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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 1939

WITH

APPENDICES

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National Oceanic and Atmospheric Administration

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 i.

This report covers two administrations of the Bureau of Fisheries. Commissioner Frank T. Bell resigned, effective March 21, 1939, and the duties of that office were assumed by Charles E. Jackson, as Acting Commissioner, on that date.

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**U. S. DEPARTMENT OF COMMERCE
BUREAU OF FISHERIES**

HEADQUARTERS STAFF, 1938-39

Acting Commissioner

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Inquiry Respecting Food Fishes.—**ELMER HIGGINS.**

Fishery Industries.—**R. H. FIEDLER.**

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BUREAU OF FISHERIES

Available statistics indicate that there was a decrease in the volume but an increase in the value of fishery products taken in the United States and Alaska during 1937 as compared with the preceding year. Data on the catch were collected for both 1936 and 1937 in the Chesapeake, South Atlantic and Gulf, Pacific, and Lake States and in Alaska. The combined catch in these sections alone shows a decrease of 13 percent in volume but an increase of 7 percent in value. Decreased catches were made in each of the five geographical sections; however, the principal reductions occurred in the Pacific Coast States where greatly reduced catches of pilchards were taken, and in Alaska where there was a large decline in the catch of salmon.

The total catch of fishery products in the United States and Alaska, as based on the most recent surveys, amounted to 4,352,549,000 pounds, valued at \$100,845,000. About 130,000 fishermen were employed in making this catch.

The production of canned fishery products in the United States and Alaska during 1937 amounted to 742,197,000 pounds, valued at \$105,175,000; the output of byproducts was valued at \$36,804,000; the production of frozen fishery products, excluding packaged products, amounted to 103,112,000 pounds, estimated to be valued at \$8,800,000; and fresh and frozen packaged fish and shellfish, 201,803,000 pounds, valued at \$27,678,000. Based on surveys for previous years, the production of cured fishery products amounted to 104,339,000 pounds, valued at \$15,635,000. It is estimated that about 686,000,000 pounds of fresh fishery products (excluding packaged fish and shellfish), valued at about \$57,000,000, was marketed during 1937. The total marketed value to domestic primary handlers of all fishery products in 1937 is estimated at \$251,000,000.

Fishery products imported for consumption were valued at \$50,636,000 and domestic exports were valued at \$14,567,000.

The value of the production of canned fishery products in all sections increased 11 percent as compared with 1936; byproducts increased 5 percent; frozen fish, about 1 percent; and packaged fish, 3 percent.

INTERNATIONAL RELATIONS

HALIBUT INVESTIGATIONS

The International Fisheries Commission continued the investigation and regulation of the Pacific halibut fishery, under authority of the treaty of January 29, 1937, between the United States and Canada.

In fulfillment of its regulatory duties, the Commission recorded the catch from each regulatory area, forecast and announced the date

of attainment of each area limit, and closed the areas accordingly. It opened the 1939 fishing season on April 1 under regulations essentially unchanged from those of the preceding year.

Areas 1 and 2 were closed to halibut fishing in 1938 at midnight of July 29, with catches of approximately 706,000 and 22,923,000 pounds, respectively. Areas 3 and 4 were closed at midnight of October 29, with catches of 25,591,000 and 0 pounds, respectively.

The investigations of the Commission's scientific staff were continued along the lines necessary for fulfillment of the purpose of the treaty. Current biological and statistical data, which form a system of observation of the changes occurring in the stocks of halibut as a result of regulation and a necessary basis for the continued rational control of the fishery, were collected and analyzed. The collection of biological data made necessary the operation of a vessel at sea.

The abundance of halibut, as indicated by the catch per unit of fishing effort, showed a further increase all along the coast in 1938. In area 2, between Cape Spencer in Alaska and Willipa Bay in Washington, the abundance was 15 percent greater than in 1937, 100 percent greater than in 1930. In area 3, between Cape Spencer and the Aleutian Islands, it was 3.5 percent greater than the previous year and 77 percent greater than in 1930, the last year of unrestricted fishing.

Sampling of the stocks of marketable halibut by means of market measurements was continued to determine the changes occurring in their composition as a result of regulation. For the first time since the Commission began regulating the fishery, market measurements failed to show an increase in the size of the fish landed or in the proportion of mature fish on the more depleted banks of area 2. The maximum proportion of larger sizes from the stock of young available at the time regulation began appears to have been reached and a further increase in the larger sizes may not occur until the increasing stock of young has had time to grow up.

Observation of the effect of regulation on the production of spawn in area 2 was continued by means of net hauls taken at sea during the winter spawning season. Analysis of the catches of eggs indicated that the increase observed in their abundance from 1934-35 to 1936-37 was not continued in 1937-38 and 1938-39. No special significance can yet be attributed to the failure of production in the latter 2 years to equal the high level of 1936-37, because of the variations that occur normally from year to year among marine species, but it is to be suspected that it may be associated with the changes in size composition mentioned above.

INTERNATIONAL PACIFIC SALMON FISHERIES COMMISSION

Work of an experimental and preliminary nature, to establish facts upon which the permanent program could be based, was carried on during the 1938 season. A compilation and analysis of the great mass of existing records of the sockeye run to the Fraser River was nearing completion by the end of the year. A survey of the spawning grounds was begun. The adult migrants in salt water were tagged and extensive recoveries made on the spawning grounds.

The Commission held its third meeting September 23-24 in Vancouver, B. C. The program of investigation, then under way, was discussed and that for 1939 approved. In February 1939, William A. Found resigned and was replaced by A. J. Whitmore.

JAPANESE ACTIVITIES IN THE BRISTOL BAY FISHERY

Japanese fishery operations in Bristol Bay in 1939, the tenth consecutive season in which such activities have been carried on, were confined to the catching and canning of king or spider crabs, and only one floating cannery, together with auxiliary craft, was employed. This indicates a continued adherence on the part of the Japanese Government to the assurance given in the spring of 1938 that its official survey of the salmon in Bristol Bay would be suspended and that it would issue no license to vessels to take salmon in those waters.

CONSERVATION OF WHALES

The Protocol of June 24, 1938, which amends in certain particulars the International Agreement for the Regulation of Whaling, signed at London on June 8, 1937, came into force as to the United States on March 30, 1939, and was proclaimed by the President on April 8, 1939.

The principal provisions of the Protocol of 1938, which are advances in the measures of conservation of the whale stock of the world provided in the agreement of 1937, are as follows:

(1) A prohibition against the taking or treating of humpback whales south of 40° south latitude by factory ships or whale catchers attached thereto from October 1, 1938, to September 30, 1939. (Article 1.)

(2) The establishment of a sanctuary for baleen whales south of 40° south latitude between 70° west longitude and 160° west longitude for a period of 2 years from December 3, 1938. (Article 2.)

(3) A clarification of provisions in articles 7 and 8 of the agreement of 1937, which had given rise to conflicting interpretations, so as to make clear that no factory ship which has been used for the purpose of treating baleen whales south of 40° south latitude shall be used for that purpose elsewhere within 12 months from the end of the open season; that only factory ships which have operated within the territorial waters in 1937 shall so operate after the signature of the protocol; that such ships shall be treated as land stations, shall remain moored, and shall not operate more than 6 months in any 12-month period; and that such operations shall be continuous. (Article 3.)

NORTH AMERICAN COUNCIL ON FISHERY INVESTIGATIONS

The twenty-fifth meeting of the North American Council on Fishery Investigations was held in Boston, Mass., October 4-7, 1938. Representatives from Canada, Newfoundland, and the United States were present. At the invitation of the Council, members of the Fishery Advisory Committee of the Department of Commerce and other leaders of the fishing industry attended a general session on

October 5 for a discussion of fishery problems in the North Atlantic area. The general program of fishery investigations being conducted by Canada, Newfoundland, and the United States was presented.

In the sectional committee meetings dealing with groundfish investigations, shorefish studies, hydrographic research, and fishery statistics, nearly a score of investigators presented reports on their work, affording members of the Council a summary review of progress during the year in these fields and permitting them to modify their official program accordingly. Important advances were reported in the study of the cod fishery being prosecuted by Canada, the lobster studies in Newfoundland, and the investigations in the United States leading to a proposal for effective management of the haddock fishery.

INTERSTATE COOPERATION IN FISHERY MANAGEMENT

As a result of efforts of the Council of State Governments in cooperation with the Bureau of Fisheries and with fishery administrators of the various States concerned, progress has been made toward the solution of fishery problems in the Great Lakes and on the Atlantic coast.

The Interstate Committee on Great Lakes Fisheries, appointed at the conference held under the auspices of the Council of State Governments in February 1938, met in Chicago on December 5. An international treaty to bring about uniform regulation of Great Lakes fisheries was again endorsed. Pending the adoption of an international treaty, however, the Committee recommended the adoption of an interstate compact for the regulation of United States fisheries in the Great Lakes. The formation of such a compact has been authorized by the Congress of the United States. The Committee also urged that State fish and game commissioners be given discretionary power to regulate fisheries without legislative action.

At the Eastern States Conservation Conference held in New York November 19, a resolution was unanimously adopted petitioning Congress to grant permission to States bordering on the Atlantic coast to enter into a compact for the protection of migratory fishes in territorial waters. A committee was appointed to prepare a draft of the compact for submission to the States.

FISHERY ADVISORY COMMITTEE

The Fishery Advisory Committee met in Boston, Mass., on October 5, 1938, in conjunction with the National Fisheries Convention in session during the week. Discussion centered largely around problems of production and merchandizing fishery products. On October 5, members also attended a general session of the North American Council on Fishery Investigations for consideration of fishery problems in the North Atlantic area.

The Committee met in Washington, D. C., January 30-31, 1939. Special problems challenging the industry at this time, recommended by the Committee for further research, are improvements in methods of transporting iced and frozen fishes and more complete utilization of the waste products of the fisheries. Inasmuch as fishery products constitute a wholesome and nutritious food which contains mineral

elements essential to health that are not readily available in many foods of land origin, an even flow of fishery products from producer to consumer is essential to the public interest.

DOMESTIC RELATIONS

COOPERATION WITH FEDERAL, STATE, AND OTHER AGENCIES

Cooperation was given by members of the Bureau technological staff to chemists and bacteriologists of the Food and Drug Administration, U. S. Department of Agriculture, in connection with the development and application of tests on methods of determining the quality and constituents of various fishery products; and to the Extension Service of the U. S. Department of Agriculture in connection with the conduct of demonstrations and practical instruction on the preservation of fishery products and more complete utilization in the diet of the excellent food value of fish and shellfish.

Members of the economic and marketing staff of the Division of Fishery Industries cooperated with the Department of Labor in holding conferences with fishermen's unions and associations to settle disputes. The Division also worked with various Federal agencies in obtaining statistical data on our fisheries. These included the Bureau of Agricultural Economics, the health authorities in Washington, D. C., and the Bureau of the Census.

The Bureau has carried on cooperative investigations in technological work with several colleges, universities, and other State institutions. Outstanding among these are Washington State College, Pullman, Wash.; University of Washington, Seattle, Wash.; University of Maryland and Maryland State Agricultural Experiment Station, College Park, Md.

In the conduct of its statistical and marketing work some form of cooperation is given the Bureau in virtually every State where commercial fishing is prosecuted. This cooperation probably reached its greatest development in the States bordering on the Great Lakes and in the Pacific Coast and Chesapeake Bay States.

The Division of Fish Culture maintains the closest liaison with the State fish and game departments and other Federal agencies concerned with the conservation of fish. There has been close contact between the Bureau's representatives, the Bureau of Reclamation, and fisheries officials of the State of Washington with reference to the development of plans for the artificial propagation of the salmon run to be affected by the completion of the huge Grand Coulee Dam.

There has been continued expansion of the policy of routing fish applications to the State departments for check and approval before deliveries are made. The natural consequence of this has been a development of arrangements for the States to deliver the fish with their own equipment and this has been practiced in a number of instances.

The exchange of eggs and fish by the Bureau has been of mutual benefit, particularly in Michigan and Minnesota. In the Western States also, particularly in Oregon, the fish-cultural and fish-distribution work is closely coordinated, with resultant economies to both the State and the Federal Governments.

In the Tennessee Valley area, three-way agreements between the Bureau of Fisheries, the Tennessee Valley Authority, and the States of Alabama, Tennessee, and North Carolina have been made effective or are being negotiated. Under such agreements the T. V. A. has established and built hatcheries and rearing facilities which the Bureau is to operate. The fish produced are to be distributed by the States in that part of the Tennessee Valley area which are included within the respective State boundaries.

The work with the National Park Service has continued in a constructive way and at the close of the year the Park Service was constructing a new hatchery at Glacier Park with subsequent operations to be managed by the Bureau.

In view of the tremendous responsibility upon the Forest Service of the Department of Agriculture for the maintenance of fishing in the national forests, the Bureau has enjoyed unusual cooperation with that agency. A new trout-rearing unit was under construction in the Allegheny National Forest in Pennsylvania, under plans developed and approved by the Bureau with the expectation that it would be operated by this Bureau upon completion.

The State of North Dakota Fish and Game Department donated the site for a new hatchery at Valley City. At St. Louis, Mo., the city officials have approved the construction, at no cost to the Bureau, of a modern hatchery and service building in the Forest Park hatchery. This series of ponds was taken over by the Bureau for operation shortly before the start of the fiscal year 1939 and the results have been most favorable. The State of Minnesota donated a tract of land for a hatchery at New London and furnished the services of surveyors and engineers in acquiring additional property. The site for a new hatchery, at Farlington, Kans., was more easily acquired by reason of the donation of water rights to a State-owned lake. The State of Ohio purchased and donated to the Bureau a splendid location for the new hatchery to be constructed in that State.

CONSTRUCTION ACTIVITIES

At the start of the fiscal year there was being undertaken an extensive program of hatchery development and improvement financed by an allocation of \$808,500 from the Public Works Administration, and \$500,050 from the Works Progress Administration.

These funds were allocated to more than 70 different field projects, involving complete rehabilitation of some of the older hatcheries and enlargement and improvement of the newer establishments. The work involved replacement of pipe lines or complete construction of new water-supply systems; construction, repair, and improvement of buildings; construction of ponds; installation of new equipment; and general landscaping. In some instances there was a 100-percent increase in the productive capacity of a station. The Public Works Administration funds were largely used for the purchase of materials, supplies, and equipment; while the labor, practically all from relief sources, was a contribution from the Works Progress Administration allotment.

The principal development of an entirely new nature was the construction of a pondfish hatchery at the Roy Inks Dam on the lower

Colorado River in Texas. The site was furnished by the Lower Colorado River Authority and the construction was supervised by the Bureau. It was financed by a portion of the P. W. A. allotment and by the assignment of N. Y. A. labor. At the close of the year this project was virtually completed and some of the ponds were stocked with fingerling bass.

Great improvements were effected at the Fort Worth station, where an additional tract of land was donated by the city of Fort Worth and utilized for the development of additional ponds.

The Charlevoix, Mich., hatchery, which had been closed since 1933, was entirely rehabilitated and equipped for the rearing of lake trout fingerling.

In several instances the State W. P. A. projects were in effect, also making possible additional improvements. An outstanding example of this method was at Guttenberg, Iowa, where initial work on a very large bass and pondfish hatchery within the Upper Mississippi River Wild Life and Fish Refuge was undertaken. Curtailment of the scope of the C. C. C. resulted in some restriction of the construction work prosecuted by this agency. A limited number of assignees were held at work at Lamar, Pa., but the C. C. C. development at the York Pond, N. H., station was terminated. However, it was possible to continue developments there by utilization of emergency funds allotted directly to the Bureau.

In addition to the improvements made possible by direct cash allotments to the Bureau, the Appropriation Act for 1939 carried the sum of \$155,000, provided for the construction of new hatcheries in Kansas, North Dakota, Minnesota, and Ohio. A suitable site was located at Valley City, N. Dak., and, at the close of the fiscal year, the hatchery was approximately 75 percent completed, although not in readiness for operation. Sites were selected at Hebron, Ohio, Farlington, Kans., and New London, Minn., but various difficulties were encountered in acquiring clear titles to these sites, with resultant delay in starting actual construction. At the close of the year, however, preparations were being made to initiate the construction phase at each of these locations. The funds appropriated for these hatcheries were continued available during the fiscal year 1940.

By means of funds allotted from the Public Works Administration and the Works Progress Administration, improvements were also made during the year to the technological byproducts laboratory building and the chemical laboratories in Seattle, Wash.

ALASKA FISHERIES SERVICE

ADMINISTRATION OF FISHERY LAWS AND REGULATIONS

Careful observations of the runs and escapement of salmon were made in all fishing districts, and regulations were modified as seemed desirable. In general, the salmon runs were satisfactory, and most of the changes in regulations during the season were relaxations to permit additional commercial fishing in specified localities. The Commissioner of Fisheries spent several weeks in Alaska inspecting the fishery and fur-seal activities.

Revised regulations, issued on February 11, to be effective in 1939 contained few changes of major importance. The salmon fishing

season was shortened in parts of southeast and central Alaska, and in some localities the season was extended slightly, in view of the satisfactory runs. In order to promote the use of claims for outlying areas that had previously been but little exploited, the limitation on the pack for the Seward-Katalla district as a whole was increased, while a limitation was placed on the output of certain well-known beds in the district. Some additional restrictions were placed on commercial fishing for herring and crabs.

