKES (ESOCIDAE): Pike and pickerel (*Esox sp.*).

SUNFISHES (CENTRARCHIDAE):
- Crappie (*Pomoxis annularis* and *P. sparoides*).
- Largemouth black bass (*Micropterus salmoides*).
- Smallmouth black bass (*Micropterus dolomieu*).
- Rock bass (*Ambloplites rupestris*).
- Warmouth bass (*Chaenobryttus gulosus*).
- Bluegill sunfish (*Lepomis incisor*).
- Green sunfish (*Lepomis cyanellus*).
- Redbreasted bream (*Lepomis auritus*).
- Red-eared sunfish (*Lepomis heros*).
- Common sunfish (*Lepomis gibbosus*).
- Rio Grande perch (*Herichthys cyanoguttatus*).

PERCHES (PERCIDAE):
- Pike perch (*Stizostedion vitreum*).
- Yellow perch, ringed perch (*Perca flavescens*).

WHITE BASSES (SERRANIDAE):
- White bass (*Roccus chrysops*).
- Striped bass (*Roccus lineatus*).
- White perch (*Morone americana*).

DRUMS (SCIAENIDAE): Fresh-water drum, lake sheepshead (*Aplodinotus grunniens*).

CODS (GADIDAE):
- Cod (*Gadus callarias*).
- Haddock (*Melanogrammus aeglefinus*).
- Pollock (*Pollachius virens*).

FLOUNDERS (PLEURONECTIDAE): Winter flounder, American flatfish.

MACKEREL (SCOMBRIDAE): Common mackerel (*Scomber scombrus*).

LOBSTER (HOMARIDAE): Lobster (*Homarus americanus*).

Summary, by species, of the output of fish and fish eggs during the fiscal year ending June 30, 1937

Species	Eggs	Fry	Fingerlings	Total
Catfish			21,178,900	21,178,900
Buffalofish	329,250,000		3,660,800	332,910,800
Carp	163,500,000		2,788,500	166,288,500
Shad		18,413,000		18,413,000
Whitefish	2,280,000	86,255,000		88,535,000
Lake herring		160,000		160,000
Glut herring		12,500,000		12,500,000
Striped bass		641,000		641,000
Chinook salmon	22,425,000		29,967,450	52,392,450
Chum salmon		17,405,500		17,405,500
Silver salmon		612,000	1,445,600	2,057,600
Sockeye salmon	1,250,000	2,000,000	2,810,500	6,060,500
Sockeye salmon, landlocked			112,350	112,350
Steelhead trout	125,000		1,446,100	1,571,100
Atlantic salmon			10,000	10,000
Landlocked salmon			59,500	59,500
Rainbow trout	3,883,550	358,400	9,033,950	13,275,900
Blackspotted trout	10,437,100		10,630,500	21,067,600
Loch Leven trout	5,132,600	1,186,875	3,404,275	9,723,750
Lake trout		599,100	254,600	853,700
Brook trout	3,384,000	2,343,320	15,217,480	20,944,800
Grayling	1,543,000	1,470,040	7,460	3,020,500
Pike and pickerel			122,750	122,750
Crappie			9,826,700	9,826,700
Black bass, largemouth		2,050,500	5,153,300	7,203,800
smallmouth		660,000	231,400	891,400
Rock bass			171,500	171,500
Warmouth bass			23,100	23,100
Sunfish			16,766,150	16,766,150
Pike perch	6,400,000	221,695,000		228,095,000
Yellow perch	14,250,000	240,263,000	125,400	254,638,400
Freshwater drum			45,100	45,100
White bass			95,650	95,650
White perch		2,500,000		2,500,000
Miscellaneous fish			1,632,000	1,632,000
Mackerel		8,833,000		8,833,000
Cod	2,670,717,750	162,832,900		2,833,550,650
Haddock	750,855,600			750,855,600
Flatfish (flounder)	12,473,900	1,466,108,200		1,478,582,100
Pollock	961,413,600	571,409,650		1,532,823,250
Lobster		3,261,500		3,261,500
Total	4,959,321,100	2,823,557,985	136,221,015	7,919,100,100

PRODUCTION

The recession in output below the figures of last year was distributed throughout several groups of species. The Pacific coast salmon, with the exception of the chum salmon and steelhead trout, were produced in lesser numbers. The game trouts, particularly the rainbow, blackspotted, and Loch Leven, were likewise available in lesser quantities. There was considerable regression in the number of pike, perch, and yellow perch distributed. Increases were registered for both the shad and whitefish. Among the marine species the haddock and pollock, totaling over two and a quarter billion eggs and fry, showed an increase, with a drop for the flounder and cod. The moderate curtailment in the production of the game trout, the Pacific salmon, and some of the pan fish, such as sunfish, was reflected in a reduction in the output of fingerlings and the larger sized fish. While over 136 million of these fish were put out in sizes ranging from 1 inch to legal size, this represented a shortage of 14 million in comparison with the previous year.

The strictly game fish comprised approximately 126 million of the total output. It is frequently difficult to inculcate in the public mind the reason for this discrepancy in the number of game fish distributed in comparison with the commercial and semicommercial varieties. The explanation lies largely in the fact that the latter are distributed as newly hatched fry or sometimes as fertilized eggs, whereas, the game

varieties are retained and fed at the hatcheries for periods ranging from several months to a year or more. Furthermore, the distribution of these larger fish involves heavy costs and this feature makes it necessary to restrict the hatchery production to a level which will permit the proper handling of the fish in distribution under the funds available for this purpose.

Hatchery production can be increased to a limited degree by more efficient methods and more intensive utilization of existing facilities. Any marked increase in production must be based upon an expansion of hatchery facilities, either through the establishment of new hatcheries or enlargement of the capacity of the older establishments. Hatchery production is also somewhat at the mercy of weather conditions and other factors, which accounts for a year-to-year variation.

The Louisville, Ky.. hatchery was completely inundated during the winter floods in that section, but the damage was overcome and a moderate production of fish was achieved during the spring. This accounted for a curtailment in the production of smallmouth bass, but the yield of largemouth bass was brought to 7,200,000, a figure exceeding any previous output by the Bureau.

CONSTRUCTION ACTIVITIES

No new work was undertaken during the year, except that at the close of the fiscal year a new project at Carson, Wash., in the Columbia National Forest was just being started. This was provided for by a special appropriation of $60,000 and was necessitated by the fact that the pool created by the Bonneville Dam will seriously affect operations at the Little White Salmon, Wash., substation. The new project was designed to offset the reduction of putput which was anticipated at the Little White Salmon unit.

During the year a W. P. A. development at the Uvalde, Tex., station was carried on and was virtually completed on June 30. The Smokemont, N. C., hatchery, located in the Smoky Mountain National Park, was likewise completed under W. P. A. auspices.

Somewhat extensive work in the nature of enlargement and improvement was carried on by the W. P. A. at several other locations. The San Angelo, Tex., station, partially developed, was improved so that it is now a complete producing unit. Throughout the year a small force was at work enlarging the pond system of the Rochester, Ind., hatchery. At Lake Mills, Wis., general improvements were being made while the pond system was also extended. The Bureau's program for the construction of culture ponds in the Upper Mississippi Wild Life Refuge was furthered by a project under way at Genoa, Wis., where a large acreage is being developed. Lesser improvements were made at the Spearfish, S. Dak., station and several other establishments.

C. C. C. assistance was obtained in a number of instances, the most outstanding of which was the continuation of the long-range development plan at the York Pond, N. H., station. At Lamar, Pa., a small detail of these workers was engaged in general improvements. At Walhalla, S. C., the hatchery building and rearing ponds were completed, but the installation of equipment for the former was not accomplished. It was not possible to construct any dwellings at this point.

Naturally, where a number of the field stations are over 35 years old there is constant requirement for ordinary maintenance and upkeep work, but current appropriations for this activity being limited, it is evident that deterioration is progressing rapidly at some of the older stations, and that special provision will have to be given to the rehabilitation of such hatcheries as the ones at White Sulphur Springs, W. Va., and Hartsville, Mass.

The Bureau selected a location in a Resettlement Administration area in Rhode Island for the establishment of a bass hatchery with the expectation of developing it by means of an appropriation made a number of years ago, and which still continues available. While tentative arrangements were satisfactory, the question of formal transfer of the desired site had not been settled at the close of the year and no active construction was started.

COOPERATION WITH OTHER CONSERVATION AGENCIES

As far as matters of fisheries conservation are concerned many of the objectives sought by reorganization of the executive agencies of the Government are now attained by practical working agreements. Federal agencies primarily interested in restocking, or other types of fisheries conservation activities, are: The United States Forest Service, National Park Service, and, to a lesser degree, the Reclamation Service, Office of Indian Affairs, Tennessee Valley Authority, and the Farm Security Administration.

The Bureau's contacts with the first two agencies are governed by definite written agreements whereby stocking and other activities on the lands under their control are performed in conformity with a mutually agreeable program. Informal contacts exist with the other Federal agencies and in specific instances where cooperation or coordination has appeared advisable, such has been reached by negotiations.

The Bureau is constantly increasing the proportion of fish or fish eggs assigned to waters under the control of the Forest Service and Park Service. In the former case, rearing ponds have been constructed in a number of the forests, to which small fish from Federal hatcheries are transferred for rearing and subsequent release. Where these nurseries have been of sufficient size, the Bureau has assigned employees to take care of the fish, and has met the costs of food, etc. In brief, where there has been developed a program of recreational use for Federal lands, and angling has been a part of the program, the Bureau of Fisheries has entered the picture as the principal Federal agency capable of providing such angling. Both the Tennessee Valley Authority and the Farm Security Administration have constructed fish hatcheries, the operation of which has been taken over by the Bureau. The Bureau has further cooperated by rendering technical advice and recommendations for other fisheries conservation projects in which the foregoing agencies were interested.

Coordination with the conservation work of other non-Federal agencies is likewise a cardinal objective in the activities of the Division of Fish Culture. Frequent conferences and meetings have been held with officials of the various State game and fish departments through meetings of the National Planning Council of Fish and Game Commissioners. These meetings have largely progressed beyond the point of mere agreement to agree, and have resulted in concrete,

definite arrangements for coordinating hatchery work, distribution of fish, and many of the other details affecting the conservation of game and commercial fish.

Additional States, particularly Pennsylvania, have undertaken to review Federal fish applications for waters within their territory, in order to assure planting of the proper species. In a number of instances, the State authorities have undertaken to actually distribute the fish produced by Federal hatcheries or rescue stations.

The Bureau has been able to assign a number of carloads of fish at the request of the North Dakota and South Dakota fish and game authorities for the provision of initial stock in new lakes and reservoirs created in those States. As usual, surplus trout eggs produced at the Federal hatcheries have been largely allocated to the States, sometimes on an exchange basis. In several instances Bureau employees have been assigned to render technical assistance in connection with problems which confronted State authorities. This has been exemplified in the case of Georgia and Arkansas particularly. In New York State arrangement has been made whereby the Bureau's hatchery employees in that area join in periodic conferences, or schools, which the State holds for its own employees. It should suffice to point out that both among the administrative personnel and the field staff there is a definite will for mutual cooperative action in conducting activities pertaining to fish culture and stocking. This inevitably results in a multitude of informal minor agreements facilitating the work of both agencies.

As has been previously indicated, cooperation with private sportsmen's organizations through the assignment of fish to nurseries or rearing pools is gradually receding. This is not due to the question of the value of such work, but is based upon the fact that State authorities, being more familiar with local conditions, are better able to furnish the necessary supervision and technical guidance to these nurseries. The Bureau lacks the extensive field force and the funds for travel which would be essential in supervising a far-flung system of cooperative nurseries. The Bureau has endeavored to cooperate with the sportsmen's groups, both national organizations and the smaller local clubs, by furnishing expert technical advice relative to their problems, surveying their areas wherever possible, and demonstrating the possibilities of improving angling through concerted local private effort.

SALVAGE OPERATIONS

In accordance with the regular procedure, the collecting stations located at various points on the Upper Mississippi River were in operation during the late summer. Seining crews were sent out by truck, launch, and houseboat for the purpose of salvaging stranded fish. The extent of this work is dependent upon river conditions, rainfall, and other local factors, as well as available funds. During 1937 conditions were somewhat more favorable for rescue work and a total of 50,572,000 fish were handled, which is an increase of approximately 7,000,000 over last year. The tabulations appearing below indicate the principal species handled, and the relative proportion of each which was used for distribution to other sections. The miscellaneous fish reported under this heading include various minnows and shiners, considered as forage fish, as well as other native varieties picked up in limited quantities.

Reference has been made previously to the fact that artificial ponds are used to produce fish within the refuge in addition to the large quantities obtained in rescue work. Construction work on several of these ponds continued throughout the year and they have demonstrated a high rate of productivity which promises a highly valuable yield of game fish when rescue work is discontinued, as it will be shortly, due to canalization of the river.

It will be noted that crappie and sunfish were most abundant among the fish rescued from the landlocked overflow pools of the Mississippi, and bass were comparatively scarce.

Number and disposition of fish rescued, fiscal year 1937

Locality and species	Delivered to applicants	Restored to original waters	Total number of fish rescued
All stations:			
Black bass	107,337	381,140	488,477
Buffalofish		3,660,775	3,660,775
Carp		2,788,575	2,788,575
Catfish	89,820	20,835,150	20,924,970
Crappie	85,035	9,653,855	9,738,890
Drum		45,000	45,000
Pike-pickerel		123,155	123,155
Sunfish	149,607	10,811,060	10,960,667
White bass		95,650	95,650
Yellow perch	5,725	108,575	114,300
Miscellaneous fishes		1,631,940	1,631,940
Total	437,524	50,134,875	50,572,399
Summary by stations:			
La Crosse	162,852	1,724,055	1,886,907
Homer	79,440	4,338,265	4,417,705
Marquette	150,447	28,478,160	28,628,607
Bellevue	7,300	9,075,835	9,083,135
Lynxville	22,035	5,898,230	5,920,265
Upper Mississippi River Refuge		223,100	223,100
Fairport	15,450	397,230	412,680
Total	437,524	50,134,875	50,572,399

ASSIGNMENTS OF FISH AND FISH EGGS TO STATES, TERRITORIES, AND FOREIGN COUNTRIES

There were 162,801,475 fish and eggs assigned to the various States, either by direct delivery or by distribution to the credit of the State. The differential in comparison with the 639,000,000 listed under the same category last year is due to the fact that the production of pike-perch at the Put-in-Bay, Ohio, station is no longer listed as an assignment to the State. This hatchery is now operated on a joint basis with the Division of Fish and Game of the State of Ohio and its output of pike perch, totaling, on an average, around 500,000,000, cannot be considered as a direct contribution of the Federal Government.

Thirty-nine States shared in the production of the Federal hatcheries, in comparison with 32 in the previous year. Approximately half of these assignments consisted of eggs, principally of the various species of trout. In many instances the capacity of the Federal hatcheries is insufficient to take care of all of the trout eggs secured, in which case the logical procedure is to transfer them to State hatcheries. In some sections, particularly in Indiana, where the available mileage of trout waters is limited, the State is relieved of the necessity of propagating trout through arrangements whereby they may be obtained from Federal hatcheries located in other States. A new

departure was the assignment of flatfish or flounder fry to the State of Rhode Island.

Assignments of fish and fish eggs to State fish commissions, fiscal year 1937

States and species	Eggs	Fry	Fingerlings, etc.	Total
Alabama:				
Black bass, largemouth			19,180	19,180
Sunfish (bream)			1,034,200	1,034,200
Arizona:				
Brook trout	502,000			502,000
Loch Leven trout	200,340			200,340
Largemouth black bass			15,000	15,000
Arkansas: Largemouth black bass			36,000	36,000
Colorado: Loch Leven trout	1,000,700			1,000,700
Connecticut:				
Loch Leven trout	100,100			100,100
Smallmouth black bass		269,000		269,000
Georgia:				
Black bass, largemouth			4,470	4,470
Catfish			85,275	85,275
Loch Leven trout	100,100			100,100
Rainbow trout	250,000			250,000
Sunfish			152,230	152,230
Idaho:				
Blackspotted trout	4,301,520		192,800	4,494,320
Brook trout			97,480	97,480
Grayling	506,000			506,000
Loch Leven trout	122,000			122,000
Rainbow trout			389,300	389,300
Illinois: Sunfish			12,000	12,000
Indiana:				
Black bass, largemouth			25,150	25,150
Brook trout			89,590	89,590
Loch Leven trout			91,850	91,850
Rainbow trout			72,720	72,720
Sunfish			4,340	4,340
Iowa:				
Loch Leven trout	40,000			40,000
Rainbow trout	26,700	10,000	13,500	50,200
Sunfish			2,500	2,500
Kentucky: Black bass, smallmouth		40,000		40,000
Maine: Brook trout		150,000	389,000	539,000
Maryland:				
Sunfish			3,000	3,000
Yellow perch		1,871,000		1,871,000
Massachusetts:				
Loch Leven trout	100,100			100,100
Rainbow Trout	198,000			198,000
Michigan:				
Black bass, smallmouth			10,000	10,000
Rainbow trout	250,000			250,000
Mississippi: Sunfish			41,650	41,650
Montana:				
Black bass, largemouth			58,980	58,980
Blackspotted trout	1,536,040			1,536,040
Catfish			5,100	5,100
Crappie			21,590	21,590
Loch Leven trout	1,000,640			1,000,640
Rainbow trout	100,170		83,400	183,570
Nebraska:				
Brook trout			49,350	49,350
Loch Leven trout			23,800	23,800
Rainbow trout			71,600	71,600
Nevada: Rainbow trout	500,000			500,000
New Hampshire:				
Brook trout	500,000	356,000	52,600	908,600
Lake trout		21,450		21,450
New Jersey: Flatfish		28,682,000		28,682,000
New Mexico:				
Black bass, largemouth			497,200	497,200
Blackspotted trout	500,000			500,000
Catfish			5,500	5,500
Loch Leven trout	50,350			50,350
Sunfish			264,900	264,900
New York: Rainbow trout			20,000	20,000
North Carolina:				
Black bass, largemouth			500	500
Brook trout			128,450	128,450
Catfish			240	240
Loch Leven trout	200,500			200,500
Rainbow trout	1,674,500		104,500	1,779,000
Smallmouth black bass			1,680	1,680
Sunfish			57,200	57,200

Assignments of fish and fish eggs to State fish commissions, fiscal year 1937—Contd.

States and species	Eggs	Fry	Fingerlings, etc.	Total
North Dakota:				
Black bass, largemouth			68,825	68,825
Crappie			8,740	8,740
Ohio: Rainbow trout			25,000	25,000
Oregon:				
Blackspotted trout	800,000			800,000
Brook trout			632,500	632,500
Chinook salmon	12,900,000			12,900,000
Grayling	506,000			506,000
Loch Leven trout	690,000		107,800	797,800
Rainbow trout			65,000	65,000
Silver salmon			260,000	260,000
Steelhead trout			10,000	10,000
Pennsylvania: Rainbow trout			10,365	10,365
Rhode Island:				
Rainbow trout	20,000			20,000
Flatfish		49,768,000		49,768,000
South Carolina:				
Brook trout			63,000	63,000
Black bass, largemouth			19,190	19,190
Rainbow trout	400,000		20,000	420,000
Sunfish			11,215	11,215
Yellow perch			20	20
South Dakota:				
Black bass, largemouth			11,470	11,470
Blackspotted trout			52,900	52,900
Brook trout			55,800	55,800
Catfish			10,000	10,000
Crappie			14,075	14,075
Rainbow trout			8,000	8,000
Rock bass			1,100	1,100
Sunfish			19,440	19,440
Tennessee:				
Loch Leven trout			33,000	33,000
Rainbow trout	295,000		25,000	320,000
Utah:				
Brook trout	302,000		155,250	457,250
Grayling	506,000			506,000
Vermont:				
Brook trout	500,000	795,000	7,500	1,302,500
Chinook salmon	25,000			25,000
Lake trout		130,640		130,640
Landlocked salmon			3,000	3,000
Pike perch	6,400,000			6,400,000
Rainbow trout			15,000	15,000
Yellow perch	14,250,000			14,250,000
Virginia:				
Rainbow trout			110,230	110,230
Yellow perch		16,000,000		16,000,000
Washington:				
Blackspotted trout	425,000		59,250	484,250
Brook trout			34,500	34,500
Rainbow trout			202,700	202,700
Sockeye salmon	1,250,000	816,000		2,066,000
West Virginia:				
Brook trout	1,014,000		688,450	1,702,450
Black bass, largemouth			950	950
Loch Leven trout	500,000			500,000
Rock bass			7,800	7,800
Sunfish			34,800	34,800
Rainbow trout			494,820	494,820
Wisconsin:				
Catfish			35,625	35,625
Crappie			19,250	19,250
Grayling	25,000			25,000
Rainbow trout	52,700			52,700
Sunfish			40,000	40,000
Wyoming:				
Blackspotted trout	1,000,000		14,000	1,014,000
Brook trout			83,325	83,325
Grayling			450	450
Loch Leven trout	315,640			315,640
Rainbow trout	150,000		39,120	189,120
Total	56,086,100	98,909,090	7,806,285	162,801,475

There was a resumption in the shipment of fish and fish eggs to foreign countries. Canada received a number of trout eggs in consummation of exchanges previously arranged, while the Argentine Republic, Cuba, and Mexico were likewise on the Bureau's export list. The former was allotted 2,500,000 whitefish eggs. The Republic of Mexico has established a fish-cultural service and rainbow eggs were assigned in order to assist that agency in inaugurating its work. The Bureau again cooperated with the Insular Government of Puerto Rico, furnishing both trout eggs and pondfish.

Throughout the year there are received numerous requests for the allotment of American species to foreign countries. In many instances preliminary inquiry reveals that conditions are unsuited for our more desirable varieties. The number of fish which can be furnished upon such request is also limited. Reports from foreign territories indicate that American game fish have established themselves very successfully in many countries and they are very popular.