Two 15-year leases of oyster bottoms in Alaska were executed during the fiscal year 1939 under the authority granted by the act of August 2, 1937, for the protection of oyster culture in Alaska. Liberal leasing terms have been established in order to encourage the development of this industry.

Fourteen vessels of the Bureau, five speedboats, and a number of other small power boats were used in the patrol of the fishing grounds. The personnel identified with fishery-protective work numbered 209, including wardens, stream guards, weir operators, vessel crews, and biologists. Chartered airplane service was used to some extent to supplement the vessel patrol, and also for surveys of the spawning grounds and transportation of officials to isolated districts.

Attention was given to the reclaiming of former spawning areas that had become inaccessible to the salmon by reason of accumulated debris from slides and windfalls. This work was largely incidental to the patrol of the fishing grounds. The destruction of predatory trout that feed upon salmon eggs and fry was continued in the Bristol Bay and Cook Inlet regions through funds supplied by the Territory and by local salmon packers. An appropriation of \$25,000 was made by the Territorial Legislature in 1939 to continue the improvement of salmon streams and the payment of bounty on predatory trout during the next 2 years.

Biological studies of the salmon and herring were continued, the work in connection with the former being extended to include a comprehensive investigation of the red-salmon fisheries of Bristol Bay. Further studies concerning the effect of predatory trout in reducing the numbers of young salmon were carried on in the Kodiak region. Weirs for counting the escapement of spawning salmon were operated in 11 representative salmon streams.

PRODUCTS OF THE FISHERIES

Notwithstanding the fact that several plants stood idle because of prolonged labor negotiations in the spring and the consequent delay in preparation for the season's operations, the volume of fishery products in Alaska compared favorably with the average for recent years. An outstanding feature was the unusual abundance of red salmon in the Bristol Bay area, resulting in the largest catch ever recorded for that region.

The total output of Alaska fishery products in 1938 was 446,664,000 pounds, valued at \$42,870,000, as compared with 452,545,000 pounds, valued at \$51,743,000 in 1937. The estimated value of the 1938 catch to the fishermen was approximately \$12,040,000, or about \$2,198,000 less than in the preceding year. There were 28,084 persons employed in the various branches of the industry, as against 30,331 in 1937.

Salmon products comprised approximately 78 percent in quantity and 91 percent in value of the total output of the Alaska fisheries in 1938. Ninety-three percent of the salmon products consisted of canned salmon, the pack amounting to 6,807,000 cases, or 326,736,000 pounds, valued at \$36,637,000. Red salmon represented 37 percent and pinks 47 percent of the total pack of canned salmon, as against 32 percent and 54 percent, respectively, in 1937. As compared with the pack of the preceding year, the output of canned salmon in 1938 showed an increase of 2 percent in quantity but a decrease of nearly 18 percent in value. Ninety-eight canneries were operated, or 15 less than in 1937, and the number of persons employed in the salmon-canning industry dropped from 24,865 in 1937 to 22,280 in 1938.

Seventeen herring plants were operated, as compared with 20 in the previous year, and the quantity of herring products declined from the peak production of 1937, although continuing at a comparatively high level. Other fisheries in which there was a decreased production included the whale, shrimp, and crab industries. Only one whaling station was operated in Alaska in 1938. Halibut landings of the Alaska fleet showed a slight increase in volume, as did also cod, clam, and a few other minor fishery products.

ALASKA FUR-SEAL SERVICE

GENERAL ACTIVITIES

Sealing and foxing operations at the Pribilof Islands were carried on, as heretofore, by the natives under the supervision of a staff of 13 regular employees and a number of sealing assistants. Approximately 80 Aleutian natives also were employed during the summer in connection with sealing activities, and 23 skilled employees of the Fouke Fur Co. were at the islands for several weeks to assist in curing and packing the sealskins.

The byproducts plant on St. Paul Island was operated for the utilization of fur-seal carcasses. Products for the 1938 season amounted to 30,587 gallons of oil and 357,222 pounds of meal. These products, other than small quantities retained at the islands for fox feed, were shipped to Seattle, where the oil was sold for commercial use and the meal was transferred to the Division of Fish Culture for feeding fish at the hatcheries.

On St. George Island a warehouse and three new cottages for natives were built, and improved roads were extended about a mile. Considerable resurfacing of roads also was done there and on St. Paul Island. Four cabins and a powerhouse, as well as some new equipment, were added to the substation for sea-otter investigations and patrol in the western Aleutians.

Valuable cooperative service was rendered by the Navy Department in assigning the U. S. S. *Vega* to carry the annual shipment of supplies to the Pribilof Islands, and by the Coast Guard in patrolling waters of the North Pacific and Bering Sea for the protection of fur seals and sea otters.

Delivery of 8,755 fur-seal skins, or 15 percent of the take on the Pribilof Islands in 1938, 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 of 1911, continued the practice of sharing in the proceeds of sale, rather than taking actual delivery of the skins.

Two hundred and ten fur-seal skins taken by the Japanese Government on Robben Island in 1938 were allotted to the United States as its share under the treaty provisions and were shipped to the Department's selling agents at St. Louis, Mo., for processing and sale.

A new contract for the processing and sale of Government-owned fur-seal and other skins was entered into by the Acting Secretary of Commerce and the Fouke Fur Co., St. Louis, Mo., under date of June 9, 1939, covering sealskins taken in 1939 and the following season, and thereafter until the contract is terminated by either party.

SEAL HERD

The computed number of animals in the Pribilof Islands fur-seal herd on August 10, 1938, was 1,872,438, an increase of 33,319, or about 2 percent over the corresponding figure for the preceding year. This comparatively small increase is accounted for by the fact that it has been found necessary to apply higher mortality rates for animals in their first year at sea and to make adjustments accordingly in respect to certain age groups.

TAKE OF SEALSKINS

In the calendar year 1938 there were taken on the Pribilof Islands 58,364 fur-seal skins, of which 46,082 were from St. Paul Island and 12,282 from St. George Island. This was an increase of 3,184 over the total take in 1937. Insofar as possible, killings were confined to 3-year-old males. A suitable number of this age class was reserved for breeding stock.

SALE OF SEALSKINS

Two public auction sales of fur-seal skins were held at St. Louis in the fiscal year 1939. At the sale on October 10, 1938, there were sold 9,754 skins dyed black, 14,490 skins dyed safari brown, and 46 miscellaneous skins for a gross total of \$509,293.75. On May 22, 1939, 7,800 skins dyed black and 12,720 dyed safari brown brought a gross sum of \$344,338.75.

Sealskins sold at private sales under special authorization by the Secretary of Commerce consisted of 324 dyed black, 487 dyed safari brown, 1 partly processed, and 73 raw-salted skins, which brought a gross total of \$17,713. In all, 45,695 fur-seal skins were sold for the account of the Government in the fiscal year 1939, for a total gross sum of \$871,345.50.

FOXES

The care of blue foxes on the Pribilof Islands is an important seasonal activity, requiring attention only during the winter months when sealing operations are at a minimum. During the 1938-39 season 219 blue and 5 white foxskins were taken on St. Paul Island and 799 blue and 6 white foxskins were taken on St. George Island, a total of 1,029. Suitable reserves for breeding purposes were made

on both islands. Eight hundred and forty-seven blue and 16 white foxskins, taken on the Pribilof Islands in the 1937-38 season, were sold at public auction in the fiscal year 1939. The blue foxskins brought \$16,452.50 and the white skins brought \$216, a total gross sum of \$16,668.50.

FUR-SEAL SKINS TAKEN BY NATIVES

The North Pacific Sealing Convention of July 7, 1911, provides that aborigines dwelling along the Pacific coast may take fur seals under restricted conditions. In 1938 Indians under the jurisdiction of the United States took 184 sealskins and Canadian Indians took 1,367 sealskins, which were duly authenticated by Government officials of the two countries.

FUR-SEAL PATROL

Vessels of the Coast Guard were again assigned by the Secretary of the Treasury to patrol waters of the North Pacific and Bering Sea for the protection of the fur seals and sea otters. One vessel of the Bureau of Fisheries also participated in the fur-seal patrol during the northward migration of the herd.

PROTECTION OF SEA OTTERS, WALRUSES, AND SEA LIONS

New regulations for the protection of walruses and sea lions were issued on June 29, 1939, extending the closed season on these animals until June 30, 1941, while continuing permission for their capture under certain specified conditions. The killing of sea otters is prohibited at all times.

PROPAGATION AND DISTRIBUTION OF FOOD AND GAME FISHES

The preliminary records of production for the hatcheries operated by the Division of Fish Culture show an output of 8,094,000,000 eggs, fry, and larger fish. With the 1938 production amounting to slightly over 8,121,000,000 it is evident that there was little variation in the scope and magnitude of the activities. Forty-six species were handled at the hatcheries and in the rescue fields. Among the individual species an increase was recorded for 16. As usual the greatest increase was shown with the commercial or semicommercial species. The Bureau initiated the propagation of Kentucky bass, which had not previously been handled at its hatcheries. No glut herring, carp, or humped-back salmon were handled at the hatcheries during the fiscal year 1939. The conduct of repair and improvement work rendered some of the fish-cultural facilities inoperative during the season with consequent curtailment of production of fish. The output of brook-trout eggs was unusually low because of the fact that a disease epidemic at the York Pond, N. H., station, the principal point of production for this species, necessitated a complete elimination of all stock on hand and reduced the distribution to negligible proportions. The production of fingerlings and large fish was 84,459,000, which presents a sharp drop in comparison with the previous year when 119,000,000 were handled. This, however, does not indicate any limitation upon the hatcheries' activities but is rather a reflection of the virtual cessation of rescue and salvage work in the Upper Missis-

issippi River Wild Life and Fish Refuge, from which source the fingerlings of warm-water species have heretofore been obtained in large numbers. The number of unfilled applications for game species as submitted by private individuals and conservation organizations was, at the close of the year, as low as at any time within recent years.

PROPAGATION OF COMMERCIAL SPECIES

The three hatcheries in New England propagating commercial species of the inshore waters were operated with increased intensity with the result that there was a noticeable increase in the production of cod, haddock, and flatfish. Pollock were produced in reduced quantities and the output of lobster fry was approximately 50 percent of the previous year's record. However, by virtue of new experimental methods the young lobsters were reared to larger size before releasing, as a means of producing greater survival. Over 5½ billion of the above-mentioned species were distributed as fertilized eggs on the spawning grounds. This is a byproduct recovery, since these eggs would otherwise be completely wasted in the marketing of the fish taken by the commercial fishermen. Propagation of mackerel was again resumed at the Woods Hole, Mass., station with an output of 11,000,000 fry. An outstanding development was the establishment by the Maine Department of Sea and Shore Fisheries of a large modern lobster-rearing unit on the grounds of the Federal hatchery at Boothbay Harbor, Maine. This establishment is operated by the State on a cooperative basis with the Bureau. There is assurance that this project will be of great significance in the future in conserving and building up the supply of lobsters, the mainstay of the inshore fisheries of the State.

Pacific salmon.—There was a worthwhile increase in the production of chinook salmon. This species is handled in two fields, the Columbia River and the Sacramento River, and the distribution was materially increased in both areas. This is especially gratifying in view of the fact that both runs have been threatened by the construction of large dams, and the 1939 figures for hatchery production indicate that there will be a satisfactory stock of salmon upon which to base future propagation activities which will serve to nullify the detrimental influences of dams. Absence of humped-back salmon in the records is merely a result of the so-called "off year" for this species. Sockeye salmon are handled in the Puget Sound area and at Quinalt, Wash. At the latter point the production is deliberately curtailed so as to permit the rearing of all of the fry produced to a larger size before distribution. The salmon hatcheries also included the propagation of steelhead trout, a preeminent game fish, within the scope of their work but failed to obtain a production equal to that of the previous year.

Anadromous species, Atlantic coast.—The second year of an intensive program of rehabilitation of the shad has shown an increase in the hatchery production of this species. Over 34 million fry were planted, in comparison with 26 million in 1938. No new propagating stations were operated and the increase is a direct result of larger runs and more intensive hatchery utilization of the potential egg supply. The shad stations on the Potomac River and at Edenton, N. C., also propagated other indigenous species, including the white

perch, yellow perch, and striped bass. These are handled somewhat as a side line since they are propagated during the inactive season for shad. The output of 1,797,000 striped bass fry in North Carolina represents a material increase and is in line with an effort to build up this valuable species.

Commercial species, interior waters.—Inasmuch as the supply of buffalofish and carp appears adequate for economic needs the hatchery production of these forms was curtailed and no carp whatever were distributed. Several of the States in the Great Lakes area are opposed to any promiscuous propagation or distribution of carp and the Bureau has coordinated its work accordingly. As a consequence the present contribution to the commercial fisheries of the interior section was the propagation of whitefish, lake herring, and lake trout carried on at Put-in-Bay, Ohio; Duluth, Minn.; and Cape Vincent, N. Y. Production of pike perch at Put-in-Bay was brought up to 334,000,000, a noticeable increase over 1938. The aggregate production of whitefish at the Bureau's stations amounted to approximately 33,000,000, somewhat lower than the previous year. Lake trout production at a level of slightly over 2,000,000 reflects the difficulty of securing eggs of this species. A new policy was adopted in connection with the propagation of the lake trout, however, by the reopening of the Bureau's hatchery at Charlevoix, Mich., for the purpose of rearing the fish to the fingerling size before release. Several hundred thousand lake-trout fry were supplied by the Michigan Conservation Department and were being fed at the Charlevoix hatchery at the close of the year. The activities at the Put-in-Bay, Ohio, station were conducted jointly with the State of Ohio, as has been the case for several years. It is felt that the State is in a position to take full responsibility for this work and at the close of the year negotiations were under way whereby the hatchery property might be turned over to the State.

Game species.—Again the collection of black-spotted trout eggs at Yellowstone Park was materially increased, the collection of eggs approaching 40,000,000. There was a moderate drop in the production of the other species of game trout, and a noticeable increase in the production of largemouth and smallmouth bass, the distribution amounting to over 14,000,000. Of this total, approximately 9,000,000 represented the fingerling and larger sizes which are so eagerly sought for restocking the tremendous area in which these two species thrive. The yield of the lesser warm-water species, including the sunfish, crappie, rock bass, warmouth bass, catfish, etc., was greatly below the levels maintained previously. However, as indicated elsewhere, this is of little significance as far as stocking is concerned because of the fact that the millions released in previous years were largely replanted directly in the Mississippi River in the area where they were salvaged. There was a continuation of the program for acquiring more distribution trucks, and the handling of fish applications was systemized and organized so as to coordinate the planting with the corresponding activities of the States. More and more of the game fish from Federal hatcheries are being utilized in stocking Federal lands, particularly in national forests, reclamation reserves, Indian reservations, and tracts which have been acquired in the land-utilization program.

The Bureau again made an allotment of rainbow trout eggs to Puerto Rico in continuation of the program for developing trout fishing in that Territory.

RESCUE OPERATIONS

The virtual completion of the 9-foot channel in the upper Mississippi River brought to a practical close the practice of salvaging fish in the overflowed areas and sloughs, which development has been predicted by the Bureau. There were handled in this activity only 2,800 fish of all species in comparison with the 40 to 50 million which were seined and returned to the river in the past. The Bureau, however, has proceeded with the construction of propagating ponds in the Refuge, particularly at Genoa, Wis., and Guttenberg, Iowa. The yield of game fish, especially bass, from these ponds has been most surprising and there is ample evidence of a continuing supply of bass and sunfish if the program of construction can be continued.

FISHERY INDUSTRIES

ECONOMIC AND MARKETING INVESTIGATIONS

Surplus fish situation.—The holdings of frozen, cured, and canned fishery products in the United States in the spring of 1939 amounted to about 172,000,000 pounds, according to a study of the surplus fish situation. This represents about 5,600,000 pounds more than normal holdings.

Survey of retail marketing of fish and shellfish.—The field work of a survey of retail marketing of fish in about 50 representative cities east of the Mississippi River was completed late in the fiscal year 1939. The results of the survey will be tabulated and analyzed to determine the factors which lead to the most favorable response from the public and to establish criteria which may guide retailers toward those practices which are most successful or promising.

Commercial fisheries of the world.—On the basis of the most recent available data, the world's annual commercial catch of fishery commodities amounts to about 33,600,000,000 pounds, valued at approximately \$740,000,000. The United States, including Alaska, ranks first in the value of annual yield and is exceeded only by Japan in volume.

Cod fisheries off the east coast of North America.—In 1935, which is the most recent year for which complete statistics are available, the catch of cod off the east coast of North America by Canadian United States, French, and Portuguese fishermen, amounted to 1,109,000,000 pounds, as compared with an average annual catch of 1,108,000,000 pounds for the 10-year period from 1926 to 1935, inclusive, and 1,169,000,000 pounds for the preceding 10-year period. The most important country in the volume of its catch of cod in this area is Newfoundland, which took an annual average of 495,000,000 pounds during the period from 1931 to 1935. Following in order of the importance of their annual catches were Canada, France, the United States, and Portugal.

Cooperative marketing.—During 1938 work was continued on the collection of data relating to fishermen's cooperatives and other fishermen's organizations in this country and abroad. Appeals for aid

in organization of cooperatives have been received from many sections of the country and such assistance has been rendered as has been possible with the limited staff and funds available for this work. Arrangements have been completed to enlist the aid of statistical and marketing agents of the Bureau, who visit virtually all the fishing areas of the United States each year, to assist in keeping the Bureau's data on fishermen's organizations current.