Shipments of fish and eggs to foreign countries, fiscal year 1937

Country and species	Eggs	Yearlings and adults
Argentine:		
Whitefish	2,500,000	
Canada:		
Blackspotted trout	900,000	
Brook trout	300,000	
Loch Leven trout	500,230	
Cuba:		
Crappie		665
Mexico:		
Rainbow trout	90,000	
Puerto Rico:		
Catfish		425
Sunfish		1,000
Rainbow trout	100,000	
Total	4,390,230	2,090

TRANSFER OF EGGS BETWEEN STATIONS

While it is a routine administrative procedure to ship eggs between the various stations of the Bureau, a tabulation of such shipments is submitted as an illustration of the interrelationship between the units of an extensive hatchery system. Certain hatcheries are operated principally for the production of the raw material in the form of eggs. These shipments also serve to accelerate the spread of desirable species into new territories. Instance of this may be seen in the fact that the brown trout is becoming increasingly popular in the Eastern States, which has resulted in heavy shipments of the Loch Leven, a closely related form, from the Bozeman, Mont., station.

In this connection it should be pointed out that the shipment of trout eggs to minor auxiliary stations, operated at low overhead cost, is a real economy in comparison with attempting to distribute large-size fish to the same area from a larger hatchery located at a more distant point.

Transfer of eggs between stations, fiscal year 1937

Species	Number of eggs	From—	To—
Black-spotted trout	104,100	Saratoga, Wyo	Springville, Utah.
	107,900	do	Bozeman, Mont.
	200,250	do	Leadville, Colo.
	50,000	Yellowstone Park, Wyo	Baker Lake, Wash.
	1,335,000	do	Bozeman, Mont.
	200,000	do	Clackamas, Oreg.
	200,000	do	Crawford, Nebr.
	375,000	do	Creede, Colo.
	50,000	do	Eagles Nest, N. Mex.
	2,269,300	do	Glacier Park, Mont.
	450,000	do	Hagerman, Idaho.
	5,000	do	Jackson, Wyo.
	3,406,800	do	Ennis, Mont.
	100,000	do	Mt. Rainier, Wash.
	500,000	do	Leadville, Colo.
	250,000	do	Quilcene, Wash.
	350,000	do	Quinault, Wash.
	175,000	do	Spearfish, S. Dak.
	50,000	do	Spokane, Wash.
	100,000	do	Springville, Utah.
Brook trout	200,000	Berkshire, Mass	Nashua, N. H.
	200,000	Craig Brook, Maine	Barneveld, N. Y.
	700,000	do	Cape Vincent, N. Y.
	100,000	do	Duluth, Minn.
	500,000	do	Erwin, Tenn.
	150,000	do	La Crosse, Wis.
	150,000	do	Manchester, Iowa.
	10,500	do	Nashua, N. H.
	200,000	do	Northville, Mich.
	475,000	do	White Sulphur Springs, W. Va.
	250,000	do	Wytheville, Va.
	200,000	Leadville, Colo	Bozeman, Mont.
	150,000	do	Hagerman, Idaho.
	353,000	do	Spokane, Wash.
	804,000	do	Springville, Utah.
	502,000	Creede, Colo	Birdsview, Wash.
	225,000	do	Bozeman, Mont.
	100,000	do	Clackamas, Oreg.
	651,000	do	Crawford, Nebr.
	351,000	do	Duluth, Minn.
	225,000	do	Hagerman, Idaho.
	504,000	do	La Crosse, Wis.
	101,000	do	Lake Mills, Wis.
	200,000	do	Manchester, Iowa.
	200,000	do	Mt. Rainier, Wash.
	400,000	do	Northville, Mich.
	151,000	do	Quilcene, Wash.
	50,000	do	Quinault, Wash.
	130,000	do	Spearfish, S. Dak.
	100,000	do	Spokane, Wash.
	300,000	National Forest of New Hampshire.	Cortland, N. Y.
	250,000	do	Erwin, Tenn.
	200,000	do	Leadville, Colo.
	200,000	do	Nashua, N. H.
	120,000	do	Pittsford, Vt.
	1,745,500	do	St. Johnsbury, Vt.
	100,000	do	Smokemont, N. C.
Grayling	342,200	Yellowstone Park, Wyo	Bozeman, Mont.
	200,000	do	Jackson, Wyo.
	200,000	do	Pittsford, Vt.
Lake Trout	25,000	Cape Vincent, N. Y	Barneveld, N. Y.
	29,000	do	Cortland, N. Y.
Landlocked salmon	5,000	National Forest of New Hampshire.	St. Johnsbury, Vt.
Loch Leven trout	50,200	Bozeman, Mont	Barneveld, N. Y.
	125,000	do	Birdsview, Wash.
	100,400	do	Cape Vincent, N. Y.
	750,100	do	Clackamas, Oreg.
	50,000	do	Cortland, N. Y.
	190,300	do	Crawford, Nebr.
	52,800	do	Creede, Colo.
	100,100	do	Duluth, Minn.
	100,100	do	Flintville; Tenn.
	237,000	do	Hagerman, Idaho.
	251,000	do	La Crosse, Wis.
	75,100	do	Lake Mills, Wis.
	135,700	do	Manchester, Iowa.
	52,250	do	Nashua, N. H.
	100,300	do	Northville, Mich.
	100,100	do	Rochester, N. Y.
	100,400	do	Saratoga, Wyo.
	250,100	do	Spearfish, S. Dak.

Transfer of eggs between stations, fiscal year 1937—Continued

Species	Number of eggs	From—	To—
Loch Leven trout	300,000	do	Springville, Utah.
Rainbow trout	6,750,000	Ennis, Mont	Bozeman, Mont.
	320,000	do	Do.
	196,200	Manchester, Iowa	Do.
	196,500	do	Crawford, Nebr.
	151,200	do	Duluth, Minn.
	312,700	do	La Crosse, Wis.
	76,800	do	Lake Mills, Wis.
	253,300	do	Northville, Mich.
	464,000	Neosho, Mo	Crawford, Nebr.
	220,000	do	Creede, Colo.
	161,000	do	Flintville, Tenn.
	196,800	do	Hagerman, Idaho.
	255,000	do	Saratoga, Wyo.
	152,000	do	Spearfish, S. Dak.
	100,000	Salmon, Idaho	Aquarium, Washington, D. C.
	1,425,000	do	Hagerman, Idaho.
	103,600	Springville, Utah	Birdsview, Wash.
	32,000	do	Bozeman, Mont.
	35,000	do	Crawford, Nebr.
	70,500	do	Quilcene, Wash.
	100,000	do	Quinault, Wash.
	201,300	do	Spokane, Wash.
	150,000	White Sulphur Springs, W. Va	Barneveld, N. Y.
	60,000	do	Cortland, N. Y.
	15,000	Wytheville, Va	Aquarium, Washington, D. C.
	50,000	do	Ogletown, Pa.
	75,000	do	Rochester, N. Y.
	49,000	do	Smokemont, N. C.
Sockeye salmon	850,000	Birdsview, Wash	Quilcene, Wash.
Steelhead trout	250,000	do	Quinault, Wash.
	75,000	do	Mt. Rainier, Wash.
	50,000	do	Salmon, Idaho.

STATION OUTPUT

The list of producing units represents some change from the previous year. The 1937 production was obtained from a total of 90 stations and substations in comparison with 81 reported last year. The former comprise 41 main stations and 49 substations. There was no actual decrease in the number of main stations, but for administrative purposes the establishments at Fairport, Iowa, and Quilcene, Wash., were transferred from the category of main stations to that of substations.

The net increase is accounted for by the opening of several new establishments including those at Santa Rosa, N. Mex., Uvalde, Tex., Hoffman, N. C., Norris, Tenn., and Smokemont, N. C. Several of the field auxiliaries which have been in operation previously were listed individually as to output during the past year, and certain field activities which had been closed down were resumed. Among these was the resumption of striped bass propagation at Weldon, N. C. One auxiliary station, Lakeland Ponds, located in Maryland just outside of Washington, was discontinued.

No tabulation has been included covering the numerous rearing pools in the National Forest areas or under the auspices of sportsmen's organizations. These have received the output of many of the regular hatcheries but as a rule are not operated directly by the Bureau and are therefore not considered as units in the Federal hatchery system. In administering these hatcheries effort has been made to establish a regional set-up whereby the superintendent in charge of a group of stations will not only direct the hatchery activities, but will be available for consultation with State authorities and for preliminary survey of streams and lakes for determination of stocking programs.

In view of the possible criticism which might arise upon noting the distribution of carp, it is necessary to point out that these eggs or fish are planted only where they are already exceedingly abundant and are the basis of commercial fishery. None are distributed outside of such territories.

Stations and substations operated and the output of each, fiscal year 1937

Stations, substations, and species	Eggs	Fry	Fingerlings	Total
Baird, Calif.:				
Battle Creek, Calif.: Chinook salmon			2,943,050	2,953,050
Mill Creek, Calif.: Chinook salmon			1,575,300	1,575,300
Birdsview, Wash.:				
Blackspotted trout			66,000	66,000
Brook trout			46,135	46,135
Chinook salmon			518,360	518,360
Loch Leven trout			80,000	80,000
Rainbow trout			84,810	84,810
Silver salmon		612,000	382,000	994,000
Sockeye salmon	1,250,000	2,000,000	540,000	3,790,000
Steel head trout	125,000		184,000	309,000
Baker Lake, Wash.:				
Blackspotted trout			46,250	46,250
Rainbow trout			23,600	23,600
Mt. Rainier, Wash.:				
Blackspotted trout			136,000	136,000
Brook trout			241,800	241,800
Golden trout			12,000	12,000
Loch Leven trout			22,300	22,300
Rainbow trout			64,100	64,100
Spokane, Wash.:				
Blackspotted trout			57,750	57,750
Brook trout			78,000	78,000
Rainbow trout			372,000	372,000
Boothbay Harbor, Maine:				
Cod	878,855,000			878,855,000
Flatfish		731,700,000		731,700,000
Haddock	47,160,000			47,160,000
Lobster		2,625,000		2,625,000
Pollock	14,532,000			14,532,000
Bozeman, Mont.:				
Blackspotted trout			972,180	972,180
Brook trout			296,218	296,218
Grayling		217,000	72,000	289,000
Loch Leven trout	4,220,600			4,220,600
Rainbow trout			819,990	819,990
Ennis, Mont.:				
Blackspotted trout			148,717	148,717
Grayling		430,840	1,970	432,810
Loch Leven trout		1,186,360	1,358,770	2,545,130
Rainbow trout	100,170		520,517	620,687
Miles City, Mont.:				
Black bass, largemouth			213,088	213,088
Catfish			4,776	4,776
Crappie			70,414	70,414
Sunfish			3,540	3,540
Cape Vincent, N. Y.:				
Black bass, smallmouth		6,000	25,200	31,200
Brook trout			24,500	24,500
Lake herring		160,000		160,000
Lake trout		290,000		290,000
Landlocked salmon			2,500	2,500
Whitefish		160,000		160,000
Yellow perch		2,500,000		2,500,000
Barneveld, N. Y.:				
Brook trout			36,300	36,300
Rainbow trout			10,585	10,585
Cortland, N. Y.:				
Brook trout			335,635	335,635
Lake trout			17,210	17,210
Loch Leven trout			18,910	18,910
Rainbow trout			33,900	33,900
Lakeland, Vt.:				
Pike perch	6,400,000			6,400,000
Yellow perch	14,250,000			14,250,000
Watertown, N. Y.:				
Brook trout		60,000	101,815	161,815
Loch Leven trout			11,245	11,245
Rainbow trout			4,095	4,095

Stations and substations operated and the output of each, fiscal year 1937--Continued

Stations, substations, and species	Eggs	Fry	Fingerlings	Total
Rochester, N. Y.:				
Black bass, largemouth			16,000	16,000
smallmouth			10,000	10,000
Brook trout			15,375	15,375
Loch Leven trout			66,000	66,000
Rainbow trout			101,975	101,975
Clackamas, Oreg.:				
Blackspotted trout			98,350	98,350
Brook trout	125,000		648,000	773,000
Chinook salmon	2,200,000		3,262,500	5,462,500
Loch Leven trout	750,100		152,800	902,900
Rainbow trout			135,650	135,650
Silver salmon			13,270	13,270
Butte Falls, Oreg.:				
Chinook salmon			4,893,500	4,893,500
Rainbow trout			6,590	6,590
Silver salmon			1,003,000	1,003,000
Steelhead trout			922,000	922,000
Big White Salmon, Wash.: Chinook salmon	7,200,000		8,051,200	15,251,200
Little White Salmon, Wash.:				
Chinook salmon	13,025,000		8,713,000	21,738,000
Sockeye salmon			80,750	80,750
Craig Brook, Maine:				
Atlantic salmon			10,000	10,000
Brook trout			835,830	835,830
Landlocked salmon			37,000	37,000
Crawford, Nebr.:				
Black bass, largemouth			50,425	50,425
Blackspotted trout			180,500	180,500
Brook trout		8,000	375,400	383,400
Catfish			640,190	640,190
Crappie			11,185	11,185
Loch Leven trout			276,340	276,340
Rainbow trout			455,040	455,040
Rock bass			6,300	6,300
Sunfish			39,290	39,290
Yellow perch			900	900
Dexter, N. Mex.:				
Black bass, largemouth			573,750	573,750
Catfish			14,800	14,800
Crappie			100	100
Sunfish			338,100	338,100
Santa Rosa, N. Mex.:				
Black bass, largemouth			31,500	31,500
Catfish			14,000	14,000
Crappie			4,300	4,300
Duluth, Minn.:				
Brook trout			625,000	625,000
Lake trout		157,000	21,000	178,000
Loch Leven trout			76,000	76,000
Pike-perch		9,470,000		9,470,000
Rainbow trout			41,000	41,000
Whitefish		2,595,000		2,595,000
Edenton, N. C.:				
Black bass		75,000	20,038	95,038
Crappie			940	940
Glut herring		12,500,000		12,500,000
Shad		6,240,000		6,240,000
Sunfish			27,620	27,620
Warmouth bass			3,100	3,100
White perch				
Yellow perch		2,500,000		2,500,000
			87	87
Weldon, N. C.: Striped bass		641,000		641,000
Erwin, Tenn.:				
Black bass		503,000	2,416	505,416
Brook trout			418,945	418,945
Rainbow trout			370,580	370,580
Rock bass			3,930	3,930
Sunfish			21,260	21,260
Flintville, Tenn.:				
Black bass			750	750
Loch Leven trout			43,000	43,000
Rainbow trout			138,970	138,970
Rock bass			900	900
Sunfish			1,300	1,300
Fort Belvoir, Va.:				
Black bass			5,670	5,670
Catfish			200	200
Crappie			400	400
Shad		11,758,000		11,758,000
Sunfish			800	800
Yellow perch		237,763,500	1,100	237,764,600

Stations and substations operated and the output of each, fiscal year 1937 Continued

Stations, substations, and species	Eggs	Fry	Fingerlings	Total
Gloucester, Mass.:				
Cod	1,791,862,750	162,832,900		1,954,695,650
Flatfish	12,473,900	43,529,600		56,003,500
Haddock	703,695,600			703,695,600
Lobster		226,500		226,500
Pollock	946,881,520	521,409,650		1,518,291,170
Hagerman, Idaho:				
Blackspotted trout			213,300	213,300
Brook trout			87,130	87,130
Rainbow trout	200,000		541,700	741,700
Salmon, Idaho:				
Blackspotted trout			54,000	54,000
Loch Leven trout	122,000		61,400	183,400
Rainbow trout			730,000	730,000
Hartsville, Mass.:				
Black bass, smallmouth		590,000		590,000
Catfish			3,175	3,175
Brook trout			147,850	147,850
La Crosse, Wis.:				
Black bass, largemouth			29,615	29,615
Brook trout			618,300	618,300
Buffalo fish			19,900	19,900
Carp			275,900	275,900
Catfish			694,960	694,960
Crappie			614,837	614,837
Loch Leven trout			205,600	205,600
Pike-pickerel			39,700	39,700
Rainbow trout			213,700	213,700
Sunfish			467,315	467,315
White bass			24,800	24,800
Yellow perch			20,150	20,150
Miscellaneous fishes			127,000	127,000
Bellevue, Iowa:				
Black bass, largemouth			30,570	30,570
Buffalo fish	283,500,000		1,645,500	245,145,500
Carp	64,000,000		418,300	64,418,300
Catfish			2,350,000	2,350,000
Crappie			675,800	675,800
Pike-pickerel			7,230	7,230
Sunfish			2,714,000	2,714,000
White bass			8,950	8,950
Miscellaneous fishes			1,227,785	1,227,785
Fairport, Iowa:				
Black bass, largemouth		249,000	53,950	302,950
smallmouth			3,600	3,600
Buffalo fish	33,750,000		79,200	33,829,200
Carp	69,500,000		125,800	69,625,800
Catfish			128,400	128,400
Crappie			19,115	19,115
Pike-pickerel			50	50
Sunfish			160,285	160,285
White bass			925	925
Yellow perch			5,375	3,375
Miscellaneous fishes			21,655	21,655
Guttenberg, Iowa:				
Buffalo fish	12,000,000			12,000,000
Carp	30,000,000			30,000,000
Homer, Minn.:				
Black bass, largemouth			77,100	77,100
Buffalo fish			3,375	3,375
Carp			15,775	15,775
Catfish			424,680	424,680
Crappie			2,653,425	2,653,425
Drum			1,000	1,000
Pike-pickerel			9,375	9,375
Sunfish			1,051,700	1,051,700
White bass			34,325	34,325
Yellow perch			14,750	14,750
Miscellaneous fishes			132,000	132,000
Lake Mills, Wis.:				
Black bass, largemouth		6,000	44,290	50,290
Brook trout			82,500	82,500
Crappie			20,800	20,800
Loch Leven trout			62,700	62,700
Rainbow trout			61,000	61,000
Yellow perch			500	500
Lynxville, Wis.:				
Black bass, largemouth			141,475	141,475
Buffalo fish			586,500	586,500
Carp			447,500	447,500
Catfish			1,965,000	1,965,000
Crappie			772,850	772,850
Pike-pickerel			17,050	17,050
Sunfish			1,982,090	1,982,090
Yellow perch			2,800	2,800

Stations and substations operated and the output of each, fiscal year 1937--Continued

Stations, substations, and species	Eggs	Fry	Fingerlings	Total
La Crosse, Wis.--Continued.				
Marquette, Iowa:				
Black bass, largemouth			232,682	232,682
Buffalo fish			1,326,300	1,326,300
Carp			1,505,300	1,505,300
Catfish			15,324,850	15,324,850
Crappie			5,004,600	5,005,600
Drum			43,800	43,800
Pike-pickerel			49,550	49,550
Sunfish			16,921,450	16,921,450
White bass			26,650	26,650
Yellow perch			69,930	69,930
Miscellaneous fishes			133,500	133,500
Rochester, Ind.:				
Black bass, largemouth			288,025	288,025
smallmouth			24,270	24,270
Catfish			1,120	1,120
Crappie			7,180	7,180
Rock bass			5,200	5,200
Sunfish			88,020	88,020
Yellow perch			5,000	5,000
Upper Mississippi River ponds:				
Black bass, largemouth			770,850	770,850
smallmouth			3,105	3,105
Buffalo fish			10,100	10,100
Carp			125,900	125,900
Crappie			5,985	5,985
Drum			200	200
Pike-pickerel			10,400	10,400
Sunfish			16,195	16,195
White bass			7,000	7,000
Miscellaneous fishes			68,000	68,000
Lake Park, Ga.:				
Black bass, largemouth			50,495	50,495
Catfish			110,930	110,930
Sunfish			176,440	176,440
Warm Springs, Ga.:				
Black bass, largemouth		247,500	91,680	339,180
Catfish			274	274
Sunfish			398,800	398,800
Lamar, Pa.:				
Brook trout			92,200	92,220
Loch Leven trout			22,554	22,554
Rainbow trout			81,165	81,165
Ogletown, Pa.:				
Brook trout			175,280	175,280
Loch Leven trout			16,900	16,900
Leadville, Colo.:				
Blackspotted trout			267,000	267,000
Brook trout	1,516,000		1,991,600	3,507,600
Lake trout			46,780	46,780
Loch Leven trout			49,000	49,000
Rainbow trout			510,600	510,600
Creede, Colo.:				
Blackspotted trout	300,000		248,000	548,000
Brook trout	141,000		1,922,900	2,063,900
Loch Leven trout			74,500	74,500
Rainbow trout			570,050	570,050
Eagles Nest, N. Mex.:				
Blackspotted trout			49,000	49,000
Rainbow trout			436,000	436,000
Leetown, W. Va.:				
Black bass, largemouth		3,000	9,990	12,990
smallmouth			32,130	32,130
Brook trout			23,506	23,506
Crappie			625	625
Loch Leven trout			8,983	8,983
Rainbow trout			103,512	103,512
Silver salmon			20,110	20,110
Louisville, Ky.:				
Black bass, largemouth			15,330	15,330
smallmouth		40,000	11,785	51,785
Crappie			280	280
Rock bass			7,350	7,350
Sunfish			49,800	49,800
Mammoth Springs, Ark.:				
Black bass, largemouth		100,000	178,825	278,825
smallmouth			55,500	55,500
Rock bass			80,000	80,000
Sunfish			102,900	102,900
Manchester, Iowa:				
Black bass, smallmouth			1,900	1,900
Brook trout			149,040	149,040

Stations and substations operated and the output of each, fiscal year 1937—Continued