STATISTICAL INVESTIGATIONS

FISHERIES OF THE UNITED STATES, CALENDAR YEAR 1937

New England States.—The commercial fisheries of Maine, New Hampshire, Massachusetts, Rhode Island, and Connecticut in 1937 gave employment to 19,624 fishermen who took 670,864,000 pounds of fishery products, valued at \$19,937,000. This is an increase of 2 percent in volume and 11 percent in value as compared with 1935 when the most recent previous survey of the total catch was made. Landings by United States fishing vessels at Boston and Gloucester, Mass., and Portland, Maine, in 1937, amounted to 387,960,000 pounds, valued at \$9,790,000—a decrease of 6 percent in volume and 12 percent in value as compared with 1936.

Middle Atlantic States.—During 1937 the commercial fisheries of New York, New Jersey, Pennsylvania, and Delaware gave employment to 7,720 fishermen. Their catch amounted to 264,652,000 pounds, valued at \$7,896,000—a decrease of 5 percent in volume but an increase of 23 percent in value as compared with the catch in 1935 when the preceding complete survey of the catch was made. A survey of the Hudson River shad fishery for 1937 showed that 613 fishermen took 2,732,000 pounds of shad, valued at \$213,000—an increase of 11 percent in volume and 25 percent in value as compared with the catch in the previous year.

Chesapeake Bay States.—In 1937 the commercial fisheries of Maryland and Virginia employed 16,529 fishermen. Their catch amounted to 292,244,000 pounds, valued at \$6,361,000—a decrease of 7 percent in volume and 2 percent in value as compared with the previous year.

South Atlantic and Gulf States.—The commercial fisheries of North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, and Texas gave employment to 30,244 fishermen in 1937. Their catch amounted to 546,751,000 pounds, valued at \$14,226,000—a decrease of 2 percent in volume but an increase of 5 percent in value as compared with the previous year.

Pacific Coast States.—During 1937 the commercial fisheries of Washington, Oregon, and California gave employment to 21,555 fishermen, whose catch amounted to 1,576,877,000 pounds, valued at \$28,776,000. This is a decrease of 18 percent in the volume but an increase of 16 percent in the value of the catch as compared with the previous year. The total catch of halibut by United States and Canadian vessels in 1937 amounted to 48,659,000 pounds, valued at \$3,828,000—an increase of 1 percent in volume and 6 percent in value as compared with the catch in the preceding year.

Lake States.—In 1937 the commercial fisheries of the United States and Canada, in the Great Lakes and international lakes of northern Minnesota (Lakes Ontario, Erie, Huron, Michigan, and Superior,

Namakan and Rainy Lakes, and Lake of the Woods), yielded 116,064,000 pounds of fishery products. Of this amount, United States fishermen took 83,958,000 pounds, valued at \$6,033,000—a decrease of 11 percent in volume and 6 percent in value as compared with the catch in the previous year. The Lakes fisheries of the United States gave employment to 6,418 fishermen in 1937.

Mississippi River and tributaries.—Complete data on the fisheries of the Mississippi River and its tributaries were not obtained for 1937. The catch of Lakes Pepin and Keokuk and the Mississippi River between the two lakes in 1937 amounted to 5,585,000 pounds, valued at \$226,000—a decrease of 32 percent in volume and 40 percent in value as compared with the catch in these waters during 1936.

MANUFACTURED PRODUCTS OF THE UNITED STATES AND ALASKA, CALENDAR YEAR 1937

Fresh and frozen packaged fishery products.—In 1937 the domestic production of fresh and frozen packaged fishery products amounted to 201,803,000 pounds, valued at \$27,678,000. Important commodities in this group were fresh-shucked oysters, 6,644,000 gallons, valued at \$9,081,000; packaged haddock, 30,187,000 pounds, valued at \$4,162,000; and fresh-cooked crab meat, 8,300,000 pounds, valued at \$2,822,000.

Frozen products.—The production of frozen fishery products in 1937 amounted to 168,224,000 pounds, estimated to be valued at \$14,600,000. The volume of the production was 6 percent less than in 1936. The principal items frozen were groundfish, whiting, salmon, halibut, and rosefish.

Cured products.—The production of cured fishery products, based on surveys for 1937 in all sections except the Mississippi River, and for 1931 in that area, amounted to 104,339,000 pounds, valued at \$15,636,000. Important products in this group were smoked and kippered salmon, 12,173,000 pounds, valued at \$3,515,000; salted cod, 19,857,000 pounds, valued at \$2,379,000; and mild-cured salmon, 9,615,000 pounds, valued at \$1,863,000.

Canned fishery products.—In 1937 the production of canned fishery products amounted to 742,197,000 pounds, valued at \$105,175,000—a decrease of 7 percent in volume but an increase of 11 percent in value, as compared with 1936. Canned salmon was the most important item, accounting for 362,642,000 pounds, valued at \$52,924,000. Other leading canned fishery products were tuna and tunalike fishes, sardines, shrimp, mackerel, clam products, and oysters.

Byproducts.—The production of fishery byproducts in 1937 was valued at \$36,804,000—an increase of 17 percent as compared with the previous year. The principal products in this group were marine-animal oils and meals and aquatic shell products.

FISHERY MARKET NEWS SERVICE

The past year has been one of intensive activity in the development of the Fishery Market News Service and in the opening of new offices. Field offices for the daily collection and dissemination of fishery market news are now operating in New York, N. Y.; Boston, Mass.; Chicago, Ill.; Seattle, Wash.; and Jacksonville, Fla. In addition to these offices for the preparation and dissemination of daily reports,

the service also operates numerous news-reporting activities in important fish-producing areas along our coasts. These reporting activities make possible the inclusion of a much wider coverage of news in the daily reports of our field offices than would otherwise be possible. Periodic market news reports also are prepared and disseminated from the Washington office. These include summarized data made available through the daily and monthly reports of the field offices as well as articles relating to the commercial fisheries and other related information.

TECHNOLOGICAL INVESTIGATIONS

Preservation of fishery products for food.—During 1938 projects in this field included studies of rancidity in fish, of lactic acid as a possible index of decomposition in frozen fish, of identification of canned salmon, of changes in the composition of pink salmon, of the composition of commercial species of fish taken on the Pacific coast, and the canning of aquatic products.

Of particular interest has been the work on lactic acid as a possible index of decomposition in frozen fish. It is known that lactic acid rises to a maximum content in fish muscle during the rigor of death. It has also been shown that the alkaline reaction of fish muscle and the accompanying onset of spoilage of the fish follows after the loss of muscular rigor. Since spoilage occurs after the lactic acid content of the fish muscle reaches a maximum, the determination of lactic acid in fish flesh before and during a period of cold storage is of value in obtaining direct knowledge of the processes of decomposition of fish.

Information has been obtained regarding the changes in the chemical composition of pink salmon accompanying the pronounced physical change during their spawning migration and while in the commercial fishery. Additional data have been collected in connection with the development of a means for identifying the various species of salmon after canning. A survey has been undertaken to determine the chemical composition of the principal food fish of the Pacific coast, and the wastage occurring during their preparation for market. Studies were continued to determine the effectiveness of certain natural antioxidants in preventing rancidity in preserved fishery products and an attempt is being made to develop a simple and accurate method for measuring oxidative deterioration in fatty fish.

Bacteriological studies.—During the past year important bacteriological problems were studies of ultraviolet rays in killing bacteria, studies in the handling of fresh oysters, and studies of methods of preparing crab meat.

The studies in the handling of fresh oysters revealed that there is a definite relation between the pH in oysters and the bacterial count. The experiments showed that the bacterial flora changes with the acidity of the oysters and the bacterial count rises as a result of the increased acidity of the oysters. It was further discovered that excessive washing of oysters with fresh water caused a loss of mineral content.

At the request of several members of the crab-meat industry, the Bureau assigned a chemist and a bacteriologist to investigate possible measures designed to improve the quality of their product. This investigation included a survey of the crab-meat packing plants with

a view to making recommendations as to improved methods of handling and packing for shipment which would assure the public a higher quality product. Tentative recommendations were made to the crab-meat packers pending the issuance of a completed report.

Pharmacological studies.—As indicated in previous years, the role of minerals in nutrition has become increasingly important. Fishery products are considered to be an excellent source of minerals in quantity and variety, and a better understanding of the physiological effects of these minerals on the animal organism is necessary. During 1938 the Bureau's technologists completed a study of the chemical and pharmacological aspects of fluorine in fishery products. No toxic symptoms were observed when the fluorine in the diet came from salmon or mackerel.

Nutritive value of fishery products.—During 1938 investigations in this field included a study of the chemical composition and nutritive value of fish proteins, the vitamin content of fishery products, a study of sodium alginate (produced from sea kelp) as a stabilizer in products of the dairy industry, and a cooperative study of kelp meal in animal feeding at the dairy department of the University of Maryland and of the Maryland State Agricultural Experiment Station, College Park, Md.

The studies of the mineral constituents of fishery products showed that fish filets are about equal to the muscle cuts of beef in mineral content, except that the fish greatly exceeds the meat in iodine content; that canned salmon contains about 15 times as much calcium, almost twice as much phosphorus, 20 times as much iodine, and approximately equal quantities of other minerals as beef round; and that oysters, shrimp, and crab meat contain approximately half as much calcium, more than 5 times as much magnesium, and more phosphorus than an equal quantity of milk. In addition, these shellfish are a particularly good source of iron, copper, and iodine.

The results of the studies on the chemical composition and nutritive value of fish proteins showed that, by using an arbitrary factor of 100, the proteins of the following fish and shellfish fell into the following groups according to relative growth-promoting value, as compared to beef at a factor of 63: Oysters, 100; pilchard, red snapper, shrimp, and Boston mackerel, 90; and shad, cod, croaker, and silver salmon, 80.

The results of the studies on sodium alginate showed that this product is an excellent mechanical stabilizer for use in food products, due to its chemical and physical properties and high viscosity value.

Preservation of fishery byproducts.—During the year data have been obtained regarding specific problems of salmon cannery waste utilization. These include investigation of the suitability of small-unit operations for canneries whose outputs are too small to warrant installation of standard fish-meal equipment, the preparation of edible salmon oils, the preparation of dehydrated protein and vitamin concentrates, and in the case of large canneries having short operating seasons, the chemical preservation of waste for subsequent reduction and the conversion of waste into new types of products as a result of chemical treatment. A survey was undertaken to determine the potential vitamin value of the livers and viscera of the principal food fish taken commercially on the Pacific coast. In cooperation with the Division of Fish Culture and the University of Washington

School of Fisheries, information was obtained which helps to clarify the steps in preparation responsible for improving the nutritional properties of fish meal for fish feeding and which suggest less costly processes of manufacture. Also, studies were made which indicate the possibility of materially reducing the danger of spontaneous heating of fish meal, a difficulty which now causes the industry great inconvenience and considerable financial loss.

BIOLOGICAL FISHERY INVESTIGATIONS

INVESTIGATIONS OF COMMERCIAL FISHES

North Atlantic fishery investigations.—In the offshore fisheries of New England, analysis of extensive data collected during the course of the haddock investigation has thrown considerable light on the changes in the abundance of this species and has suggested a plan for the stabilization of yield. Years of poor survival are either years in which large haddock are especially abundant, offering serious competition for food, or years when the stock of adults has been so reduced as to furnish insufficient spawners. The most favorable level was approximately that which prevailed in 1922 to 1924, 1929, and 1936. The course of the natural cycles of abundance may be seriously interfered with if a period of intensive fishing happens to coincide with a period of poor survival of the young. The recent marked decline in the abundance of haddock, which has been evident both on Georges and the Nova Scotian Banks has been shown to be the result of such a combination of circumstances. It is indicated, therefore, that by holding the population at the optimum level by regulation of the fishing intensity, it would be possible to sustain the yield at a productive level.

Data collected during the year on the age composition of the catch revealed an increasing dependence on the young or "scrod" haddock, a trend which is regarded as prejudicial to the interests of the fishery, inasmuch as these fish are growing rapidly and would be of considerably greater value if allowed at least 1 more year's growth.

The catch records and biological data collected during the 1937 mackerel season, a year of extremely low production, were subjected to analysis during the year. The composition of the mackerel population differed markedly from previous years in that no year class or classes dominated the fishery. With the exception of the 1932 class, year classes following 1929 were present in better than 5 percent strength each. Inasmuch as a study of lightship temperature records revealed that water temperatures in the western part of the Gulf of Maine ran higher than the average for the previous 10 years, it is suspected that hydrographic conditions affected the distribution of mackerel and were an important factor in the low catch.

The catch for the 1938 season was almost double that of 1937, but the early season landings for 1939 sank to a lower level than those for the corresponding period of 1937. Biological data show that the mackerel spawned in 1937, a group that was expected to contribute much to the fishery, as 2-year-old fish were virtually unrepresented in 1939. Because pound-net fishermen inshore were reported to be making good catches, an investigation of the relation between the catch by seiners offshore and that of the pound nets was begun early in the 1939 sea-

son to determine to what extent changes in the offshore catch may represent merely changes in the distribution of mackerel.

During the fiscal year 1938 a study was undertaken to determine whether a decline in abundance of flounders is in progress in the North Atlantic area. In order to interpret fluctuations in abundance, it was necessary to develop techniques for determining age and growth, the existence of separate races within the population, and the extent of migrations.

Owing to the increased utilization of redfish, flounders, and other species of groundfish in addition to haddock, an investigation of the abundance of such fishes was begun during 1938. The central problem is to assess total catch, fishing effort, and abundance in order to determine for each species whether it has already reached the point where an increase in yield will give a larger production only with detriment to future supplies.

As a result of cooperation between the Bureau of Fisheries and the State of Maine, an investigation to test new methods of rearing lobsters, to determine the relative effectiveness of artificial and natural propagation, and to ascertain the condition of the lobster fishery on the coast of Maine has been added to other scientific fishery investigations being conducted in the New England area. The State has constructed a lobster-rearing plant adjacent to the Bureau hatchery at Boothbay Harbor, with facilities for carrying on experimental work, and has assigned funds for the employment of a biologist. Experiments with larval lobsters and tagging of adults were begun during the spring of 1939.

Middle and South Atlantic fishery investigations.—At the request of the New York State Conservation Department, the Bureau participated in a biological survey of the marine fisheries of Long Island, acting principally in an advisory capacity. The survey was undertaken to provide a basis for improving or maintaining good fishing wherever the supply is controllable and to determine by a census of fishing activities the recreational and commercial value of the marine district of Long Island. Definite recommendations for the conservation of several species and for additional study have been included in a report to be published by the State.

Evidence continued to accumulate which indicated an inadequate spawning escapement as the principal cause of the decline in abundance of shad along the Atlantic coast. Much of the field work of this investigation has been directed toward comparison of the spawning escapement in the Hudson, where complete recovery of abundance has occurred, with the escapement in other rivers which are still severely depleted. The principal methods of study are tagging experiments, designed to estimate fishing intensity from the percentage of tags recovered, and studies of scales intended to estimate the percentage escapement from the percentage of scales bearing spawning marks.

Prior to recommending measures to insure an adequate number of spawners in the various coastal rivers, it was necessary to determine whether shad return to spawn in their native rivers or whether, as many fishermen believe, there are extensive migrations. A direct attack on this problem has been made by tagging. Results of tagging experiments in North Carolina, the Chesapeake Bay, and the

Hudson indicate that the great majority of shad return to the same river year after year. Additional data on this point are being gathered by extensive analysis of the racial characteristics of shad from the different rivers.

Because of the importance of reproduction in shad conservation a careful ecological study of the early life history is being made in southern rivers. In 1938 intensive work was done in the Edisto and in 1939 these studies were extended to other rivers.

Shrimp investigations.—Studies of the shrimp fishery consisted of several cruises to assess available supplies in the offshore waters of the Gulf of Mexico, a continuation of tagging experiments to determine the seasonal migrations of shrimp along both the Atlantic and Gulf coasts, and ecological studies of the relationship between environmental changes and the distribution of shrimp along the Texas coast.

As a result of a cruise of the *Pelican* along the Louisiana and Texas coasts in January and February, the presence of shrimp off the Louisiana coast in concentrations sufficient to warrant commercial exploitation was confirmed. No large concentrations of commercial shrimp were found off the Texas coast. In a later cruise a similar lack of commercial shrimp was observed off the coasts of Alabama and Florida between Mobile Bay and Apalachee Bay.

Tagging of shrimp on the Atlantic coast from Cape Canaveral to St. Augustine, where the bulk of the South Atlantic coastal shrimp congregate for the winter, gave evidence of a return movement at least as far as 250 miles northward. Other tagging experiments indicated that the small shrimp do not engage in coastwise migrations as extensively as do the larger sizes.

In cooperation with the Texas Game, Fish, and Oyster Commission, a program of hydrographic surveys and experimental trawling was instituted in Aransas Bay to determine the extent to which hydrographic factors may control the distribution of shrimp and day-to-day fluctuations in the catch.

North Pacific and Alaska fishery investigations.—Commercial fishery investigations in northern Pacific waters form the basis of recommendations for the management and conservation of the salmon runs in the rivers of the Northwestern Coastal States. They are also concerned with maintaining at a productive level the salmon and herring fisheries of Alaska, over which the Federal Government has regulatory power.