Stations, substations, and species	Eggs	Fry	Fingerlings	Total
Manchester, Iowa—Continued.				
Loch Leven trout	40,000		68,300	108,300
Rainbow trout	89,900	10,000	118,100	218,000
Rock bass			19,600	19,600
Marion, Ala.:				
Black bass, largemouth			303,070	303,070
Sunfish			2,162,090	2,162,090
Tupelo, Miss.:				
Black bass, largemouth		15,000	314,815	329,815
Sunfish			245,575	245,575
Nashua, N. H.:				
Black bass, smallmouth		12,000	450	12,450
Brook trout			55,500	55,500
Catfish			1,900	1,900
Rainbow trout			1,100	1,100
National Forest of N. H. (Berlin, N. H.):				
Brook trout	1,300,000	888,825	290,940	2,479,765
Lake trout		113,100		113,100
Rainbow trout		148,400		148,400
St. Johnsbury, Vt.:				
Black bass, smallmouth			2,300	2,300
Brook trout		1,387,500		1,387,500
Lake trout		38,985		38,985
Landlocked salmon			20,000	20,000
Neosho, Mo.:				
Black bass, largemouth		219,000	35,725	254,725
Catfish			11,010	11,010
Crappie			27,550	27,550
Rainbow trout	96,500		63,635	160,135
Rock bass			11,930	11,930
Sunfish			38,965	38,965
Bourbon, Mo.: Rainbow trout	1,147,000			1,147,000
Natchitoches, La.:				
Black bass, largemouth			436,747	436,747
Crappie			1,510	1,510
Sunfish			54,960	54,960
Warmouth bass			5,665	5,665
Tishomingo, Okla.:				
Black bass, largemouth			347,000	347,000
Catfish			7,350	7,350
Crappie			112,390	112,390
Sunfish			212,020	212,020
Warmouth bass			5,000	5,000
Northville, Mich.:				
Black bass, largemouth			9,975	9,975
smallmouth			68,430	68,430
Brook trout			647,215	647,215
Loch Leven trout			95,000	95,000
Rainbow trout			207,490	207,490
Rock bass			1,600	1,600
Sunfish			2,210	2,210
Orangeburg, S. C.:				
Black bass, largemouth			466,540	466,540
Catfish			4,375	4,375
Crappie			9,905	9,905
Sunfish			234,245	234,245
Warmouth bass			9,290	9,290
Yellow perch			195	195
Jacksonboro, S. C.: Shad		65,000		65,000
Hoffman, N. C.:				
Black bass, largemouth		53,000	5,000	58,000
Sunfish			143,000	143,000
Pittsford, Vt.:				
Brook trout			51,200	51,200
Rainbow trout			37,115	37,115
Put-in-Bay, Ohio:				
Pike perch		212,175,000		212,175,000
Whitefish	2,280,000	83,500,000		85,780,000
Quinault, Wash.:				
Blackspotted trout			181,560	181,560
Brook trout			92,000	92,000
Sockeye salmon			1,939,750	1,939,750
Steelhead salmon			80,950	80,950
Duckabush, Wash.: Chum salmon		10,990,000		10,990,000
Quilcene, Wash.:				
Blackspotted trout			228,000	228,000
Brook trout			217,000	217,000
Chum salmon		6,415,500		6,415,500
Rainbow trout			154,260	154,260
Silver salmon			27,215	27,215
Sockeye salmon			250,000	250,000
Steelhead trout			259,115	259,115

Stations and substations operated and the output of each, fiscal year 1937—Continued

Stations, substations, and species	Eggs	Fry	Fingerlings	Total
Saratoga, Wyo.:				
Blackspotted trout			351,790	351,790
Brook trout			798,330	798,330
Loch Leven trout			297,465	297,465
Rainbow trout			236,520	236,520
Spearfish, S. Dak.:				
Blackspotted trout			124,450	124,450
Brook trout			599,835	599,835
Grayling			5,500	5,500
Loch Leven trout			135,560	135,560
Rainbow trout			150,160	150,160
Springville, Utah:				
Blackspotted trout			310,000	310,000
Brook trout	302,000		701,680	1,003,680
Bear Lake, Utah:				
Brook trout			204,880	204,880
Lake trout			79,600	79,600
Rainbow trout			30,400	30,400
Sockeye salmon (landlocked)			112,355	112,355
Uvalde, Tex.:				
Fort Worth, Tex.:				
Black bass, largemouth			46,700	46,700
Catfish			2,305	2,305
Crappie			36,715	36,715
Sunfish			26,330	26,330
San Marcos, Tex.:				
Black bass, largemouth		217,000	139,135	356,135
Crappie			1,890	1,890
Sunfish			154,520	154,520
White Sulphur Springs, W. Va.:				
Brook trout			960,060	960,060
Loch Leven trout			28,000	28,000
Rainbow trout	631,000		626,930	1,257,930
Rock bass			6,000	6,000
Sunfish			51,800	51,800
Woods Hole, Mass.:				
Flatfish		690,879,000		690,879,000
Mackerel		8,833,000		8,833,000
Wytheville, Va.:				
Black bass, largemouth			21,065	21,065
smallmouth		12,000	5,500	17,500
Brook trout			381,350	381,350
Rainbow trout	1,565,000		276,020	1,841,020
Rock bass			19,900	19,900
Sunfish			93,625	93,625
Harrison Lake, Va.:				
Black bass, largemouth			39,875	39,875
Crappie			6,450	6,450
Shad		350,000		350,000
Sunfish			23,350	23,350
Norris, Tenn.: Black bass, largemouth		404,500	3,000	407,500
Smokemont, N. C.: Rainbow trout			53,865	53,865
Yellowstone Park, Wyo.:				
Blackspotted trout	10,137,100		6,810,000	16,947,100
Grayling	1,543,000	625,000		2,168,000
Jackson, Wyo.:				
Blackspotted trout			90,500	90,500
Grayling		197,200		197,200
Lake trout			90,000	90,000

EGG COLLECTIONS

Egg collections during the fiscal year 1937 totaled 8,532,198,900 in comparison with 8,683,260,300 for 1936. As usual, the greater proportion of these collections comprised four marine species, the eggs of which are fertilized and planted directly on the spawning grounds. Weather conditions, which greatly affect the collection of eggs from wild fish, were generally more favorable during 1936. The drop in collections from certain species of Pacific salmon was due, in part, to the regularly recurrent "off year" of these forms.

Comparison of egg collections, fiscal years 1936 and 1937

Species	1936	1937	Species	1936	1937
Shad	22,128,000	20,034,000	Yellow perch	324,166,000	256,014,000
Whitefish	59,970,000	138,175,000	Cod	3,956,886,000	2,864,601,000
Chinook salmon	75,282,000	52,466,400	Haddock	430,109,000	770,148,000
Chum salmon	19,703,000	22,383,000	Pollock	1,462,985,000	1,667,138,000
Silver salmon	4,487,000	2,193,000	*Flatfish* (flounder)	1,634,507,000	1,639,143,000
Sockeye salmon	16,262,000	7,653,000	Mackerel	1,796,000	12,300,000
Steelhead salmon	2,547,000	2,377,400	Lake herring	6,760,000	1,600,000
Rainbow trout	24,154,000	22,381,000	Glut herring		24,220,000
Blackspotted trout	40,879,000	35,131,100	Striped bass		1,260,000
Loch Leven trout	15,757,000	11,563,000	Carp	1,500,000	163,500,000
Lake trout	1,578,500	918,000	Buffalo fish	13,912,000	329,250,000
Brook trout	27,128,800	32,585,000			
Grayling	3,918,000	3,715,000	Total	8,683,260,300	8,532,198,900
Pike perch	536,845,000	451,450,000			

NOTES ON OPERATIONS

COMMERCIAL SPECIES

Pacific salmon.—The collection of approximately 5,000,000 chinook salmon eggs at the Battle Creek and Mill Creek, Calif., substations was somewhat below the normal take in this territory. At the former point a concrete settling tank for the water supply was constructed. At the latter location a new concrete structure was installed as a foundation for installing the racks used in trapping the fish. The station garage was enlarged and remodeled to provide office and shop space.

The Baird, Calif., station was largely inactive and, at the end of the year, arrangements were being made for its abandonment and release to the Reclamation Service. A large dam contemplated in this area would effectively prevent the continuation of fish-cultural operations at this point. This marks the close of an establishment which was one of the earliest hatcheries operated in the United States.

In the Columbia River territory, the Clackamas, Oreg., station and its auxiliaries collected a total of 49,146,000 eggs, some 15,000,000 less than in 1936. Excellent collections were achieved with the chinook salmon at both the Big White Salmon and Little White Salmon stations. Flood conditions restricted the collection of steelhead trout eggs at the Butte Falls substation. Over 1,000,000 trout eggs were incubated at the Clackamas station, the fingerlings being released in various local waters. The surplus of chinook salmon eggs at Little White Salmon substation necessitated planting some 6,000,000 eyed eggs directly in local streams. Flooding of the station site by the pool from the Bonneville Dam will materially affect future operations here. Consequently, a deficiency appropriation of $60,000 was made available to provide for the relocation of the station and transfer of the major portion of the work. A site at Tyee Springs on the Wind River near Carson, Wash., in the Columbia National Forest was selected. Construction activities were commenced in June. At Big White Salmon substation the run of chinook salmon was sufficient to have permitted the collection of additional eggs had trough space been available. As it was, several million eyed eggs were planted directly in suitable streams.

In the Puget Sound territory, the Birdsview, Wash., station almost doubled the output of the previous year, handling 4 species of salmon and 3 varieties of trout. An excellent run of sockeye salmon has been

built up by plants made from this station over a number of years. Interesting data on the migrating characteristics of the species were also obtained. A Works Progress Administration project resulted in some clearing and grading of the grounds and repairs to buildings. There was also an extensive distribution of trout fingerlings from this station. Good results were obtained by incubating some of the eggs on floating trays.

At the Baker Lake, Wash., substation trout fingerlings on hand were released in the fall. During the winter heavy snow caused the collapse of several of the buildings and damage to others. C. C. C. aid was obtained for salvaging the material and remodeling the sawmill into a hatchery. This work was under way at the close of the year.

Over 650,000 trout eggs were shipped in to the Mt. Rainier, Wash., substation and the resulting fish were released in various waters of Mt. Rainier National Park. Further investigation was made of the possibility of collecting eggs from wild fish in the park. Work was started on construction of two new rearing ponds. The rearing project located at Spokane, Wash., produced 500,000 fingerlings which were released to the States of Washington and Idaho. W. P. A. aid was secured in remodeling a general service building.

Under a revision of policy at the Quinault, Wash., hatchery, collections of sockeye salmon eggs were restricted to 2,000,000, the remainder of the run being allowed to spawn naturally. Space and funds made available by this procedure are being utilized for more intensive propagation of trout. However, all salmon are reared to fingerling size before release. The several hundred thousand trout fingerlings produced were distributed in the waters of the Olympic Peninsula, which has become increasingly popular as a recreational center.

The Duckabush and Quilcene, Wash., substations made capacity collections of over 19,000,000 chum salmon eggs. At the latter point more attention has been given to the propagation of trout, and numerous fingerlings were distributed in local waters. One of the buildings formerly used as an office was remodeled into a small dwelling. The fish-food dehydrating plant was operated successfully and the dry salmon meal produced was utilized by a number of the trout hatcheries in the Western territory. Production has so far been insufficient to meet the requirements.

MARINE SPECIES

The continued propagation of winter flounder at the Woods Hole, Mass., station has produced interesting results. There have been rather definite indications that plants of these fry in Long Island Sound and Narragansett Bay are responsible for an increase in young flounders. Almost 700 million fry were produced at the hatchery, in addition to some 8 million mackerel fry.