The activities of the Columbia River staff have centered about the problem created by the erection of Grand Coulee Dam, blocking that portion of the Columbia River salmon run that normally spawns in tributaries of the upper Columbia. Salvage operations were begun in 1939. The runs are being trapped at Rock Island Dam, 150 miles downstream, and transferred in specially constructed trucks to tributaries between Rock Island and Grand Coulee Dams. It is hoped that the fish will spawn in these tributaries, and that their progeny will later return to them. If the plan yields the anticipated results, the entire run of upper Columbia fish will be transferred to tributaries below Grand Coulee within a period of 5 years, or the life cycle of a salmon.

At the beginning of the fiscal year 1939 Congress made funds available to the Bureau of Fisheries for a large-scale study of the factors that control the salmon populations of Bristol Bay in order that a sound and comprehensive system of management might be applied. With the cooperation of the Coast Guard, extensive hydrographic observations were conducted in the summers of 1938 and 1939. Biological observations were made also to discover the schooling habits of the fish far offshore, the abundance and distribution of food animals, and the migratory habits of the salmon in approaching the coast from these offshore feeding grounds. Correlated with these oceanographic studies, investigations of the life cycle of the salmon in the five major watersheds of this area are under way. These include detailed population studies of the spawning runs, surveys of spawning grounds, and measurement of the mortality of the young in fresh water. This investigation is planned to cover a 5-year period, or the normal life cycle of the red salmon.

Studies of the returns to be expected from any given escapements of spawning salmon were continued in the Karluk watershed. Further evidence was secured that variations in the ratio of returns to escapement are mainly due to conditions existing in the fresh-water environment. To determine the role of the predatory Dolly Varden trout in reducing the number of young red salmon, the migratory habits and biological characteristics of the populations of trout have been investigated through the tagging of large numbers of these fish.

In areas where the migration routes of salmon pass through commercial fishing areas to a number of different streams, the 50-percent escapement required by law cannot be assured unless the exact routes of the salmon and their distribution on the spawning grounds are determined. Tagging experiments were conducted during the 1938 and 1939 seasons to trace the migration routes of pink salmon passing through Lower Chatham Strait. The two experiments will provide information covering the routes of migration of both the odd- and even-year pink salmon runs.

The usual population studies to determine the size of the pink-salmon runs and the proportion of males and females were conducted at Little Port Walter. The construction of a permanent dam and counting weir, which was in operation during the 1939 season, now permits an accurate count of seaward-migrating young as well as upstream migrants, so that the returns from a known number of spawners may be determined with greater accuracy than heretofore. Changes in the time of appearance of the pink salmon runs are being closely analyzed so that any necessary curtailment of the fishery may be effected in time to allow an adequate escapement to the spawning grounds.

As an aid to rebuilding the runs of coho salmon in Puget Sound, studies have been carried on over a period of years to determine the age at which hatchery-reared fry may be released most advantageously. A series of marking experiments for this purpose was concluded in 1938. Biological studies of the size and age composition of the population were made by taking samples of the commercial catch and of the fish on the spawning grounds.

Studies of the age composition of the herring population of southeastern Alaska were responsible for demonstrating that this stock

has declined to a dangerously low level and that curtailment of fishing is necessary. The decline has been caused by the virtual failure of three successive broods, those of 1932, 1933, and 1934, combined with excessive fishing. Closure of the Cape Ommaney area was recommended until the population shows definite signs of recovery. The fishery of the Prince William Sound and Kodiak areas continued at a high level of abundance, but since considerable expansion is contemplated, a close watch must be maintained to avoid over-exploitation.

Collection, tabulation, and analysis of the daily catch records from the various types of fishing gear operated by the salmon fishing industry in Alaska have been continued. Indexes of abundance derived from these data are an important basis of recommendations for changes in the fishing regulations.

Pilchard investigations.—Although biologists of the Pacific Coast States have already collected a considerable body of information bearing on the migrations, spawning, and age and growth of the pilchard, the basic problem remaining for solution is the determination of the optimum level of catch below which the stock would go to waste through underutilization, above which it would become reduced to commercial unimportance through overexploitation. To provide a basis for determining this level, the staff conducted studies dealing with the determination of abundance, age, and reproductive success, and with the importance of intermigration.

The use of aerial observers in gaging abundance was tested but rejected as unsatisfactory. Changes in relative abundance are therefore being determined by statistical analysis of the commercial catch records over a period of years.

To discover how much the stock is reduced by fishing it is necessary to determine the ages of the fish making up the population each year, thus learning the relative abundance of the individual broods of previous years and how fast they are removed by fishing and by natural mortality. Age determination is being attempted by interpreting marks in scales and otoliths, by observing the growth of young pilchards, and by identifying modes in frequency distributions of the adult population.

During the spring of 1939 several cruises were made in the spawning and nursery grounds, quantitative samples of the young pilchards being taken. These cruises were made possible by the cooperation of the Scripps Institution of Oceanography, which furnished the vessel *E. W. Scripps*. When the surveys are completed, it is hoped that light may be thrown on the distribution and abundance of eggs and young, as well as on the effect of oceanic conditions on the success of spawning.

To determine whether the pilchard stock in northern waters is self-perpetuating or is maintained by migrations from other areas, techniques are being developed for appraising the contributions from various spawning areas through study of the sculpturing on the scales. If the method proves valid, it will aid in determining how much fishing in specific areas affects the stock in other areas.

Great Lakes fishery investigations.—A state of critical depletion continues to exist among the more valuable commercial species of the Great Lakes. The extent of this depletion is apparent from

comparisons of present-day production of certain species with yields of earlier years. In Lake Michigan, for example, production of wall-eyed pike, lake herring, lake trout, whitefish, and yellow perch varies from 43 to 62 percent of normal. Production of Lake Superior whitefish is only 10 percent of normal. In Lake Huron production of perch and chubs is 44 and 36 percent, respectively, of normal. In Lake Erie production of nearly all important commercial species is on the decline, and total production of Lake Ontario is only 10 percent of normal.

Members of the Great Lakes staff cooperated actively with State and Federal officials and with sport and commercial fishermen, participating in an advisory capacity in 19 meetings and conferences in which Great Lakes fisheries problems were under consideration and assisting State conservation officials in the drafting of fisheries regulations.

At the request of the Office of Indian Affairs of the Department of the Interior, a survey was made of the fisheries of Upper and Lower Red Lakes in Minnesota to settle various controversies concerning the regulation of the commercial gill-net fishery. Recommendations for the management of the fishery are being submitted.

The report of the International Fact-Finding Commission on Lake Champlain was largely completed. The report will contain a discussion of the fisheries controversies, a tabulation and analysis of all available information concerning commercial fishing and angling, descriptions of the natural history of the various species, a critical historical review of the artificial propagation of wall-eyed pike and yellow perch, and recommendations for the regulation of the commercial and sport fisheries of the lake.

Age and growth studies of the whitefish of Lake Huron and Lake Champlain were completed for publication, and life-history studies of the yellow perch were continued.

AQUICULTURAL INVESTIGATIONS

The work of the aquicultural investigations continued along three principal lines: The development of means to obtain the maximum production of food and game fishes consistent with environmental conditions, the improvement of methods of artificially propagating and rearing fish, and the control of fish parasites and diseases.

Investigations were conducted in trout waters to obtain definite information on the annual drain to which the trout population is subjected by anglers and the value of artificial stocking in maintaining a stable fish population. Such studies were conducted through the operation of test waters in Vermont; experimental stocking of streams in the Pisgah National Forest where fishing is closely supervised and an accurate check on returns may be obtained; and the operation of the Convict Creek experimental stream in California. These studies have demonstrated that in some situations natural propagation is superior to artificial in maintaining a stock of trout under adverse conditions and have emphasized the necessity of regulating planting operations in accordance with the amount of natural food present in the streams.

Feeding experiments with fingerling, yearling, and adult trout were carried out at the Leetown, W. Va., and Pittsford, Vt., stations to determine the effect on growth, mortality, and egg production of dry meals fed at different levels and in different combinations. One of the most striking results was the marked increase in growth following the addition of cod liver oil to a diet composed of sheep liver and whitefish meal. Experiments with brood fish showed considerable variation in the hatchability of eggs from fish on different diets.

During the year a regional biologist was appointed to resume fish management work in the Intermountain Region. In this area fishing intensity is increasing rapidly and many of the streams are unable to maintain a sufficient fish population to meet demands. In addition to overfishing, adverse changes in the streams and lakes are important factors in the general decline. Among such changes might be cited silting resulting from overgrazing, hydroelectric and irrigation projects that interfere with normal migrations, and fluctuations of water level in artificial lakes. Management plans have been worked out for several waters showing possibilities of early improvement of fishery resources.

The staff of the California trout investigations has been engaged in determining the number of salmon and the extent of spawning streams that will be blocked by the completion of the Shasta Dam on the Sacramento River. The estimates of the 1938 fall run combined with the counts of the 1939 spring run fish indicate that approximately 25,000 salmon a year will ultimately have to be handled in the salvage operations. Pending the completion of engineering surveys to determine the feasibility of certain alternative features of the plan, a tentative program has been drafted which calls for a combination of artificial propagation and provision of areas for natural spawning below the dam.

Field work in bass streams was designed to measure the extent and efficiency of natural propagation and the effect of intensive fishing on the bass population. An important result of these studies was the finding that even in heavily fished waters there is little danger of serious depletion of bass if adequate spawning facilities are available. However, intensive fishing frequently leaves excessive numbers of small bass, with consequent reduction in the abundance of forage fishes. It is apparent that the remedy is to build up the food supply and that stocking with young will only serve to intensify the unbalanced condition. Programs for the effective management of bass in ponds and lakes are being developed in Florida.

Facilities for the experimental study of fish diseases were greatly increased during the year with the enlargement of the field laboratory at the Quilcene, Wash., hatchery, and the provision of a second experimental laboratory through the cooperation of the University of Washington. Studies of various disinfectants used in the prevention and treatment of disease were continued to determine the maximum nontoxic concentrations that the fish could withstand. Studies of common bass parasites, believed to be an important factor in the mortality of the young, were carried on at Leetown, W. Va. The Disease Service continued to aid Federal, State, and private fish-culturists in the diagnosis of hatchery disease.

POLLUTION INVESTIGATIONS

Field and laboratory studies have been continued over a wide area of the country for the purpose of analyzing stream and hatchery waters from the standpoint of their suitability for various types of fishes and of determining the harmful actions of specific pollutants. Methods of determining the physiological condition of the fish themselves have been markedly improved.

Many of the findings of the past year are of considerable interest and importance. For example, it has been found that arsenicals and other materials commonly used as mosquito larvacides impair the growth and nutrition of fishes even though used in very small quantities, and may also build up serious hazards of lethal poisoning. It has also been demonstrated that small quantities of many substances, normally present or introduced into streams and lakes, may have a cumulative effect over a period of time that is even more detrimental to fish life than many more obvious pollutants. Certain minerals found in small quantities in various western streams and several inorganic salts that are common in southern and western waters exert this type of cumulative action.

Problems arising from the concentration of minerals and other compounds hazardous to fish and other aquatic life in impounded waters have been investigated at Elephant Butte Reservoir, N. Mex., and Lake Mead, Nev.

Acute pollution problems were investigated during the year in Florida, South Carolina, North Carolina, Minnesota, Idaho, Montana, Oregon, and Mississippi. Specific types of industrial pollution studied include that produced by paper mills, phosphate mines, and copper, lead, zinc, and placer gold mining operations.

CONSTRUCTION OF FISH-PROTECTIVE WORKS

A section on hydraulics has now been established under the supervision of the Division of Scientific Inquiry, with an experienced engineer for the design of fish-protection facilities. During the year the engineer assisted in designing and supervising the installation of fish screens being constructed with the aid of P. W. A. and W. P. A. funds on certain Federal power and irrigation projects in the Northwest. Important consulting services on screens and ladders were also afforded to other agencies.

SHELLFISH INVESTIGATIONS

Scientific investigations have been directed toward increasing the cultivation of oysters, improving the quality of oyster meat, and standardizing the raw and canned product.

In the Long Island Sound area, where the collection of a good crop of seed oysters is of paramount importance to the industry, regular bulletins were issued during both the 1938 and 1939 seasons advising oystermen when spawning and setting might be expected. To aid in protecting valuable beds from starfish, surveys of the distribution of this oyster enemy were made and the results communicated to oystermen, permitting more efficient eradication.

On the south Atlantic coast, although generally favorable conditions for growth are found, some beds are badly overcrowded. Experiments are being conducted to develop a method of protecting seed oysters from the attachment of larval oysters, barnacles, etc., so that they may be grown to marketable size as single individuals of good quality.

Experimental oyster beds have also been established in South Carolina to develop methods of cultivation suitable for small oyster farms, from 2 to 10 acres in extent, to be leased and operated by the tide-water residents. The program differs from previous experiments in presupposing that capital requirements will be at a minimum and that materials, equipment, and supplies will be obtained or produced by the labor of the oyster farmer himself.

At the Pensacola, Fla., laboratory an experimental oyster farm is being established to determine rates of growth and fattening, productivity annually per unit of bottom, and costs of production. The results will be compared with those of similar projects conducted on the Atlantic coast. A program of oyster planting and of rehabilitation of exhausted natural beds is also being conducted from this laboratory.

Investigations carried out at the Yorktown laboratory demonstrated that pollution of the river by pulp-mill wastes has brought the decline of the oyster fisheries. During the past year intensive chemical studies were carried on for the purpose of determining the particular chemical or chemicals in the pulp-mill effluents which are responsible for the altered physiology of oysters. An attempt will then be made to find a means of eliminating the harmful substances.

Studies of the physiology of the oyster carried out at Woods Hole, Mass., included investigations of the phenomenon of sex reversal in adult oysters, experiments on the time of survival of eggs and sperm, and a study of respiration in relation to the carbohydrate metabolism of the oyster and the accumulation of elements which are important food constituents of oyster meat.

LAW ENFORCEMENT DIVISION

The act of July 2, 1931, the Federal Black Bass Law regulating interstate commerce in black bass, is administered by this Division; also certain parts of the Whaling Treaty Act of May 1, 1936, giving effect to the various international treaties for the protection of whales. The Division also maintains an angler's service, and issues permits to take bait fish in the District of Columbia.

The Federal black bass law.—The personnel and methods of enforcement remain the same as last year. Owing to insufficient personnel, no particular effort has been made to carry on the work west of the Rocky Mountains, where salmon and trout predominate. Reports of illegal interstate shipments of black bass have been investigated, producing evidence of violations of both State and Federal laws. A number of these cases have been turned over to the States for prosecution in State courts, as such action generally produces quick and effective results. Two cases of illegal interstate shipments of black bass by trucks were successfully prosecuted during the year, a fine of \$100 and 1 day in the custody of the U. S. Marshal being

assessed in each case. The defendant in one of these cases remained in jail approximately 3 months previous to trial, being unable to furnish the required bond.

Improvements in State laws protecting black bass have been continued in accordance with the Bureau's recommendations for adequate protection. Thirty-nine States now prohibit the sale of black bass at all times, regardless of where taken, and all but four States provide a closed season on these game fish during at least a part of the spawning period. The States have cooperated 100 percent in carrying on this branch of the work. A summary of the game-fish laws for 1937-38, with special reference to black bass, was prepared and published, also several leaflets on subjects pertaining to angling.

Whaling.—The total number of licenses issued for taking whales was 15—covering 3 shore stations and 12 catcher or killer boats. The total revenue received for these licenses was \$4,750 which was covered into the United States Treasury.

The Division prepared, in accordance with the terms of the Whaling Convention of September 24, 1931, two statistical reports covering the number of whales captured, species, size, etc., and has made biological studies of the samples of stomach contents taken from whales captured by United States vessels. It has completed two biological reports which, together with the two statistical reports, were forwarded to the International Bureau of Whaling Statistics, Sandefjord, Norway, as required under the convention.

Angling.—Requests for information on how, when, and where to fish with rod and line have increased during the fiscal year. Thirty-nine permits, required by act of Congress, to take certain small bait fish in the District of Columbia were issued.

VESSELS

Fifteen vessels of the Alaska service cruised approximately 107,000 nautical miles in the fiscal year 1939, as compared with 117,000 miles in the previous year. The *Penguin* covered about 30,000 miles, the *Teal* 11,000 miles, and the *Crane* 9,000 miles. Owing to the accidental grounding of the *Brant* on Williams Reef on July 15, that vessel was out of commission during a considerable part of the season, and its total mileage in the fiscal year was only about 8,000 miles.

The *Penguin* made five round trips between Seattle and the Pribilof Islands, carrying personnel and emergency supplies. Interisland service also was performed, and native workmen from the Alaska Peninsula were transported to the Pribilofs to assist with sealing activities. Two trips were made to the western Aleutians in connection with sea-otter investigations and patrol.

The *Auklet*, *Kittiwake*, *Merganser*, *Murre*, and *Widgeon* were engaged in fishery protective work in southeast Alaska. The *Eider* operated in the Kodiak area, the *Ibis* at Chignik, the *Red Wing* in the Alaska Peninsula area, and the *Coot* on the Yukon River. The *Blue Wing* was on Prince William Sound and also assisted in the patrol of southeast Alaska.

The *Teal* operated on Cook Inlet, carried on the stream survey in the Prince William Sound area, and assisted in the stream survey and general patrol in southeast Alaska. The *Crane* transported per-

sonnel and supplies between Seattle and Bristol Bay and patrolled the Alaska Peninsula area. The *Scoter* was used on Bristol Bay and relieved the *Crane* in the Alaska Peninsula area for about 10 days.