In contrast, the Gloucester, Mass., station concentrated more strongly on the so-called "off-shore" work where spawntakers are assigned to fishing vessels for fertilizing and planting the eggs of haddock, pollock, and cod. The two former species were handled in greatly increased numbers, whereas there was a recession in the production of cod and flatfish. The hatchery was, of course, operated to capacity when sufficient eggs were obtainable. The total number of eggs handled by the station exceeded 4,400,000,000. The station

extended its lobster-cultural work, collecting 1,200,000 eggs, which left some 1,000,000 fry on hand at the close of the year.

While the Boothbay Harbor, Maine, station reported favorable weather conditions, a shortage of flounders on the regular spawning grounds curtailed production of this species to slightly more than 730 million fry. An unusual development of slime on the spawning grounds is considered to have some bearing on the absence of breeding fish. Special effort in the spring yielded collections of cod eggs numbering slightly less than in the previous year. A moderate number of haddock and pollock eggs was also obtained. Here, too, in cooperation with the State of Maine, lobster culture was resumed. Three and one-fourth million fry were hatched. A new method of rearing with artificial feeding, as developed in Connecticut, was tried out on a portion of the fry, the balance being liberated.

GREAT LAKES SPECIES

The propagation of commercial species of the Great Lakes has continued at a relatively low level except on Lake Erie. Here the Federal hatchery at Put-in-Bay has been operated on a joint basis with the State of Ohio. One hundred and thirty-four million whitefish eggs and 451 million pike-perch eggs were handled in this work, with the hatch averaging at normal proportions.

Since there is no special open season for egg-taking operations in Michigan waters, the Duluth, Minn., station secured only a few hundred thousand lake trout eggs, and 3¼ million whitefish eggs. Ten million pike-perch eggs were allotted by the State of Minnesota.

The Cape Vincent, N. Y., station was unable to send spawntakers into the field due to shortage of funds, but secured whitefish, lake trout and lake herring eggs from local fishermen. The total secured by this means approximated 2¾ millions. Some yellow perch and pike-perch fry were obtained from operations at the Swanton, Vt., substation which was maintained by the State of Vermont.

As the work with commercial species at these stations has been curtailed, the slack has been taken up by extending the propagation of game fish. At Cape Vincent in particular the propagation of smallmouth bass has been quite successful and a number of trout rearing substations are operated in this field.

ANADROMOUS SPECIES, ATLANTIC COAST

Propagation of Atlantic salmon has been virtually discontinued because of inability to secure eggs from Canada. No supply is available from domestic sources. The Craig Brook, Maine, station distributed a few fingerlings, which had been held over from the previous year.

The 11¾ million shad fry produced at the Fort Belvoir, Va., station represent a moderate increase over the previous year. This station also supplemented its work with shad by hatching yellow perch, of which 237 million fry were produced.

At the Edenton, N. C., station vigorous efforts were made to extend the shad propagation activities. In cooperation with the State an employee of the Bureau was assigned to make a study of all factors concerned with the conservation of this species. A small run of shad defeated efforts to bring in eggs from distant points but collections from the vicinity of the station yielded 7¼ million eggs, an increase

over the previous year. Promising experiments were conducted, looking toward the rearing of shad and striped bass in ponds. Favorable results were also achieved in the hatching of white perch and herring. Again, in cooperation with the State of North Carolina, the Edenton personnel assisted in hatching striped bass at the Weldon substation. A new hatchery and water supply system was installed. Egg collections were rather limited, due to restrictions on fishing and the new equipment caused some loss of fry until corrections were made.

Supplementing its hatching activities on the Edisto River, the Orangeburg, S. C., station developed a new shad unit on the Black River. However, unfavorable water conditions and other adverse factors reduced total egg collections to about 650,000, and the fry production was very poor. In the aggregate the shad hatchery production for the entire Atlantic Seaboard surpassed the records of the past several years.

GAME-FISH PROPAGATION

Upon noting that only about 126 million of the total hatchery production of 1937 consisted of strictly game or pan species, the angler may be inclined to feel that this phase of the work has been neglected. As a matter of fact, however, the funds, facilities and personnel assigned to the propagation of sport fishes were fully as large as were the assignments for the propagation of food and commercial varieties. Game fish are "hand raised" and many are planted at the legal size. Transporting them to the myriads of lakes and streams which are to be stocked is also an expensive procedure. The aggregate production of game trout was somewhat lower than in the previous year, but an increase was recorded for bass.

Much of the aquicultural research is directed toward perfecting the artificial propagation of the game fishes and this has resulted in the adoption of many improved practices. Selective breeding, food research, and disease studies have all contributed to the maintenance of angling as one of our most important outdoor recreations. Supplementing this is the fact that virtually all of the new hatchery construction has been for the purpose of building up the stock of sport fishes. With the States and the Federal Government setting aside and improving tremendous areas suitable for stocking, the need for augmented production of trout, bass, and panfish has never been greater.

ROCKY MOUNTAIN TERRITORY

The tremendous amount of Federally owned land in the Rocky Mountain States constitutes a pressing need for increased production of trout. Emphasis is placed upon fishing as one of the recreational assets of this territory, and while the Bureau's output is distributed to various public waters, the National Forests alone could well utilize the entire production.

Considering the activities of the individual stations, in Utah the Springville hatchery suffered a slight reduction in the collection of rainbow trout eggs from station brood stock. By shipments from other stations the production of fingerlings was kept up to satisfactory levels. One small pond was utilized for the production of bass for which there is a limited demand in that section. The depredations of birds greatly curtailed the output.

At the Bear Lake, Utah, substation, W. P. A. labor was secured for effecting certain improvements to buildings, roads, ponds, etc. No eggs were taken from station brood stock but trout and salmon of four species were shipped in.

At the Spearfish, S. Dak., station W. P. A. work was under way throughout the greater part of the year. Accomplishments included the construction of a stone hatchery building, a flume for water-supply requirements, construction of a stone garage, installation of a refrigerator, and various minor improvements. This station experienced serious difficulty due to failure of the spring-water supply ordinarily utilized. By the means mentioned above, additional water was obtained and the difficulties in this connection were temporarily overcome. The distribution of the fingerling output was handled on a cooperative basis, with the assistance of the United States Forest Service, local sportsmen's organizations, and the State Game and Fish Commission.

The Saratoga, Wyo., station conducted its activities along routine lines and obtained normal success in the production and distribution of trout fingerlings. A special distribution tank was constructed during the year for handling trout in truck shipments. Some C. C. C. labor was utilized in caring for the grounds.

In the Colorado territory, a W. P. A. project was developed, resulting in the construction of two circular rearing pools at the Leadville station, the remodelling and repainting of several buildings, and improvements to a water supply ditch and dam. As usual, the Leadville station cooperated with local parties in the collection of trout eggs and obtained 5¾ million brook trout eggs, and approximately 300,000 Loch Leven eggs through this means.

At the Creede, Colo., substation the year's work was more successful than at any time since its establishment. Close to 3 million trout fingerlings were distributed, in addition to shipments of over 3 million trout eggs to other establishments. The field egg-collecting station at Lake San Cristobal was operated successfully, yielding 4¼ million brook and rainbow eggs. This increase was achieved, despite the fact that the lake is fished heavily. An additional dwelling was completed and made ready for occupancy and at the close of the year arrangements were being made for the installation of Diesel-electric power.

In the Idaho territory, the Hagerman station was likewise the beneficiary of a W. P. A. project, which permitted the construction of a storage shed, oil house, renewal of a pipe line, and repairs to ponds. The fish-cultural work, both the production of rainbow eggs from station brood stock and the rearing of fingerlings for distribution, was of normal scope and average success.

The substation at Salmon, Idaho, was utilized for handling eggs collected from Williams Lake and other local waters. This station is operated on a joint basis with the Idaho Department of Fish and Game and the collections of rainbow trout eggs amounted to 4,600,000. The station was closed after distribution of the fingerlings, since it is more economical to operate it on a seasonal basis.

In the Montana territory, the Bozeman station constructed a new addition to the hatchery building and made considerable improvements to the other buildings. Work was started on the construction of two rearing ponds. The Bozeman station, as usual, was utilized as a center for shipping the Loch Leven eggs collected at the substation

in the Madison Valley. The substation at Ennis is still uncompleted and lacks adequate rearing space and other facilities. Due to demands for hydro-electric purposes of the water stored in Meadow Lake, the collection of Loch Leven trout eggs from wild fish was greatly reduced in comparison with collections of previous years.

At the Ennis, Mont., substation 1,000 feet of new water-supply line was laid. A brood stock is being built up here to offset, in part, the drop in the collections of rainbow and Loch Leven eggs from the Madison River.

The output of bass from the Miles City, Mont., substation exceeded all previous records at this point, although there was a drop in the production of other species. A heavy loss of bass brood stock was experienced due to smothering under heavy ice in the wintering pond. W. P. A. labor was utilized in making general improvements.

The pondfish station at Dexter, N. Mex., reported the largest production since establishment of the station, with an output approaching 1 million. Fish ducks took a heavy toll of sunfish and crappie brood stock. Here, too, approval of a W. P. A. project permitted development of a number of improvements, including construction of new ponds, holding tanks, and the grading of roads. The new substation at Santa Rosa, N. Mex., was in operation, but little distribution was undertaken prior to the close of the year. Egg collections and propagation of trout and grayling at Yellowstone Park met with the usual success.

The Seattle office personnel maintained close supervision over the foregoing activities and in addition handled details of a cooperative program of fish food studies conducted with the University of Washington.

NEW ENGLAND TROUT STATIONS

The York Pond, N. H., station experienced no trace of the poor quality brook trout eggs which marred the operations of the previous year. Likewise, the mortality of brood stock was strictly within normal limits. Both the States of New Hampshire and Vermont contributed funds for the production of larger fish to be stocked in their respective waters. Extensive developmental work was prosecuted here; utilizing C. C. C. and W. P. A. labor. New ponds were created and the water-supply system improved. An ice house was constructed. Total brook trout egg collections amounted to approximately 9,000,000, of which over 5,000,000 were shipped to other Bureau stations and State conservation departments, etc.

At the Craig Brook, Maine, station three circular ponds were constructed by C. C. C. labor for the purpose of rearing fish for Acadia National Park. The collection of 4,800,000 brook trout eggs was 1,400,000 in excess of the figures for the previous year. Of these, 2,075,000 were shipped to other points. A limited number of Atlantic salmon were carried over at the end of the year. Improvements aside from the new ponds consisted of minor repairs to the older ponds. At the close of the year a much larger number of brook trout were being held over than has been the practice in the past.

At Nashua, N. H., the hatch of over 500,000 trout eggs permitted normal production and distribution.

A continuation of the former practice of collecting smallmouth bass fry from a reservoir lake in Connecticut produced over 500,000 of this species for distribution, one-half of which were allocated to the

State of Connecticut. The work was handled by the Hartsville, Mass., station, which also propagated its normal quota of trout, many of which were of large size.