The *Brant* was used in general supervisory work, chiefly in south-east Alaska, although a trip was made westward as far as Anchorage. In December this vessel transported employees of the Bureau between Seattle and points in southeast Alaska for the conduct of hearings on the Alaska fishery regulations. The *Brant* was based at Juneau for approximately 3 months at the beginning of the year to render service in connection with the biennial session of the Territorial Legislature.

The *Scoter* engaged in the fur-seal patrol in the vicinity of Neah Bay, Wash., in the spring of 1939.

The *Pelican* was engaged in exploratory trawling to determine the abundance and distribution of shrimp in the offshore waters of the Gulf of Mexico.

APPROPRIATIONS

Appropriations for the Bureau for the fiscal year aggregated \$2,220,200, as follows:

Salaries, Bureau of Fisheries.....	\$150, 000
Propagation of food fishes.....	962, 000
Construction of fish screens.....	20, 000
Maintenance of vessels.....	173, 000
Inquiry respecting food fishes.....	338, 000
Fishery industries.....	83, 600
Fishery market news service.....	70, 000
Alaska fisheries service.....	270, 000
Enforcement of Black Bass and Whaling Treaty Acts.....	17, 000
Mississippi Wild Life and Fish Refuge.....	17, 900
Fish cultural station.....	6, 500
Travel expense.....	112, 200
	<hr/>
	\$2, 220, 200

U. S. DEPARTMENT OF COMMERCE
HARRY L. HOPKINS, Secretary
BUREAU OF FISHERIES
CHARLES E. JACKSON, Acting Commissioner

Administrative Report No. 35

PROGRESS IN BIOLOGICAL INQUIRIES

1938

By ELMER HIGGINS

APPENDIX I TO REPORT OF COMMISSIONER OF FISHERIES
FOR THE FISCAL YEAR 1939



UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON : 1939

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.

PROGRESS IN BIOLOGICAL INQUIRIES, 1938¹

By ELMER HIGGINS, *Chief, Division of Scientific Inquiry*

[With the collaboration of investigators]

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¹ Administrative Report No. 35, Appendix I to Report of the U. S. Commissioner of Fisheries for 1939. Approved for publication June 1, 1939.

INTRODUCTION

The fundamental objectives and general characteristics of the research activities of the Division of Scientific Inquiry have been presented at considerable length in the previous annual reports of "Progress in Biological Inquiries" together with detailed reports of the individual research projects. The underlying philosophy of fishery conservation based on a continually growing body of scientific knowledge is now so well understood and the program of investigation under way during the past decade has justified itself so completely, both in its theoretical aspects and its practical applications, that it has acquired a momentum that in itself is a protection against irresponsible diversion of interest or activity into byways of local application or temporary value. A lengthy introduction to the major purposes of the various investigations reported in detail herein is therefore unnecessary.

Each of the recent years has seen the development of new projects of investigation that contribute to a well-rounded scientific program designed to afford still more complete answers to the original questions as to "what diminution in the fish supply of our coastal and inland waters has occurred, to what causes the same may be due, and what remedial measures may be adopted?" With the passing of the years new techniques of investigation have been developed or have been adapted from other fields of scientific endeavor. New concepts of the reactions of marine fish populations to commercial fishing have developed and new knowledge of the natural requirements of fish in inland waters and of means of their management for sustained yield has accumulated.

Time has also permitted the ripening and the fruition of a series of fishery investigations, always time-consuming, so that during the year a number of definitive reports have been completed which, it is hoped, will be published in the near future. At the same time, and coincident with economic recovery, additional appropriations during the past few years have permitted the undertaking of new projects, bringing to hitherto neglected fisheries the benefit of research and the examination of their abuses or deficiencies and paving the way for their ultimate rehabilitation and protection.

During 1938 a new project of considerable magnitude was undertaken by the Division—an investigation of the red-salmon fisheries of Bristol Bay, Alaska. One of the richest and most productive red-salmon fishing areas in the world, Bristol Bay, an arm of Bering Sea in western Alaska, receives endless replenishment from the spawning grounds of five major tributary river systems. The fishery there has developed over many years until it reached a reasonably stable maximum at the beginning of the past decade. Three years ago, however, the fishery was menaced by an exploration seeking to establish commercial fisheries on the high seas to intercept the run

of spawning fish en route to their native streams. The development of a commercial fishery in the offshore waters of Bristol Bay could only result in the disruption of the industry ashore, which takes its supply from coastal waters under strict regulation of the Federal Government, for adequate escapement of fish to the spawning grounds must be assured if the resource is to be maintained. The threat of developing an offshore fishery, therefore, was the occasion, if not the primary cause, of the undertaking of a comprehensive investigation of the Bristol Bay salmon, for the fundamental objective in such a study is to acquire sufficient knowledge of the natural history and the requirements of these fish and the factors that favor or hinder survival of each year's brood to permit a more certain and a more flexible control of the commercial fishery in the interest of wise management.

The investigation has been divided into two major phases—a study of the life of the salmon in fresh water, including the varying success of annual propagation and the factors that affect it and the natural requirements, habits, migrations, feeding conditions, and survival of the salmon during their life in the sea.

With the aid of the United States Coast Guard cutter *Redwing*, a program of hydrographic investigations in the offshore waters of Bristol Bay was undertaken to study the oceanic conditions that so profoundly affect the well-being of the salmon schools. During 1939 this program will be expanded to include experimental fishing to study the schooling of fish, their routes and times of migration, their relative mortality, and the probable effects of the commercial fishery upon the supply. Likewise, a more intensive study of the stream life of the salmon will be undertaken to determine the success or failure of spawning and the responsible factors, in the hope of perfecting a system of prediction of future yields that will simplify the economic exploitation of the fishery and facilitate governmental regulation.

A special fund of \$20,000, provided by the appropriation act for the fiscal year ending June 30, 1939, permitted the establishment of another new project of considerable importance. This fund is for the construction, operation, and maintenance of fish screens and ladders on Federal irrigation projects and the conduct of necessary investigations and surveys, preparation of designs, and supervision of construction. It also, for the first time, permits the Bureau to discharge its obligation to determine the requirements for fishways or other fish-protective devices which, under the terms of the Federal Water Power Act of 1924, the Secretary of Commerce is authorized to prescribe at dams constructed under licenses issued by the Federal Power Commission.

With this authority a Hydraulics Section was established, under the supervision of the Division of Scientific Inquiry, employing a competent biologist for the study of fishway requirements and an experienced engineer for the design of the fish-protection facilities. During the latter part of the year the engineer who was first employed not only assisted in the design of fish screens constructed with emergency funds in the Pacific Northwest States, but also redesigned a screen in the Pishkun Reservoir, Montana, which had proved inef-

fective. Important consulting services on screens and ladders were also afforded to other agencies.

This illustrates a recent trend toward the development of service activities as a part of the regular work of this Division. In recent years there has been a rapidly growing number of requests from the State fish and game commissions, fish and game clubs, and other organizations for technical services and advice in connection with stream surveys, stream improvement, pollution surveys, examination of the quality of water in hatcheries or rearing ponds, development of fishing lakes and reservoirs and the screening of their outlets, discovery of the causes of mortality of fish in lakes, ponds, and streams, the treatment of fish diseases in hatcheries, and the like in amazing variety.

It is clearly recognized that satisfying these demands is a valuable function which the Bureau of Fisheries should render to the taxpayers—services that, because of their technical character, can only be furnished by scientifically trained personnel. There is a serious question, however, to what extent the funds appropriated for investigation in a field which so urgently needs the development of fundamental scientific principles should be applied to routine activities which, while locally useful, contribute little to fishery science. Obviously a balance between original research and these practical services should be maintained, for the requests for service are so numerous that if an attempt is made to satisfy them all the major program of scientific investigation would be handicapped.

It is not suggested that the Hydraulics Section will not make important contributions to the conservation of the fish supply, particularly in the Northwest where extensive irrigation projects constitute a major hazard to migrating salmon and trout, nor that the studies in connection with the design of fishways or screens will not contribute also to an understanding of the habits and requirements of these fish. The Hydraulics Section, however, is primarily a service agency and hence is properly financed by a separate appropriation.

Normal development and improvements, including minor modifications or extensions of activities, have occurred in all of the other major research projects of the Division, the details of which will appear in the following reports of progress.

COOPERATION

In previous reports the Bureau has been pleased to acknowledge a growing spirit of cooperation in fishery research among the various governmental departments, the States, and private organizations. This trend has been continued during the past year without abatement. Outstanding examples of cooperation in fishery conservation are afforded by the United States Forest Service, United States Bureau of Reclamation, the Coast Guard, and the Tennessee Valley Authority. Many States have likewise contributed either by actually furnishing funds, personnel, or other facilities, or through a less tangible but an equally real spirit of sympathy and support.

The most ambitious cooperative project undertaken by the Division of Scientific Inquiry during the year was a survey of the marine

fisheries of Long Island, N. Y., the major portion of which program was financed by the State Conservation Department and carried out largely by State personnel. Several of the New England States are making active plans to assist in the collection of vitally necessary fishery statistics applicable to the biological problems of maintenance of supply. Specific acknowledgement of cooperation and assistance of many other States and organizations is made in connection with the individual reports of projects.

NORTH AMERICAN COUNCIL ON FISHERY INVESTIGATIONS

Since 1921 the United States has participated, through membership in the North American Council on Fishery Investigations, with Canada, Newfoundland, and France in planning and coordinating studies of the fisheries of the North Atlantic area in which all four nations have a material interest. The twenty-fifth meeting of the Council was held in Boston, Mass., on Oct. 4-7, 1938, at the same time and place that the commercial fishery industries were holding their fishery exposition and convention. The Council invited the members of the Fishery Advisory Committee of the Department of Commerce, and other leaders of the industry, to attend a general session on Oct. 5 at which time fishery problems in the North Atlantic area were discussed and the program of fishery investigations carried on by Newfoundland, Canada, and the United States was presented.

The meetings of the Council are particularly useful in that they afford an opportunity for the investigators of the several fishery departments to discuss their technical problems and to exchange experiences and opinions regarding methods, objectives, and results. Nearly a score of fishery investigators in the various services were present and participated in sectional committee meetings dealing with groundfish investigations, shorefish studies, hydrographic research, and fishery statistics, affording the members of the Council a summary review of progress during the year in these fields and permitting them to modify their official programs accordingly.

COUNCIL OF STATE GOVERNMENTS

During the year important progress has been made toward the solution of vital problems of fish protection on the Great Lakes, where, under the present system of divided control, it is impossible to halt the depletion of the fisheries; and on the Atlantic seaboard, where the migratory nature of many of the important commercial species introduces difficult problems in fishery management and administration. This progress has resulted from the efforts of the Council of State Governments in cooperation with the Bureau of Fisheries and with fishery administrators of the various States concerned.

Two conferences on the problems of the Great Lakes fisheries were held during the year. The first of these, which met in Detroit on Feb. 25-26, was called by the Council of State Governments at the request of the Michigan Cooperation Commission. Action was taken by the Detroit conference as follows: (1) The Federal Government

was urged to discuss with Canadian authorities the establishment of an International Board of Inquiry to consider and recommend measures for the conservation of the Great Lakes fisheries. (2) A special Interstate Committee on Great Lakes Fisheries, consisting of representatives of the Lake States, with advisory members from the Bureau of Fisheries, the State Department, the Province of Ontario, and the Dominion of Canada, was appointed with instructions to offer its services to the State Department as an advisory body and to assist the States in their individual and cooperative efforts to conserve the fisheries. (3) A resolution was adopted urging the legislatures of the various States bordering on the Great Lakes to give their conservation departments discretionary power to promulgate rules and regulations regarding the taking of food fishes.

The Interstate Committee created at the Detroit conference met in Chicago on Dec. 5. This committee reaffirmed its endorsement of an international treaty, and also declared itself in favor of an interstate compact for the control of United States fisheries in the Great Lakes, pending the adoption of an international agreement. The committee again urged the granting of discretionary power to State fish and game commissioners as an aid to securing uniform regulations. Commissioners of Wisconsin, Indiana, and Minnesota now have such powers. It is expected that the legislatures of Illinois and Michigan may pass similar legislation in the near future.

Legislation authorizing the formation of an interstate compact among the Great Lakes States for the preservation of their fisheries has now been passed by the Congress of the United States.

Plans for the conservation of migratory fishes of the Atlantic coast received marked impetus from action taken by the majority of the States from Maine to Florida at the Eastern States Conservation Conference held in New York on Nov. 19. A resolution was unanimously adopted petitioning the Congress of the United States to grant permission to the States to enter into a compact for the protection of migratory fishes in territorial waters. A committee was appointed to prepare a draft for submission to the States. This conference was called by the New York Joint Legislative Committee on Interstate Cooperation and all of the Atlantic Coast States, with the exception of New Hampshire, North Carolina, South Carolina, and Florida, sent one or more delegates. Another conference will be called at some future time to consider a specific draft of the interstate compact before efforts are made to secure its adoption and ratification.

PUBLICATIONS

As was intimated above, a number of important investigations, some of which have been under way for a period of 10 years, have come to completion during the year and reports are now ready for publication. There is considerable doubt, however, at the present time, regarding their probable date of release to the public, for funds available for printing have suffered a progressive decline since 1930. This shortage of funds applies to the publication of the results of investigations by the Bureau as a whole and necessarily restricts and limits the usefulness of the data acquired through many years of

work and at the expenditure of a considerable sum of money. In 1930 printing funds amounted to 14.2 percent of the amount expended on the various research projects by the Bureau of Fisheries but this percentage has declined until in 1938 only 4.7 percent of the amount of money available for investigation was available for the publication of the results of investigations. It is obvious that the accumulated findings of research, filed without publication, have little value.

Reflecting the meager amount of funds for publication, the following brief list of papers issued during the year is presented.

DAVIDSON, FREDERICK A., and LEROY S. CHRISTEY.

The migrations of pink salmon (*Oncorhynchus gorbuscha*) in the Clarence and Sumner Straits regions of southeastern Alaska. Bulletin No. 25, 24 pp., 5 figs.

DAVIDSON, FREDERICK A., and SAMUEL J. HUTCHINSON.

The geographic distribution and environmental limitations of the Pacific salmon (genus *Oncorhynchus*). Bulletin No. 26, 26 pp., 9 figs.

DAVIS, H. S.

Instructions for conducting stream and lake surveys. Fishery Circular No. 26, 55 pp., 11 figs.

GALTSOFF, PAUL S., W. A. CHIPMAN, A. D. HANLER, and J. B. ENGLE.

Preliminary report on the cause of the decline of the oyster industry of the York River, Va., and the effects of pulp mill pollution on oysters. Investigational Report No. 37, 42 pp.

HIGGINS, ELMER.

Progress in Biological Inquiries, 1937. Administrative Report No. 30, 70 pp.

PEARSON, JOHN C.

The life history of the striped bass or rockfish, *Roccus saxatilis* (Walbaum). Bulletin No. 28, 26 pp., 26 figs.

ROUNSEFELL, GEORGE A., and GEORGE B. KELEZ.

The salmon and salmon fisheries of Swiftsure Bank, Puget Sound, and the Fraser River. Bulletin No. 27, 129 pp., 29 figs.

WALFORD, LIONEL A.

Effect of currents on distribution and survival of the eggs and larvae of the haddock (*Melanogrammus aeglefinus*) on Georges Bank. Bulletin No. 29, 71 pp., 50 figs.

The following papers were published by members of the staff of the Division of Scientific Inquiry during the year 1938, outside of the Bureau of Fisheries series:

DAVIS, H. S.

Fish cultural developments during recent years. Transactions of the American Fisheries Society, vol. 68, pp. 234-239.

Objectives in trout stream management. Transactions of the American Fisheries Society, vol. 68, pp. 76-81.

FISH, FREDERICK F.

Simplified methods for the prolonged treatment of fish diseases. Transactions of the American Fisheries Society, vol. 68, pp. 178-187.

Notes on *Myxobolus inornatus* n. sp., a myxosporidian parasite in the black bass (*Huro florida* Lesueur). Transactions of the American Fisheries Society, vol. 68, pp. 173-177.

GALTSOFF, PAUL S.

Physiology of reproduction of *Ostrea virginica*. I. Spawning reactions of the female and male. Biological Bulletin, vol. LXXIV, No. 3, pp. 461-486.

Physiology of reproduction of *Ostrea virginica*. II. Stimulation of spawning in the female oyster. Biological Bulletin, vol. LXXV, No. 2, pp. 286-307.

Source of calcium for shell in *Ostrea virginica*. Nature, vol. 141, p. 922. The U. S. Bureau of Fisheries Laboratory at Woods Hole. The Collecting Net, vol. XIII, No. 2, pp. 29-32.

GINSBURG, ISAAO.

Arithmetical definition of the species, subspecies and race concept with a proposal for a modified nomenclature. *Zoologica*, vol. 23, pp. 253-286.

Eight new species of gobioid fishes from the American Pacific Coast. *University of Southern California Publ., Allan Hancock Pacific Exp.* vol. 2, pp. 109-121.

Two new gobiid fishes of the genus *Gobiosoma* from Lower California. *Stanford Ichthyological Bulletin*, vol. 1, pp. 57-59.

HERRINGTON, WM. C.

Problems of New England Fisheries. *Atlantic Fisherman*, vol. XIX, No. 11, pp. 9-10.

HIGGINS, ELMER.

Fish outlive officials. *State Government*, vol. 11, No. 3, pp. 53-54-58.

Shall our marine fish resources be squandered, hoarded, or managed—and how? *Transactions of the Third North American Wildlife Conference*, pp. 151-158.

HILDEBRAND, SAMUEL F.

A new catalogue of the fresh-water fishes of Panama. *Field Museum of Natural History, Zoological Series*, vol. XXII, No. 4, pp. 219-359, 13 figs. Twinning in turtles. *The Journal of Heredity*, Vol. 29, pp. 243-253, 5 figs.

HILE, RALPH, WILL SCOTT, and H. T. SPIETH.

The bottom fauna of Tippecanoe Lake. *Investigations of Indiana Lakes and Streams*, No. 4. *Indiana Department of Conservation in cooperation with the Indiana University Biological Station*, pp. 3-16.

LINDNER, MILTON J.

The cooperative shrimp investigations. *Louisiana Conservation Review*, Spring 1938, pp. 24-26, 38; and *Thirteenth Biennial Report, Louisiana Department of Conservation*, pp. 447-455.

LOOSANOFF, VICTOR L.

Extermination of starfish by chemical. *Atlantic Fisherman*, vol. XIX, No. 4, pp. 8-9.

LOOSANOFF, V. L. and J. B. ENGLE.

Chemical control of starfish. *Science*, vol. 88, No. 2274, pp. 107-108.

NEEDHAM, PAUL R.

Trout Streams. Pp. VIII-233. 74 figs., 26 tables, Ithaca, Comstock Publishing Company.

NEVILLE, WILLIAM C.

Some results of the Bureau's study of the marine fishes of the Middle Atlantic States. *Yearbook for 1938 of the Ocean City Fishing Club, New Jersey*.

Some benefits that may be derived from a scientific study of the marine fisheries of Long Island, New York. *Yearbook for 1938 of the East End Surf Fishing Club, Riverhead, N. Y.*

PRYTHERCH, HERBERT F.

Life-cycle of a sporozoan parasite of the oyster. *Science*, vol. 88, No. 2289, pp. 451-452.

SMITH, OSGOOD R.

Fact finding surveys in the Sacramento drainage basin. *Associated Sportsmen*, vol. 5, pp. 5 and 12.

SUBBER, EUGENE W.

A comparison of four eastern smallmouth bass streams. *Transactions of American Fisheries Society*, vol. 68, pp. 322-333.

VAN OOSTEN, JOHN.

The age and growth of the Lake Erie sheepshead, *Aplodinotus grunniens* Rafinesque. *Papers, Michigan Academy of Science, Arts and Letters*, vol. XXIII, pp. 651-668.

From clisco to perch to pike. *State Government*, vol. 11, No. 3, pp. 55-57.

Michigan's commercial fisheries of the Great Lakes. *Michigan History Magazine*, vol. 22, No. 1, pp. 3-39.

VAN OOSTEN, JOHN and HILARY J. DEASON.

The food of the lake trout (*Cristivomer namaycush namaycush*) and of the lawyer (*Lota maculosa*) of Lake Michigan. *Transactions, American Fisheries Society*, vol. 67, pp. 155-177.

UNITED STATES BUREAU OF FISHERIES.

The Progressive Fish Culturist. Memorandum I-131, 8 issues.

Progress reports of the investigations conducted by the various sections, prepared in the main by the section heads, are given in the following pages:

NORTH ATLANTIC FISHERY INVESTIGATIONS

WILLIAM C. HERRINGTON, *in charge*

On the basis of landings at the three principal New England ports during the first 11 months of the year, the total catch of the New England vessel fisheries during 1938 will be approximately 4 percent greater than that during the previous year, but the value will be 9 percent less. The increase in catch is largely the result of considerable increases in the landings of redfish (rosefish), whiting, and mackerel, which more than offset declines in haddock and cod. The decrease in value reflects the decline in price for nearly all species.

The past year also witnessed a general slowing down in the program of replacement of the old steam trawler fleet by modern vessels. During the year, but 3 new trawlers of the so-called super-trawler class were launched, compared with 10 during the previous year. The addition of new boats to the fleet has been partially or completely balanced by the decommissioning of older boats, so that the total intensity of the fishery did not change as much as the construction of new boats would indicate.

Probably the outstanding development in the New England fisheries during 1938 was the recovery of the mackerel fishery to more normal proportions after the disastrous year of 1937, and the start toward the development of a commercial tuna fishery in the Gulf of Maine. From the total of 14,000,000 pounds landed in 1937, the mackerel catch increased to 29,000,000 pounds in 1938; while the offshore tuna fishery showed an increase from around 110,000 pounds in 1937 to about 760,000 pounds in 1938.

The catch of both cod and haddock declined somewhat from that of the previous year, but it has not yet been possible to make a sufficiently complete study of the factors involved to determine whether this decline was due to a decreased fishing effort or to a decreased abundance of fish. Probably the most significant trend in the haddock fishery was toward the greater concentration of the fishery on scrod haddock, a trend which it is believed is definitely prejudicial to the future of the fishery.

Development of a Gulf of Maine shrimp fishery appears to be definitely under way. In the spring of 1938, between February and April, a total of about 75,000 pounds of shrimp was landed at Portland by small otter trawlers which caught them in inshore waters along the coast of Maine and New Hampshire. Smaller quantities were landed at other ports.

In the New England offshore fishery, the principal problems continue to be the determination of the causes of the great fluctuations in yield and the development of methods which, if adopted by the industry, will reduce these fluctuations and maintain the yield at the

highest practical level. Although good progress is being made on the species now under study (haddock, flounders, and mackerel), no biological work has been possible on the highly important fisheries for cod, redfish, pollock, and swordfish.

Pressing problems are developing in the inshore fisheries which support the small-boat fishing fleet and coastal population on long stretches of the North Atlantic coast. The most important problems here involve the improvement or maintenance of fisheries for flounders and lobsters, and the development of the fishery for shrimps.

Several important changes in the personnel of the North Atlantic staff were made during the year. J. R. Webster was assigned to continue the mackerel investigations, following the transfer of O. E. Sette to the West coast in October 1937, to assume charge of the Bureau's South Pacific Investigations. In January 1938, M. J. Lobell was transferred to this staff to carry on an investigation of the important flounder fishery; and in March 1938, Dr. G. A. Rounsefell also was transferred to carry on a comprehensive study of fluctuations in the abundance of North Atlantic groundfish, a problem which has demanded attention for some time.

The headquarters of the North Atlantic Fishery Investigations has remained in Cambridge and Boston, Mass. Harvard University has generously provided the staff with space and facilities in its biological laboratories. The cooperation of the Woods Hole Oceanographic Institution is gratefully acknowledged, as is the personal advice and interest of Prof. Henry B. Bigelow. The assistance and cooperation of fishermen and dealers in providing the use of their records, and in other ways, is also acknowledged with pleasure.

HADDOCK

The past year witnessed the continuation of several trends discussed in previous reports, but no noteworthy innovations or developments. Catch records for the first 11 months of 1938 (the only months yet available), show that the total amount of haddock landed at Boston, Gloucester, and Portland reached 138,000,000 pounds, a decrease of about 3 percent from the previous year; while the value was a little over \$3,000,000, a decrease of 15 percent from the previous year. This is the third successive year of decline in catch and the second successive year of decline in value since 1935.

The replacement of the old steam trawler fleet with new Diesel-powered boats continued during 1938, but at a slower pace than in 1936 and 1937. Two new trawlers launched late in 1937 began fishing in 1938, and three others were launched and placed in operation during the late fall and winter. However, these additions to the fleet do not necessarily mean a greater fishing intensity since they were probably more than counterbalanced by the decommissioning of old steam trawlers. The total number of trawler days at sea was somewhat less than in 1937, but the increased effectiveness of the new units probably compensated for much of the decline and it is likely that more detailed analysis will show that there was little change in absolute fishing intensity between 1937 and 1938.

The trend toward the increased utilization of species other than haddock continued, but at a much lowered tempo. These species, which in 1929 made up 34 percent of the landings of groundfish, in

1938 constituted about 64 percent. This change in the make-up of the catch is due primarily to the great increase in recent years in the landings of redfish (rosefish), whiting, cod, pollock, and grey sole. To a lesser extent it is due to the decline in the catch of haddock.

Another trend which was continued in 1938 was the increased concentration of fishing on scrod haddock, when these sizes were available. During the first 11 months of 1938, 45 percent of the haddock from Georges Bank were scrod, compared to 35, 38, and 36 percent during the 3 previous years and even lower percentages prior to that time. This appears to be definitely prejudicial to the future, inasmuch as haddock of this size still are growing rapidly and would be of considerably more value to the fishermen because of increased weight and increased value per pound, if allowed at least 1 more year's growth.

As a result of rather erratic exploitation and of natural factors which were neither understood nor even known, the catches of haddock have varied tremendously in different years, indicating a high degree of fluctuation in abundance or availability. Following 1927 the average catch per boat declined to an alarming extent (although the total catch was maintained until 1929-30 as the result of a great increase in fishing effort), and since then, has remained at a relatively low level. The fishery on the Nova Scotian banks has followed about the same course and the effects have been much the same.

The principal problems of the haddock investigation, from its inception, have been to determine the extent and causes of these great fluctuations, and to determine what practical modifications in fishing methods or procedure could be adopted in order to partially or entirely eliminate the periods of low productivity. The final problem was to develop a plan for prosecuting the fishery which, if adopted by the industry, would permit the maximum continuous catch from the area.

Analysis of extensive data collected during the course of the investigation has explained many of the factors controlling the condition of the fishery. During the period under most intensive study, the total catch increased from about 60,000,000 pounds in 1921 to nearly 250,000,000 in 1929, then dropped to about 140,000,000 in 1932 with some relatively limited increases and decreases since then. On the average, about 72 percent of this catch came from the Georges Bank area. In this region, the abundance of haddock, as shown by the average daily catch per trawler, had decreased rapidly from a relatively high level in 1921 to a low point in 1923, and had then risen precipitously to a peak in 1927. Since that year there has been a decline to an extremely low level in 1931, with little recovery since. The changes in this apparent level of abundance, particularly the low levels maintained since 1932, were due partly to the changing intensity of the fishery; but the relative success or failure of year-class survival appears to have been a very important factor. Years of good and poor survival appear to occur in cycles, the causes of which are only beginning to be understood.

Independence of the haddock population in the Georges area from that on the Nova Scotian banks has been apparent. During the first two or three years of life, the growth rate for Georges fish is much greater than for haddock from the banks to the east; while in later

years, the advantage is reversed. In most of the years for which data are available, the size composition of the populations in the two areas was entirely different.

The principal spawning ground in the Georges area is on the eastern part of Georges, although, in some years, there has been a considerable concentration of spawners in South Channel. The principal nursery ground for one-year haddock is on southeastern Georges, while the other fish move further to the north and west as they grow older. These sizes also carry on much more extensive seasonal migrations (within the limits of this area) than the yearlings and 2-year olds.

Progress in 1938.—The investigation has continued under the direction of W. C. Herrington assisted by H. M. Bearse and M. S. Moses with assistance from J. R. Webster and G. A. Rounsefell on the *Atlantis* trawling trip, and from the latter on a tagging trip to the Maine coast.

Dependable figures for total catch and relative abundance, by years and areas, have been and continue to be of primary importance to this investigation. For the past several years, it has been evident that recent data on relative abundance obtained from analysis of the haddock catch alone might not be entirely comparable to earlier years, because of the increasing importance of other species in the catch of the otter-trawl fleet. Although about 1929 haddock made up 60 to 70 percent of the catch of this fleet, in 1936 it comprised only about 36 percent. To determine the extent to which this increase in the catch of other species would affect the unit of fishing effort as applied to haddock alone, a comprehensive analysis of the entire catch taken by the fleet was necessary. During 1938, such analysis of groundfish catches was undertaken by Dr. Rounsefell. Since this work did not get under way until well on in 1938, no data are yet available as to the relative level of haddock abundance in 1938, or changes that occurred from 1937 to 1938.

Field work during 1938 consisted principally of the regular observations on the Boston Fish Pier and a trawling trip on the *Atlantis* in April–May. Data collected on the Fish Pier by H. M. Bearse included more than 55,000 length measurements, 3,000 scale samples, and interviews showing fishing grounds, fishing effort, and division of catch for all groundfish trips. The *Atlantis* trawling trip was under the direction of J. R. Webster assisted by G. A. Rounsefell and H. M. Bearse. Records were obtained covering “catch-per-hour’s-trawling” for haddock and other species, and data were obtained concerning length, sex, and age for all haddock as well as for part of the cod and other species.

Analysis of abundance.—Original records for the otter-trawl fishery from 1914–22 have now been acquired. These new data are of inestimable value, as they include information on the scrod catch not previously available. Primary analysis of the data for the entire period 1914–37 has been virtually finished. When completed, this will show the average catch per trawler per day of large haddock, scrod haddock, and total fish, for a series of years extending from the time when the commercial fishery was relatively small to the present extremely intensive fishery. Preliminary conclusions from these data indicate that cycles of relative scarcity and abundance have appeared

in the haddock populations over the entire period, which is marked by three periods of scarcity and two of abundance. Periods of abundance apparently result from a series of years with a high survival of young, while periods of scarcity result from a series with a poor survival. The years since 1930 are an exception, for since then the level of abundance has remained relatively low in spite of the consistently good production and survival of young. This condition appears to be the result of the increased intensity of the fishery in recent years. Cycles of good and poor survival of young appear to be related to the abundance of adults on the nursery grounds, the most favorable level being approximately that which prevailed in 1922 to 1924, 1929, and 1936.

These developments indicate that we are now approaching the stage where it will be possible to explain the causes for the great cycles of abundance which have been observed in the haddock fishery. It appears that the cycles of abundant and poor year classes are related to the varying abundance of large fish on the banks. Poor production or survival of young may result either from an overabundance of adults on the nursery grounds or from too great a reduction in the spawning stock. If the completed analysis of the material substantiates these indications, it will provide information of tremendous value toward development of a consistently good yield.

Population composition.—A considerable amount of information concerning the abundance and distribution of haddock was obtained from the trawled material taken on the spring *Atlantis* trip. One- and two-year fish were abundant, but older fish were relatively scarce. The 1-year fish were distributed about as in previous years, but 2-year fish, which previously were found in great numbers on Central Georges, in 1938 were almost entirely absent from this region. They were found in large numbers only on southeastern Georges and in South Channel. The latter location was particularly unusual, as but few fish of this age had been found there in previous years.

Tagging.—Early in this investigation a series of tagging experiments was carried out, using haddock held in tanks and live cars to determine the most satisfactory tag for this species. A variety of special tags were tested in addition to the disk type (plaice label) and strap tag used by other investigations. The experiments indicated that a button type was most successful with the disk type almost as good. This work was followed by field experiments in 1932-33, involving the tagging from otter trawlers of 440 haddock with button tags and 52 with belly tags, and from line trawlers of 296 with button and 117 with belly tags. No returns were received from any of these experiments except for one button tag from the line-trawl tagging. In view of the successful retention of tags in the live-car experiments, it appeared that the failure of the offshore work was the result of high mortality due to the gear and depth. Experiments next were tried from small line trawlers in shoal water along the Maine coast. In this attempt, 296 button and 117 belly tags were attached. There were 6.4 percent of the button and 6 percent of the belly tagged fish recaptured and reported.

Owing to limited personnel and funds, no further work could be done on this subject in spite of its importance until Dr. G. A. Rounsefell took charge of the work in 1938. In June of that year, 265 haddock were tagged with button tags, 266 with disk tags, and 100

with an internal anchor tag designed by Dr. Rounsefell. Tagging was done near Mt. Desert Island from a small line trawler. It is planned to continue the work next year on a sufficiently large scale to provide significant conclusions concerning the intermigration between the population of Maine shore haddock and that on the offshore banks.

Principal requirements of the investigation.—The most urgent matters now facing the investigation are the completion of the study of variations in haddock abundance and total catch, analysis of the age and size composition of the commercial catch to show the effect of year-class strength on the fishery, study of the differences in growth rate between different year classes and fishing grounds, and the determination of the extent of intermigration between the various grounds. The first is now well on the way toward completion, but, although considerable progress has been made on the others, the work has been greatly handicapped by the lack of vessel facilities for collecting basic data on the offshore fishing grounds. The generous cooperation of the Woods Hole Oceanographic Institute in providing the occasional use of the *Atlantis* at nominal cost to the Government has been of great help, but to no considerable degree has this served to displace the need for a vessel built and equipped for otter trawling and hydrographic duties and regularly assigned to fisheries work. Such a vessel is particularly needed for a systematic sampling of the young fish population at least twice a year to evaluate the distribution and abundance of each year class before it reaches commercial size; determine its mortality rate from natural causes and from the commercial fishery; and study the growth rate of the young fish.

A vessel is urgently needed to carry on further work on offshore tagging. Adequate experiments should provide data of great value concerning haddock migrations, growth rates, and mortality rates. Preliminary attempts to carry on the work from commercial vessels have proved to be a complete failure (except from small line trawlers along the Maine coast), presumably because of the high mortality of the fish resulting from the effects of the commercial gear. It does not appear that these difficulties can be overcome without the use of a research vessel to develop and use special methods for catching and handling the fish.