The St. Johnsbury, Vt., station achieved unusually good results in rearing landlocked salmon fingerlings. W. P. A. assistance permitted the renewing of foundations of the hatchery building, as well as plastering the interior of the building, painting exteriors, and improvements to ponds and grounds. The work at this station was closely coordinated with that at the York Pond, N. H., station.

COMBINATION TROUT AND PONDFISH STATIONS

In view of the overlapping of the range of cold-water and warm-water species, the desirability of propagating both at the same hatchery is self-evident. In practice, combination hatcheries have generally proved to be most efficient with one or the other of these two types. Natural conditions have determined which group could be produced most efficiently. Stations in this category were nevertheless of great importance in maintaining a balanced distribution program in 1937.

The Neosho, Mo., station has been conducting a number of interesting experiments in the development of a more economical and satisfactory food for rainbow trout. Earlier experiments indicated that an excessive proportion of dry foods affected the growth and the egg production. Production of fingerlings for distribution showed a slight improvement over last year but the egg collections were somewhat less. Interesting results were achieved in the artificial feeding of bass fingerlings, utilizing the same food as is employed with rainbow trout. Bream were also reared by the same means. The fish were unusually free from disease.

At the Bourbon, Mo., substation, operated on a cooperative basis, rainbow egg collections were less than for several years past, due to a curtailment in the number of breeders carried.

Aside from a normal production of trout at the Erwin, Tenn., station, a yield of over 500,000 bass was unusually favorable.

The Flintville, Tenn., station continued to experience difficulty in the propagation of pondfish, due to seepage of water in the rearing ponds. The station discontinued the maintenance of brood stock for the collection of rainbow trout eggs, the requirements for this species being taken care of by the shipment of eggs from other sources. A garage building was constructed during the year.

At the Lake Mills, Wis. station, W. P. A. construction has continued throughout the year, resulting in the completion of one large pond and five smaller ponds, together with other general improvements. The production of bass at this point exceeded that for the previous year.

The Lamar, Pa., station is in an incomplete status and is utilized only for the rearing of trout which are transferred in the fry stage from other stations. Over 200,000 fingerlings of three species were distributed. At the close of the year arrangements were being made for development of a C. C. C. construction program, involving erection of a hatchery building and the construction of bass ponds. This labor was also utilized during the year for the construction of eight trout-rearing ponds, landscaping, road building and general improvements.

The output of the Manchester, Iowa, station fell below the level of the previous year but the production of 1,500,000 rainbow trout eggs

was very satisfactory and permitted numerous shipments to other stations. The quality of these eggs was extra good. The propagation of smallmouth bass was virtually a failure. The cold water in the bass ponds may be considered a contributing cause to this result. The Manchester station furnished a considerable number of rainbow trout for such waters as the State of Iowa desired to stock with this species.

The Northville, Mich., station conducted 7 cooperative feeding stations to which trout fingerlings were transferred in the late spring for rearing. This station furnished a considerable number of trout to the States of Ohio and Indiana, enabling those States to stock their limited mileage of trout waters without the necessity of establishing trout-hatching or rearing units of their own. This station also supplied a considerable number of trout and pondfish, particularly smallmouth bass, for Forest Service waters. The total output of fish exceeded 1 million.

The hatchery at Smokemont, N. C., operated solely for the stocking of waters in the Great Smoky National Park, was completed during the year. The hatchery building has a capacity of 30 troughs and is of an architectural design to harmonize with the type of structures approved by the National Park Service. A residence was also constructed, together with additional service stations. This station has been equipped with a small hydroelectric power plant. Approximately 600,000 eggs were hatched. However, mortality in the rainbow fingerlings materially reduced the output. At the close of the year several hundred thousand trout fingerlings were being reared for distribution at legal size.

PONDFISH STATIONS

The hatcheries which contribute most fully to maintenance of angling for the largest number of people are those which propagate the socalled "warm water" pondfishes, of which the bass are the most popular form and the most difficult to propagate in large quantities. The methods followed in culturing these species are really merely modifications of the natural reproductive processes and are in part subject to the same hazards. Consequently, there was considerable fluctuation in the output of the different stations with, however, a trend toward increased distribution, particularly in the case of bass.

The Warm Springs, Ga., station, operating along normal lines, distributed almost 250,000 bass fry in addition to more than 500,000 bass, bream, and catfish fingerlings. The station at Lake Park, Ga., enjoyed a successful season, the distribution being largely handled by the State of Georgia.

The station at Tupelo, Miss., made a few minor improvements, including the installation of new holding troughs. The production of over 28,000 black bass per acre of water, and over 19,000 bream per acre of water is indicative of the successful operation of this establishment which, however, is restricted in its pond area.

In contrast to previous years, very little construction work was carried on at the Marion, Ala., station. The number of bass distributed to applicants was practically the same as last year but the number of fingerlings left in the pond for subsequent distribution was greater. Over 530,000 bass were handled. There was an increase of

over 400 percent in the production of bream, the deliveries to applicants amounting to 2,199,000. Efforts to propagate crappie were largely unsuccessful. The depredations of fish-eating birds have rendered it difficult to maintain an adequate brood stock at this station.

The Orangeburg, S. C., station established an all-time record in the production of pondfishes. This was due partially to the creation of additional pond space at a small auxiliary located at St. Matthews, S. C. The total output of all species from all sources was 727,000 fingerlings, an increase of 173,000 over the previous year. This hatchery directed the activities of an auxiliary at Hoffman, N. C., which was in the process of construction during the major part of the year. However, six ponds were utilized for fish production with a yield of 172,000 fry and fingerlings, largely bream. The Orangeburg station has experimented with the production of the red-breasted sunfish, a highly desirable species, which is limited in its normal distribution.

The new Tennessee Valley Authority hatchery at Norris, Tenn., operated by the Bureau, entered full production for the first time and produced over 400,000 bass fry in four acres of water. Many of these were distributed to rearing ponds within the T. V. A. area.

The Mammoth Springs, Ark., station suffered a recession in its production of smallmouth bass but made up for this reduction by an increased output of largemouth bass. Lack of adequate rearing space necessitated distribution of much of the hatch in the fry stage.

The activities at the Louisville, Ky., station were of necessity seriously affected by the disastrous flood which completely inundated the station grounds. Much of the equipment was badly damaged or completely ruined. Roadways were washed out and practically all brood fish were lost. Those surviving produced only a limited number of fry so that the distribution amounted to only 40,000 smallmouth bass fry and 85,000 fingerlings. Strenuous efforts were made to secure additional brood stock during the spring months with the aid of the State Fish and Game Department. This met with comparatively little success, however, and this station contributed little toward the aggregate output of the Bureau's hatcheries. Rehabilitation work was undertaken with the assistance of the Works Progress Administration and the National Youth Administraton. At the close of the year much of the damage to buildings, grounds, ponds, etc., had been repaired.

The Harrison Lake, Va., station has not yet reached the level of production which should be maintained when conditions in the new ponds have become more stable.

In the Texas field the Uvalde station was not completed sufficiently early to secure a worthwhile output of fish. Elsewhere in this territory production approximated normal figures.

In summary, it may be said that the pondfish hatcheries offer the greatest opportunity and need for improvement as to methods and extension of facilities, and this situation was given the fullest consideration in planning the program for the fiscal year 1938.

MISSISSIPPI RIVER TERRITORY

As in the past, semicontrolled rearing ponds were operated at three points in the Upper Mississippi Wildlife and Fish Refuge. Two

ponds were under construction at the close of the year in a program for enlarging this activity. The output of fish from this source was quite successful and affords confirmation of the belief that such ponds must be depended upon to keep up production when the rescue work is terminated, due to canalization. The rescue activities are the subject of discussion elsewhere in this report.

Trout culture was carried on at the La Crosse, Wis., station with very good results, part of the output being utilized at two Forest Service rearing stations in Wisconsin. Cooperative trout ponds, supervised by this station and stocked with trout hatched at La Crosse, numbered 55 in Wisconsin and 10 in Minnesota. The State of Wisconsin adopted the program to a considerable extent in connection with its own activities. Additional services rendered by the personnel of this station included survey and inspection activities for the Forest Service and several of the States. Many of the fish supplied to the aquarium at Washington were obtained through the La Crosse headquarters.

Among the stations operating in this general territory under supervision from La Crosse were those at Fairport, Iowa, Lake Mills, Wis., and Rochester, Ind., as well as the seasonal rescue stations at various points in the Upper Mississippi Refuge. The Fairport station reported one of the best hatches of largemouth bass that has occurred at that point. Over 580,000 fry were hatched and distributed to rearing ponds. Daphnia culture for fish food was quite successful. Some rescue activities were carried on and carp and buffalo eggs were taken in nearby waters, fertilized, and returned to the spawning grounds.

At the Lake Mills, Wis., station construction work has been prosecuted with W. P. A. labor, resulting in the completion of one new large bass pond and five smaller bass ponds, with a circular rearing pond for trout. The production of approximately 70,000 bass, crappie, etc., was a slight advance over the previous year, but below the level at which this station should produce. Activities with trout, involving the distribution of over 200,000 fingerlings, was satisfactory.

At the Rochester, Ind. station W. P. A. workers were engaged throughout the greater part of the year in enlarging the pond system. At Argos, Ind., auxiliary construction work was completed and five ponds were placed in operation. An office building was being constructed at Rochester at the close of the year, supplementing a garage which had been completed earlier. Drought conditions hampered fish-cultural activities and necessitated an early distribution of the fish. Production approximated 400,000 of all species and sizes, the predominant species being largemouth bass.

The Homer, Minn., station was, as heretofore, utilized as a base for certain rescue operations and also as a repair and storage depot for the equipment utilized throughout the Upper Mississippi area.

AQUARIUM

No new developments were initiated in the aquarium located in the basement of the Department of Commerce Building at Washington. However, this establishment was a point of attraction to many thousands of visitors to the city. The demonstration of hatching methods, utilizing live eggs of various species was a point of special attraction, as was the model fish ladder used to demonstrate the

principle of transporting fish over dams. Since collection of specimens from local waters is difficult and expensive, much of the stock used for replenishment in the spring and fall months was obtained from the Bureau's hatcheries.

DISTRIBUTION OPERATIONS

Initial requests for consignments of fish for unstocked waters were received in greater number this year than in any previous year. This was partly due to requests for the stocking of ponds recently constructed by the Department of Agriculture in a program for the prevention of soil erosion. A total of 9,887 applications from individuals and clubs were filled. This does not include the number of blanket applications from the National Forests and National Parks, to which hundreds of thousands of fish were assigned.

The distribution cars, engaged in the delivery of fish to applicants and transfers between hatcheries, this year made 95 trips and carried an average of 250 pails per trip. These cars traveled 50,342 paid miles and 19,331 free miles. Detached messengers traveled 37,712 paid miles and 5,410 free miles in delivering fish to applicants. Truck deliveries during the year aggregated 89,262 miles. The use of trucks for making deliveries of fish within a comparatively short distance of the stations is becoming a more general practice. As in previous years, the Bureau was favored with free transportation or reduced rates by a number of the railroads. Several of the State conservation departments also aided materially in the distribution of fish from our hatcheries to applicants in their respective States by furnishing facilities for this purpose.