MACKEREL

The 1938 mackerel season began late in March, and, because of growing emphasis on winter activity following the 1937 failure, was still in progress at the end of the year. Total vessel landings for the season will be approximately 29,000,000 pounds, about double the 1937 catch. Prices dropped back to the 1936 level, close to 2½ cents a pound, at principal New England ports. In general, fishermen fared better than in 1937.

Throughout its history the mackerel catch has been characterized by extreme fluctuations in yield. The mackerel investigation was undertaken to study the causes of these fluctuations, with a view to devising means of predicting the relative abundance of mackerel in advance of the season.

To provide a basis for understanding changes in abundance, catch statistics have been assembled covering the fishery from its inception—about 1804. These figures reveal a period of high catch level,

lasting from about 1820 to 1885. During this time the landings averaged roughly 80 to 100 million pounds annually, but were subject to violent fluctuations. The year 1886 ushered in a period of poor catches, lasting until the present day. In no year during this period have landings exceeded 65,000,000 pounds, while the annual average has been nearer 40,000,000 pounds. This low level has persisted so long as to be considered normal. However, the yearly fluctuations during the latter period, though less in amount, were as great in degree as those within the former period.

Investigations of mackerel behavior and life history have demonstrated that these fish range from the Middle Atlantic States to Canada. They school mostly over the inner portions of the continental shelf, generally avoiding small enclosed bays and regions over deep water. Analysis revealed two contingents in the population; one ranging between the offing of Chesapeake Bay and the Gulf of Maine and the other between southern New England and the Gulf of St. Lawrence. Both contingents probably spend the winter in offshore areas near the southern portions of their range.

Spawning occurs between April and August. Fish grow 7 to 10 inches the first season, and attain a length of 10 to 14 inches by the end of the second year. Thereafter, growth is slower. The maximum life is 12 to 15 years, length about 22 inches, and weight from 3½ to 4 pounds.

Fish from one or a few year classes usually make up a season's catch, and persist as definite groups for many years. Discovery of this fact led to the belief that the numerical strength of these dominant year classes determines the success of the commercial fishery. On the basis of year class recruitment and mortality the investigation succeeded in forecasting the approximate yield for several successive years. In 1937, however, the mackerel catch fell about 40 percent below the predicted decline, indicating that some unknown factors were at work.

Progress in 1938.—The current mackerel investigations, now under the direction of John R. Webster, have been devoted to completing and bringing up to date the lines of investigation initiated by O. E. Sette, and to determining the factors which caused the relative failure of the mackerel fishery in 1937.

The abundance analysis for 1937 was based on more than 1,500 catch records and 35,000 length measurements. As shown by catch per unit of effort, abundance fell off everywhere along the coast. Compared to 1936, this decline was not much more than 30 percent for the area west of Nantucket Shoals, but exceeded 50 percent in the Gulf of Maine area.

Study of lightship temperature records revealed that the surface waters of the extreme western Gulf of Maine in 1937 ran from 2° F. to 7° F. higher than those of the previous 10-year average. The departure from this norm was greatest during that portion of the mackerel season when the fleet operated in these waters. Since the offshore fishery fell so far below expectations during this period, it is suspected that hydrographic conditions were a factor in the decline.

Composition of the whole mackerel population in 1937 apparently differed from that of previous years since 1925. Analysis of length-

frequencies furnished strong evidence that the 1923 year class was still present, and probably the 1928 class as well. Except for the 1932 class, year classes following 1929 were present in better than 5 percent strength each. None of these stood out as dominant, however, a real departure from conditions only a few years before.

Field work during 1938 was conducted principally by F. E. Firth. This included details at Cape May and New York City in April and May, and at the Boston Fish Pier for the remainder of the year. Information on fishing effort and catch locations was obtained for over 1,000 trips and about 50,000 mackerel were measured for population composition analysis. In addition, 700 scale samples were taken for age reading reference. Late in June, Mr. Webster tagged 500 mackerel at Provincetown. There were but 5 returns, all local, within 1 week.

Preliminary studies of the 1938 catch show that the 1936 year class made large contributions to the fishery, with the combined groups of 1934 and 1933 next in importance. Detailed analysis of these data will be undertaken in 1939.

The present tendency of the seining fleet to extend both ends of the season may make necessary some changes in methods of determining abundance. For furthering studies of hydrographic conditions, it appears advisable also to obtain a more representative norm of coastal surface water temperatures. If temperature be a real factor affecting the availability of mackerel, some measure of its significance must be found. Although some advance in the solution of these problems can be made with our present facilities, expansion is necessary in order to solve others. Direct evidence is needed of the fate of certain year classes which decrease in availability faster than others. The cause may be heavier mortality or mass changes in habitat through migration. A large-scale tagging program is needed to determine this point. Further study is needed also for an understanding of the relationship between the mackerel catch by purse seiners and pound nets in the same locality. Catch statistics alone are insufficient, since it is necessary to learn when these two types of gear sample the same or different populations and why. The aid of part-time assistants at strategic points is needed to collect such information.

The mackerel problem now appears to involve more than a study of year-class recruitment and mortality. Events of the past 2 years have emphasized the need for particular knowledge of oceanic conditions affecting the mackerel fishery. In view of these facts, it is believed inadvisable to attempt forecasts of future abundance until facilities for determining these conditions are provided.

FLounder

In 1935, the last year for which complete figures have been compiled, the total North Atlantic catch of all species of flounders amounted to about 39,000,000 pounds, and was worth approximately \$1,500,000. Five species compose the bulk of the catch. They are: (1) Lemon sole (*Pseudopleuronectes dignabilis* Kendall); (2) gray sole or witch (*Glyptocephalus cynoglossus* Linnaeus); (3) winter flounder or blackback (*Pseudopleuronectes americanus* Walbaum);

(4) dab (*Hippoglossoides platessoides* Fabricius); and (5) yellow-tail (*Limanda ferruginea* Storer.) In addition, the fluke (*Paralichthys dentatus* Linnaeus), the four-spotted flounder (*Paralichthys oblongus* Mitchill), and the smooth flounder (*Liopsetta putnami* Gill) are landed in some quantities. Because of variations in life history and habitat, each of these species represents a different problem.

Studies of winter flounders previous to 1938 were confined largely to tagging experiments. In 1931, R. A. Nesbit tagged a number of flounders at Woods Hole and devised the present methods of flounder tagging. Returns indicated that the winter spawning population dispersed in various directions during the spring and summer, and that long migrations were undertaken by some individuals. In the following winters many of these tagged flounders were recaptured at the original tagging area. During 1937, a number of fish were tagged in Rhode Island and in Great South Bay, Long Island. The recoveries from these experiments indicated a high intensity of recreational fishing. As before, returns indicated a dispersion from the tagging point. Little migration from Rhode Island waters occurred, a few fish being recovered in the Nantucket region. Significant numbers of fish tagged in Great South Bay were recovered at considerable distances from the tagging area, some individuals being taken as far away as Nantucket Shoals.

In January 1938, Milton J. Lobell began an intensive study of the flounder fisheries of the North Atlantic area. The most pressing problem facing this investigation is to determine whether a decline in abundance is in progress. If the decline is serious, the reasons for it must be found and methods developed for a more efficient utilization of the stock. Determination of the total catch and catch per unit of effort must be made to cover as long a period as possible in order to determine the condition of the stock and the fluctuations in the fishery. To find the reasons for fluctuations in abundance or availability, various biological factors must be studied. These include the racial composition of the stock, age and growth, migrations, and many other problems that affect the abundance and availability of the species.

Statistics.—The first available figures for the North Atlantic flounder fisheries are for the year 1887. During this year a total catch of about 2,500,000 pounds was recorded. The peak year for flounder landings occurred in 1928, when approximately 51,000,000 pounds were reported. The years 1929 and 1930 were also important, since landings of about 49,000,000 pounds were made in each of these years. Although the value of the fishery cannot be accurately determined for the earlier years, in more recent times a basis of estimation is furnished by the value of flounders landed at the three principal New England ports, Boston and Gloucester, Mass., and Portland, Maine. In 1928, a 10,500,000 pound catch landed at these ports was valued at \$511,296. Since the total reported catch in 1928 for the whole region was about 51,000,000 pounds, or approximately 5 times as much, it can be conservatively stated that the value of the fishery was well over \$2,000,000.

The catch by species was given for the first time in 1937 in the statistical reports of the Bureau for the three principal New England ports. Gray sole landings were almost 8,000,000 pounds;

yellowtail about 4,000,000; lemon sole, 2,500,000; dabs, 2,500,000; and winter flounders slightly over 1,000,000 pounds. These figures, however, are not indicative of the total amounts landed by the entire fishery, or even of the proportions of the catch contributed by each species in New England and New York. Contrary to the situation prevailing north of Cape Cod, the bulk of the flounder catch south of the Cape is composed of winter flounders. Annual canvass figures for this area showed a decided decline, the landings having dropped about 37 percent from 1930 to 1935. Fishermen and dealers report a definite decrease in the average size of the fish. During the past 5 years an enormous sports fishery for winter flounders has developed south and west of Cape Cod, and particularly in Long Island. In some places the catch equals or even exceeds that of the commercial gear. In view of the decline of commercial catches of the winter flounder and the rising importance of the sports fishery, the work of the flounder investigation has been concentrated on this species.

Detailed and accurate statistics of the catch of winter flounders are not available for past years, owing to the fact that all species landed were lumped together, with no record of seasonal occurrence or grounds fished. In 1938, however, the Market News Service, with offices in Gloucester, Portland, Boston, New Bedford, Provincetown, and New York City, was able to furnish more complete and detailed statistics than could be procured formerly. In addition, the State of New York, through its Long Island Survey, collected much needed and detailed information on its fisheries. The State of Maine will adopt a statistical system in the early part of 1939, and other New England coastal States are expected to undertake a like program. With cooperation from these States, it will be possible to obtain more satisfactory data in the future.

Tagging.—In cooperation with the States of New York and Connecticut, about 2,000 flounders were tagged in Long Island Sound and in a number of localities on Long Island. Fish were tagged in Great South Bay, Great Peconic Bay, Gardiners Island Sound, Port Jefferson, and Huntington Harbor in New York waters. In Connecticut, tagging of the local stock was conducted in the Mystic River and of the breeding stock at the Noank Hatchery. As in previous experiments, the twin disk celluloid tag was used. These were fastened just posterior to the head and below the dorsal fin of the fish by means of nickel pins.

These experiments yielded valuable information on the movements of flounders and the relative intensity of the commercial and sport fisheries. The peaks of returns occurred from April to May and from October to November, indicating either that the fish were more available at that time or that fishing was more intensive. In general, an offshore movement in the spring and an inshore movement in the fall occurred. Summering concentrations in the Block Island region were composed of individuals from Long Island, Connecticut, Rhode Island, and the south shore of Cape Cod. Recoveries from Nantucket Shoals suggest that the offshore banks may be partially populated with fish from inshore grounds. Although a general dispersion of fish was indicated, evidences of directional migrations also occur, since it was found that in a number of cases minimum speeds of over 4 miles a day were recorded. The recovery of a large num-

ber of tags by recreational fishermen indicated that this type of gear took almost as many fish as the commercial gear in the tagging areas. Since year-round recoveries were made near the tagging locality, while seasonal recoveries occurred from points relatively far removed, it may be concluded that racial types, or at least groups with differing summer habitats, exist.

Age and growth.—Scale samples from Long Island flounders collected by the Long Island Survey and from Narragansett Bay, supplied by the Narragansett Marine Laboratory, were prepared, read, and the results partially analyzed. Particular attention was paid to the Long Island collection, since these data will be of value in connection with the survey conducted by the State of New York.

It was found that length frequencies, except for the 0-group and to some extent for the I-group, were useless in determining ages of flounders because of the multi-moded character of the length frequencies of fish other than the 0-group. Examination of the scales proved to be more enlightening, although the reading of some scales was complicated by false checks, double checks, and regeneration marks. Comparison of age and length availed but little, since oftentimes fish with two definite checks might be larger than fish with three definite checks, even in the same sample. In addition, it was found that females were consistently larger than males of the same age. Samples from one area showed growth rate differences when compared to samples from other regions. This evidence definitely indicates that the population of flounders is composed of groups with varied growth rates and possibly different habits in other respects. In general, the size at each age is: End of first year, 4¾ inches; end of second year, 7½ inches; end of third year, 9¾ inches; end of fourth year, 11½ inches; end of fifth year, 13 inches; and end of sixth year, 13¾ inches.

Races.—In addition to positive evidence of the existence of separate races from tagging recoveries and age and growth studies, examination of the characteristics of juvenile fish also indicates that differences exist. These differences are in the length-width ratio, degree of twist in the snout, angle of head profile, location of the eyes, and ratio of head length to total length. Preliminary findings suggest two types of flounders: A thin, narrow-bodied type with the snout sharply twisted, a low head profile and a large head; and a relatively thick, wide-bodied type with a straight snout, high head profile, and small head. It is thought that these two types represent the offshore and inshore races, since both groups are known to spawn in the same general areas.

These general lines of investigation will be continued in the future, with emphasis on the collection of detailed and reliable catch statistics and on a thorough study of the life history.

ANALYSIS OF GROUND FISH ABUNDANCE

Analysis of groundfish abundance was undertaken early in 1938, under the direction of Dr. George A. Rounsefell. For some time the need of this work has been increasingly apparent because of serious problems created by this rapidly expanding fishery.

New England landings of fish and shellfish from 1930-35 (excluding 1934 for which figures are not available) have averaged

611,000,000 pounds annually, of which 437,000,000 pounds consisted of the various species of groundfish. Fluctuations in the abundance of haddock, which comprised about 45 percent of the catch during the above period, have been determined as part of a biological study of the species, but no information has been available concerning the other species—cod, pollock, hake, cusk, wolffish, whiting, halibut, rosefish, and the various flounders. During recent years the industry has been developing markets for all species, bringing about a marked change from former years when boats sought only haddock, and took other species but incidentally. This means that the total catch of any one species is now partially dependent on the abundance and market value of the others.

Various other factors must be considered in an analysis of groundfish abundance. For example, in a fishery that draws upon several species, the relative abundance of any one species is not necessarily indicated by the average catch of that species per unit of fishing effort. The average catch must be qualified by such information as the depths and grounds fished and the quantities of other species caught, so that it is clear whether the fishing effort was directed toward the catching of the species in question, or whether the average cited is merely of catches made incidental to the pursuit of another species. For example, the vessels seeking rosefish trawl exclusively in the deeper waters, around 70 to 100 fathoms. Only an occasional rosefish is taken in shallow water, and these fish are not caught in commercial quantities at medium depths. Therefore, a low catch of rosefish per unit of effort in shallow-water zones would not indicate a low abundance of rosefish in general. As another example, although the gray sole is taken to some extent at lesser depths, the bulk comes from certain types of bottom in the deeper water. The lemon sole, on the other hand, is abundant only in shallower areas. These differences in habitat have raised several problems of analysis, the solution of which is treated more fully below.

Another major problem is the study of the changes in the fishing fleet in respect both to numbers and to size and type of vessel, in order to gain a measure of the total fishing effort expended. For a great many years nearly all of the groundfish were taken with hook-and-line, but in the last 20 years there has grown up a huge and expanding otter-trawl fleet. At the same time, the number of line trawlers has gradually decreased until they are now a minor factor in the fishery. Changes in the vessels affect not only their efficiency in respect to their chosen type of gear but also their adaptability to other gears. Many vessels are so constructed that it is possible to shift to whatever gear is producing the greatest monetary reward at the moment. This adaptability means that there exists a great potential capacity to take any particular species. Although this capacity is seldom exercised to any great extent, owing to an economic balance, the ability to shift fishing effort from one species or fishing bank to another must be realized and fully considered before judging the effect upon any species of changes in the abundance of another.

The total catch during this period of expansion has remained at a high level, owing principally to two developments in addition to the increase in number and efficiency of the fishing vessels. One important factor in maintaining the poundage has been the shift to other species, such as the rosefish. From 1930-35, this species contributed

but 4,000,000 pounds a year, but in 1936-38 it averaged over 60,000,000 pounds. The rosefish is now sold throughout the Midwest and South as frozen fillets of "ocean perch." Another factor has been the increased dependence of the vessels on the banks off the Nova Scotian coast. Even if these banks can stand considerably more fishing, their distance from port means greatly increased cost of production. In the past few years there has been a great increase in the amount of trawling in deeper water, out to the 100-fathom curve and beyond, because of the demand for rosefish and gray sole. Since most of the available banks and most of the commercially abundant species are now being fished, it becomes increasingly clear that the future of this huge fishery depends upon utilizing the present banks and species to the best advantage.

The main problem then is to assess the three variables, total catch, fishing effort, and abundance, in order to determine for each species whether it can yield larger quantities or whether it has already reached the point where an increase in yield will give a larger production only at the expense of the future.

For this task the investigation has access to the following records: The poundages landed by species by each vessel for each trip from 1918 to date at Portland, Gloucester, and Boston (except for Boston landings at T Wharf) are available. For the vessels of over 50 gross tons, the actual weighed-out weights are given, but for the smaller vessels (5 net to 50 gross tons) the Boston records and some of the other records are hailed weights (i. e., estimates of the catch made by the captain when the trip is put up for sale at auction.) Since 1928, each slip also shows the type of gear the vessel employed in making the catch.