Unfortunately, due to limited funds, it was necessary in some localities to request applicants to call at the hatcheries for their consignments of fish. This was not always practicable and in cases where the fish could not be delivered to the applicant at the hatchery the uncalled for fish were either given to other applicants or planted in public waters.

Summary, by States, of the distribution of fish, fiscal year 1937

State and species	Number	State and species	Number
Alabama:		Connecticut:	
Black bass, largemouth	320,564	Brook trout	16,300
Catfish	380	Black bass, smallmouth	289,000
Rainbow trout	28,000	Florida:	
Sunfish	2,037,115	Black bass, largemouth	20,740
Loch Leven trout	10,000	Sunfish	2,625
Arizona:		Georgia:	
Black bass, largemouth	21,400	Black bass, largemouth	355,600
Rainbow trout	30,000	smallmouth	1,250
Sunfish	7,500	Brook trout	2,340
Brook trout	7,500	Catfish	112,025
Arkansas:		Crappie	600
Black bass, largemouth	395,170	Rainbow trout	58,745
smallmouth	15,500	Sunfish	567,345
Rainbow trout	2,830	Idaho:	
Rock bass	32,130	Blackspotted trout	242,300
Sunfish	85,090	Brook trout	148,630
California: Chinook salmon	4,528,360	Loch Leven trout	61,400
Colorado:		Rainbow trout	1,461,320
Black bass, largemouth	2,550	Illinois:	
Blackspotted trout	515,000	Black bass, largemouth	13,170
Brook trout	3,841,300	Buffalo fish	11,000
Lake trout	46,780	Carp	23,000
Loch Leven trout	137,250	Catfish	4,900
Rainbow trout	1,198,690	Crappie	3,675
Sunfish	190	Sunfish	23,400

Summary, by States, of the distribution of fish, fiscal year 1937—Continued

State and species	Number
Illinois—Continued.	
White bass	350
Miscellaneous fishes	5, 155
Indiana:	
Black bass, largemouth	265, 870
smallmouth	21, 640
Catfish	1, 120
Crappie	7, 180
Rock bass	5, 200
Sunfish	89, 090
Yellow perch	5, 000
Brook trout	129, 790
Loch Leven trout	134, 250
Rainbow trout	110, 750
Iowa:	
Black bass, largemouth	359, 470
smallmouth	5, 500
Buffalo fish	2, 350, 700
Carp	919, 400
Catfish	15, 408, 380
Crappie	4, 878, 665
Drum	43, 800
Pike-pickerel	37, 530
Rock bass	18, 000
Sunfish	6, 374, 365
White bass	34, 575
Yellow perch	55, 500
Miscellaneous fishes	1, 352, 785
Brook trout	9, 200
Loch Leven trout	13, 000
Rainbow trout	36, 350
Kansas:	
Catfish	790
Crappie	7, 035
Rainbow trout	445
Sunfish	13, 785
Kentucky:	
Black bass, largemouth	14, 830
smallmouth	44, 485
Crappie	280
Rock bass	4, 050
Sunfish	39, 300
Louisiana:	
Crappie	1, 510
Black bass, largemouth	416, 940
Sunfish	54, 960
Warmouth bass	5, 665
Maine:	
Black bass, smallmouth	24, 000
Brook trout	922, 530
Landlocked salmon	10, 000
Flatfish	731, 700, 000
Lobster	2, 625, 000
Maryland:	
Black bass, largemouth	13, 305
smallmouth	680
Brook trout	2, 750
Loch Leven trout	1, 000
Rainbow trout	805
Silver salmon	3, 000
Yellow perch	1, 871, 000
Massachusetts:	
Black bass, smallmouth	195, 150
Brook trout	118, 650
Catfish	3, 375
Cod	162, 832, 900
Flatfish	564, 866, 100
Mackerel	8, 833, 000
Pollock	571, 409, 650
Michigan:	
Black bass, largemouth	24, 275
smallmouth	63, 430
Brook trout	718, 100
Crappie	2, 875
Rainbow trout	231, 890
Rock bass	1, 600
Sunfish	3, 375
Yellow perch	210
Minnesota:	
Black bass, largemouth	106, 500
smallmouth	3, 105
Brook trout	668, 900
Buffalo fish	3, 375
Carp	15, 775
Minnesota—Continued.	
Catfish	424, 800
Crappie	2, 675, 540
Drum	1, 000
Lake trout	178, 000
Loch Leven trout	78, 200
Pike-perch	9, 470, 000
Pike-pickerel	9, 575
Rainbow trout	71, 200
Sunfish	682, 090
White bass	83, 025
Whitefish	2, 595, 000
Yellow perch	15, 000
Miscellaneous fishes	83, 300
Mississippi:	
Black bass, largemouth	339, 215
Sunfish	322, 625
Missouri:	
Black bass, largemouth	323, 410
smallmouth	40, 000
Catfish	15, 745
Crappie	19, 015
Rainbow trout	60, 840
Rock bass	56, 300
Sunfish	33, 795
Montana:	
Black bass, largemouth	60, 310
Blackspotted trout	1, 030, 815
Brook trout	297, 815
Catfish	4, 780
Crappie	21, 590
Grayling	721, 810
Loch Leven trout	2, 545, 130
Rainbow trout	1, 368, 740
Nebraska:	
Black bass, largemouth	23, 725
Brook trout	334, 150
Catfish	19, 800
Crappie	2, 710
Loch Leven trout	82, 900
Rainbow trout	175, 740
Rock bass	2, 000
Sunfish	9, 290
Nevada:	
Blackspotted trout	25, 000
Brook trout	9, 000
New Hampshire:	
Black bass, smallmouth	34, 300
Brook trout	1, 065, 965
Catfish	1, 700
Lake trout	21, 445
Loch Leven trout	6, 000
Rainbow trout	149, 400
New Jersey:	
Black bass, largemouth	4, 055
Catfish	750
Crappie	225
Flatfish	28, 682, 000
Sunfish	3, 700
New Mexico:	
Black bass, largemouth	584, 250
Blackspotted trout	49, 000
Brook trout	24, 000
Catfish	29, 000
Crappie	5, 000
Rainbow trout	396, 000
Sunfish	303, 600
New York:	
Black bass, largemouth	16, 000
smallmouth	87, 100
Brook trout	616, 160
Flatfish	112, 526, 000
Lake herring	160, 000
Lake trout	307, 210
Loch Leven trout	103, 150
Rainbow trout	158, 945
Whitefish	160, 000
Yellow perch	2, 500, 000
North Carolina:	
Black bass, largemouth	449, 390
smallmouth	3, 180
Brook trout	217, 165
Catfish	240
Crappie	940

Summary, by States, of the distribution of fish, fiscal year 1937—Continued

State and species	Number
North Carolina—Continued.	
Glut herring	12,500,000
Rainbow trout	248,315
Shad	6,240,000
Striped bass	641,000
Sunfish	238,140
Warmouth bass	3,100
Yellow perch	85
White perch	2,500,000
North Dakota:	
Black bass, largemouth	71,900
Crappie	9,510
Loch Leven trout	2,000
Ohio:	
Black bass, largemouth	37,800
Catfish	875
Crappie	3,810
Loch Leven trout	15,000
Pike-perch	212,175,000
Rainbow trout	29,925
Rock bass	9,300
Sunfish	36,070
Whitefish	83,500,000
Oklahoma:	
Black bass, largemouth	244,770
Catfish	5,400
Crappie	113,985
Rock bass	3,500
Sunfish	216,595
Warmouth bass	5,800
Oregon:	
Blackspotted trout	98,350
Brook trout	688,000
Black bass	4,700
Chinook salmon	8,078,500
Loch Leven trout	152,800
Rainbow trout	140,220
Silver salmon	1,066,370
Steelhead trout	907,000
Pennsylvania:	
Black bass, largemouth	17,085
smallmouth	3,980
Brook trout	320,880
Catfish	26,100
Crappie	8,805
Loch Leven trout	49,160
Rainbow trout	108,535
Rock bass	1,600
Sunfish	25,120
Yellow perch	630
Rhode Island:	
Flatfish	49,768,000
South Carolina:	
Black bass, largemouth	432,050
Brook trout	63,000
Catfish	2,750
Crappie	9,305
Rainbow trout	21,600
Shad	65,000
Sunfish	258,340
Warmouth bass	9,290
Yellow perch	195
South Dakota:	
Black bass, largemouth	16,670
Blackspotted trout	117,900
Brook trout	55,035
Catfish	42,700
Crappie	18,200
Grayling	5,000
Loch Leven trout	80,650
Rainbow trout	122,680
Rock bass	1,100
Sunfish	34,440
Tennessee:	
Black bass, largemouth	602,615
Brook trout	357,820
Loch Leven trout	33,000
Rainbow trout	347,135
Rock bass	4,830
Sunfish	64,185
Texas:	
Black bass, largemouth	404,845
Catfish	2,305
Crappie	43,435
Sunfish	206,020
Utah:	
Blackspotted trout	309,090
Brook trout	768,350
Lake trout	79,600
Loch Leven trout	181,780
Rainbow trout	578,030
Silver salmon	14,355
Sockeye salmon (landlocked)	98,000
Sunfish	7,500
Vermont:	
Atlantic salmon	10,000
Black bass, smallmouth	16,300
Brook trout	1,415,250
Lake trout	130,640
Landlocked salmon	49,500
Rainbow trout	37,215
Virginia:	
Black bass, largemouth	81,388
smallmouth	23,405
Brook trout	364,675
Catfish	25
Crappie	7,410
Loch Leven trout	8,035
Rainbow trout	279,745
Rock bass	19,900
Shad	12,100,000
Sunfish	74,530
Yellow perch	235,892,500
Washington:	
Black bass, largemouth	25,416
Blackspotted trout	1,140,560
Brook trout	761,525
Chinook salmon	17,282,560
Chum salmon	17,405,500
Crappie	10,105
Golden trout	12,000
Loch Leven trout	162,300
Rainbow trout	627,870
Silver salmon	1,021,215
Sockeye salmon	4,810,500
Steelhead trout	524,060
Sunfish	1,440
West Virginia:	
Black bass, largemouth	4,455
smallmouth	19,290
Brook trout	753,300
Crappie	30
Loch Leven trout	27,950
Rainbow trout	560,105
Rock bass	8,800
Silver salmon	17,110
Sunfish	49,800
Wisconsin:	
Black bass, largemouth	1,098,245
Brook trout	596,000
Buffalo fish	1,295,700
Carp	1,830,400
Catfish	5,072,325
Crappie	1,421,770
Drum	200
Loch Leven trout	262,700
Pike-pickerel	76,050
Rainbow trout	202,100
Sunfish	3,866,890
White bass	26,400
Yellow perch	36,825
Miscellaneous fishes	162,000
Wyoming:	
Black bass, largemouth	71,425
Blackspotted trout	7,564,120
Brook trout	890,335
Catfish	9,900
Crappie	33,745
Grayling	822,650
Lake trout	90,000
Loch Leven trout	553,020
Rainbow trout	622,045
Rock bass	3,200
Sunfish	2,250
Yellow perch	900