The record of the total annual catch by species of each fishing vessel (i. e., boat over 5 net tons) in New England since 1928 has been made available through the cooperation of the Division of Fishery Industries. These records are obtained by canvassing the fishermen themselves once a year to determine their catch. These records also show the gear used by each vessel, and, when more than one type is used, it shows the amount of each species caught by each type.

Since 1932, the haddock investigation has maintained a man at the Boston Fish Pier to interview the captain of each groundfish vessel, of over 50 gross tons, each time the vessel lands. These interviews give the day and hour of departure from and arrival at the pier, the locations fished by rectangles covering 10 minutes of latitude and 10 minutes of longitude, the depth fished, the proportion of the fishing time spent on each bank, and the proportion of the fish caught on each bank.

Analysis of abundance.—The methods used in analyzing these records for the haddock investigation are in general applicable to the groundfish analysis (which will in the future include the portion of the haddock investigation dealing with abundance), but had to undergo certain modifications on account of the tremendous mass of data to be handled and the differences in habits between the various species to be studied.

Through a project of the Works Progress Administration it was possible to obtain several needed assistants. The large accumulations

of catch-record receipts for the 21 years from 1918-1938 have all been sorted by month according to vessel and type of fishing gear, and filed so as to be readily accessible.

Using these records of landings in conjunction with the information obtained at Boston from interviews with fishing vessel captains, the relative abundance is being calculated for each species for the 7-year period 1932-38 from records of selected groups of otter trawlers. The procedure followed by the haddock investigation of subtracting running time of the vessel to and from the fishing banks, as well as time lost by bad weather, etc., in order to calculate the time spent in fishing on each bank, has been retained.

In order, however, to take care of the differences in the depth habitat of the various species, the banks have been divided into three depth zones, namely: Shallow, 0-30 fathoms; medium, 31-60 fathoms; and deep, over 60 fathoms. The allocation of catches into depth zones has been simplified by using the 10-minute unit area rectangles mentioned above.

The increased fishing for rosefish and gray sole in the deep zone within the past 3 years, the inauguration of depth zones, and the analysis of additional data concerning fishing grounds obtained since 1936, made it advisable to revise the statistical subarea boundaries in International Areas XXI and XXII. These were reoutlined on the basis of 39,632 days' fishing, in the various unit areas. Three subareas were eliminated from Area XXII by amalgamation and many minor adjustments were made in an attempt to simplify the analysis of the data by adjusting the boundary lines to the natural fishing concentrations. The handling of this large mass of data has been simplified by the use of cards which permits wide latitude in the grouping of areas or depths, and is invaluable in the assembling of the material for correlations.

The current analysis of these data, starting January 1, 1939, will be tabulated by the punch-card system that has been used for some years by the Bureau in the preparation of the monthly bulletin on the landings at Boston, Gloucester, and Portland by type of gear, species, and fishing bank. The punch card has been revised and the depth zone and calculated fishing time added to the information previously punched. Mr. Bearnse interviews the vessel captains, and, by means of these interviews, supplies the Division of Fishery Industries' agent with these additional data. By this means it will be possible to obtain current data on abundance, which, despite its usefulness, is available for very few fisheries.

Total catch by areas.—A knowledge of the relative annual abundance does not permit any estimate of the productive capacity of a stock of fish without information on the total catch.

The landings of fishing vessels of over 5 net tons at Portland, Gloucester, and Boston (except for Boston landings at T Wharf) are shown both by type of gear used and by the subareas (fishing banks) where caught, in the monthly bulletin of the Division of Fishery Industries. However, these comprise but 65 percent of the New England groundfish landings.

The only records of total catch available for New England have been those of the Bureau's annual canvass; but, besides not being taken in some years, they cannot achieve a high degree of accuracy

because a large share of the individual fishermen from whom the estimates are obtained do not keep accurate records. In addition to this disadvantage, the annual canvass totals do not show either the season at which the catch was made, or the banks from which it was derived.

In cooperation with the Division of Fishery Industries and other members of the North Atlantic staff, an attempt has been made to encourage the New England States to install systems of collecting more complete and accurate statistics than those now available. One of the best systems for collecting such statistics is the use of triplicate receipt books by every fish buyer, so that a copy of each purchase showing the weighed-out poundage of every trip is available to the dealer, the fisherman, and the State. Such a system has been in use in California since 1915 and has been eminently successful.

The State of Maine inaugurated such a system on January 1, 1939, and the Bureau is aiding in getting it under way. Other New England States also are becoming more interested in obtaining better statistics of their fisheries, and the Bureau is encouraging and co-operating in the installation of such systems.

The fact that a fair share of the New England groundfish catch not landed at the three principal ports is caught in the inshore areas (as opposed to the large quantities from the offshore banks landed at the three ports) is shown by a preliminary analysis of the annual canvass vessel schedules which has revealed a large fleet of small vessels operating largely in shallow, inshore waters, and fishing primarily for flounders. These small flounder vessels are most numerous south of Cape Cod, although some land at Boston and Gloucester and along the coast of Maine. The catches of these smaller, inshore vessels will be analyzed by the flounder investigation as they will necessarily have to be correlated with the life-history findings.

Composition of the fishing fleet.—The fishing vessels have undergone many changes in size, power, and type. As explained above, these changes in the number and type of the fishing vessels must be known if one is to judge either the relative difference in annual fishing effort or the potential fishing effort that can be unleashed in any particular direction whenever economic conditions warrant. Furthermore, without knowledge of the total fishing effort, it is not safe to assume that the relative catch from year to year of a particular amount of fishing effort is not influenced by differences in the amount of competition with other vessels fishing the same grounds.

Since 1928, the weigh-out schedules for vessels landing at the three principal New England ports have given the type of gear used in making each catch. These data (available for over 700 vessels) are being analyzed to show the number of vessels of each size and type of gear that fished during each month over this period of 11 years. A preliminary tabulation of a few of the years during which New England annual canvass data are available, showed over 260 additional vessels that landed only at minor New England ports. These latter vessels were chiefly small inshore flounder trawlers and gill-net boats, although a few fair-sized vessels are included from Provincetown and New Bedford.

MIDDLE AND SOUTH ATLANTIC FISHERY INVESTIGATIONS

R. A. NESBIT, *in charge*

In Progress in Biological Inquiries for 1937 it was pointed out that the fisheries of the Middle and South Atlantic States offer an opportunity to benefit from scientifically controlled management. Increases in the amount of gear operated have diminished profits by increasing the cost of fishing and decreasing the yield. The problem of correcting excessive fishing and waste of small fish cannot be solved by individual fishermen. The responsibility rests on conservation officials, State and Federal, to advise fishermen what corrective measures they must support in their own interest.

The reduced abundance which has resulted from overfishing has also caused widespread dissatisfaction among anglers. Many of them, made impatient by the long delay in devising and adopting sound conservation measures, are advocating drastic curtailment and even elimination of commercial fishing for certain species. Legislation to this effect has been introduced in several State legislatures. Other anglers recognize that most marine species are capable, under sound management, of supporting a prosperous commercial fishery without detriment to angling interests, and are supporting the Bureau and State conservation organizations in their efforts to serve the common interests of commercial producers, anglers, and the consuming public.

The problem is twofold; to determine what measures are needed and practicable, and to provide for a unified or coordinated means of putting them into effect. The Council of State Governments is sponsoring a proposal to provide for the necessary cooperation in research and administration through an interstate advisory body created under the provisions of an interstate compact. Preliminary meetings were held during the year and a committee is preparing a draft of a compact for consideration by the several States and by Congress.

As in 1937, the courtesy of the University of Maryland in furnishing laboratory facilities at College Park, and of the Charleston Museum for similar accommodations in Charleston, S. C., is gratefully acknowledged.

SHORE FISHES

During 1938 the study of the shore fishes of the Middle Atlantic States was continued by William C. Neville. These investigations consisted principally of observations on the winter trawl fishery off the Virginia Capes, and cooperation with New York State in a biological survey of the marine fishes of Long Island.

Long Island Survey.—The Bureau participated in the Long Island Survey at the request of the New York State Conservation Department, acting principally in an advisory capacity. Mr. Neville, who was assigned as the Bureau's representative, spent most of the period from January to December on Long Island assisting the New York State biologists in the supervision and conduct of this work. Mr. Nesbit also served in an advisory capacity and Milton J. Lobell gave active support in certain phases of the study of the winter flounder. Mr. Neville assisted in the preparation and editing of a report on results of the survey, Mr. Nesbit preparing the section on squeteague

and Mr. Lobell that on the winter flounder. The Bureau assigned the *Phalarope II*, with Joseph Armstrong as engineer, from the Woods Hole, Mass., station to Long Island from May 1 to July 1. This boat was used in a survey of the young fish populations of the bays and in-shore coastal waters of that region. Some scientific equipment and miscellaneous supplies were also furnished by the Bureau.

The main objectives of the Long Island survey were: (1) To provide information that could be used as a reliable basis for improving or maintaining good fishing insofar as the factors affecting the supply are controllable, and, (2) to determine by a census of fishing activities the recreational and commercial value of the marine district of Long Island to the citizens of New York State. Particular attention was given the winter flounder and squeteague because of the primary importance of these species to anglers and commercial fishermen. Other popular species as the fluke, striped bass, porgies, sea bass, tuna, and swordfish were given such study as 1 year's observations would permit. Fortunately, the information given by the 1938 survey is supplemented by results of similar study made by the Bureau during the past 10 years. Consequently, for some species, more definite conclusions could be drawn than otherwise would have been possible. Definite recommendations for the conservation of several species and for additional study of other species have been included in the report to be published by the New York Conservation Department.

Scup.—This species appears to be successfully withstanding the year-around activity of fishing which has resulted from the rise of the winter trawl fishery beginning about 1930, supplementing the summer fishery which has been operating on a large scale throughout the Middle Atlantic States since about 1900. Major fluctuations in the catch of scup have resulted more from variations in the success of reproduction than from fishing activities. A major increase in abundance occurred throughout the Middle Atlantic States beginning in 1929 and has continued in most of the subsequent years to date. This increase has been due largely to a series of successful spawning seasons beginning in 1927. Some waste of the supply is occurring because of prevailing fishing practices which permit the destruction of undersized and unmarketable sizes of fish. Correction of this abuse is difficult because the species is caught simultaneously with a variety of other fishes and by several different types of gear. Saving of scup by appropriate modifications of gear to insure the release of a large percentage of the small fish in good condition would probably involve a loss by gilling or escapement of marketable sizes of other kinds of fish of equal or greater value.

Progress on the report dealing with the causes of fluctuations in abundance of this species during the past years along the Middle Atlantic coast has been temporarily interrupted by Mr. Neville's assignment to the Long Island Survey. It is expected that this report will be completed during 1939.

Winter trawl fishery.—The year 1938 marked the seventh anniversary of the commencement of the winter trawl fishery off the Virginia Capes. Beginning about 1931, the fishery has expanded rapidly. The total catch of the principal fishes—namely, sea bass, fluke, porgies, and croakers—has risen from approximately 4,500,000 pounds in 1931 to over 19,000,000 pounds in the past few winters. The fleet has

increased from approximately 30 vessels in 1931 to over 125 vessels in 1938 and includes, in addition to local vessels, boats from New Jersey, New York, and Massachusetts. Landings are made mostly in Virginia and, to a lesser extent, in New Jersey and New York City.

The economic importance of this winter trawl fishery has increased since its beginning in 1931 through the creation of new market outlets for its production, particularly in the Southern States. This activity has also affected the distribution of numerous fishery products and introduced keen market competition with other distributing and production points, particularly in the Middle Atlantic States.

The activity of the winter trawl fishery is of biological significance in the probable effect it may have on the supply of those species that comprise its catch. To date there is no evidence that the winter fishery has caused any significant decline in the supply of scup. A reasonable doubt, however, exists as to whether the sea bass and fluke can withstand successfully the combined withdrawal of the winter and summer fisheries. Continued decreases in the catch per unit of effort for both species in most of the recent years and a similar reported decline in the summer fishery indicates a diminishing supply, probably from actual decreases in abundance. It is recognized that the winter trawl fishery may not be wholly responsible for this diminution in the catch but that the activity of the sport and commercial summer fisheries may also be contributing to the reported decline. A detailed study of fluke and sea bass, based on observations of the summer and winter fisheries, is therefore recommended to determine the cause of this decline and what corrections for restoring higher levels of abundance are necessary.

ANADROMOUS FISHES

Striped bass.—In 1938 two important reports dealing with the life history and conservation needs of this species were submitted for publication. Dr. Vadim D. Vladykov submitted to the Maryland Conservation Department a report on his investigation in Chesapeake Bay in 1936 and 1937, and Dr. Daniel Merriman submitted to the Bureau his report on studies begun in 1936 under the auspices of the Connecticut Board of Fisheries and Game, and continued in 1937 and 1938 with the cooperation of the Bureau and several Atlantic Coast States.

The following are the principal results of these studies: The striped bass is subject to year-class dominance. When successful spawning occurs, as it did in 1934 in Chesapeake Bay, not only are local stocks greatly augmented, but, as a result of migration, abundance is greatly increased along the coast from New Jersey to southern New England, and even in the Gulf of Maine. Since the large brood of 1934 was produced in a year when spawning adults were scarce, it is doubtful whether increased numbers of spawners should be the primary object of conservation measures. Catch records and studies of age composition of the catch indicate that the numbers of such successful broods diminish rapidly. For example, the 1934 year class yielded only about one-fourth as many fish in 1937 as in 1936. Tagging experiments indicated that the fishery accounts for most of the decline. Protection of striped bass until they reach a length of at least 16

inches, measured to the fork of the tail (approximately 17½ inches over all), would lead to greater yields and larger profits from each brood, whether large or small. The number of fish reaching spawning size would also be increased.

Shad.—In marked contrast to the striped bass, the principal problem in shad conservation is maintenance of an adequate spawning reserve. Although pollution and obstruction of rivers have doubtless contributed to failure of reproduction, the decline in yield of more than 80 percent during the present century has not been limited to polluted or obstructed streams. On the contrary, some almost unpolluted rivers, such as the Edisto River in South Carolina, have been severely depleted and a fine recovery has been observed in the polluted Hudson River. This recovery is attributed to regulations limiting fishing to 4 nights a week and closing spawning areas to fishing.

In order to extend to other localities the benefits of the experience in the Hudson it is necessary to know the approximate spawning escapement there and to devise means of matching it substantially elsewhere.

Studies in 1938 indicate that the fishery removed somewhat more than 50 percent of the run. Of 196 shad tagged in Sandy Hook Bay in April, 53 percent were taken during the season in the river. Since tagging experiments usually underestimate fishing intensity it is probable that the fishery removed somewhat more than the indicated percentage.

As a check on the estimate of fishing mortality by tagging experiments, scales were examined for spawning marks in 1938 to estimate the percentage of that year's catch contributed by fish which had escaped the fishery in 1937. On the basis of the reported catch in 1937, and assuming a fishing mortality of 60 percent, approximately 1,667,000 fish should have entered the river in 1937. Of these, about 1,000,000 were caught and 667,000 escaped. Assuming 10 percent mortality among these after they left the river, about 600,000 would be expected to return in 1938. From preliminary estimates of the catch in 1938 it appears that the total run to the river was about 1,250,000 fish. Of these about 600,000, or 48 percent, would be "repeaters" or fish which had escaped the fishery and which had spawned in 1937. Forty-six percent of the scales collected in 1938 bore spawning marks indicating that they had spawned in 1937, certainly in very good agreement with the expectation from the above estimate.

Similar collections of scales have been made in other rivers where depletion is greater. As might be expected, the percentage of scales having spawning marks is much lower, but, until records of the catch for 1937 and 1938 are available, the percentage escapement in 1937 cannot be estimated.

Because of the importance of reproduction in shad conservation a careful ecological study of the early life history is being made by John C. Pearson and Louella Cable. In 1938 intensive work was done in the Edisto River in South Carolina and it is expected that these studies will be extended to other rivers in 1939. In these studies special attention is being paid to estimating rates of mortality at various stages in the early life history, at various levels of abundance of young, and under various conditions of temperature and volume

of river flow. For example, in 1938 most of the eggs taken in the plankton were dead. This may merely represent oversampling of the surface levels, for all plankton collections were made by surface nets. Further observations will be made in 1939 using bottom nets.

Such observations are expected to be of great value in estimating the optimum spawning escapement and also as a basis for estimating the most suitable size for releasing young shad produced in hatcheries.

Mr. Pearson conducted experiments in rearing shad fry in bass ponds at the Edenton, N. C., and the Orangeburg, S. C., Hatcheries. At the former station 6,500 young shad grew to a mean length of 35 mm. ($1\frac{3}{8}$ inches) in 35 days in April and early May. The pond was drained and an attempt made to rear a second lot in the same pond. Only 500 fish survived. It is not known whether this was the result of diminished food production during the summer or to the activities of predators accidentally introduced.

As a working hypothesis for the shad investigation, it has been assumed that the majority of the shad return to the river in which they were spawned. The correctness of this assumption is being tested from several angles. The tagging experiments which were intended primarily to measure fishing intensity will also indicate whether adult shad seek the same river each time they spawn. (Five shad have been recaptured, after a lapse of a year, in the same river or in estuaries en route.) Vertebral counts of adult shad are being compared with those of juveniles taken in connection with the early life history studies. The scales of adult shad from each of several rivers are being compared with those of young shad. Marked differences have been noted in the size and appearance of the stream-growth portion of the scales from different rivers, but until data from other years are available it cannot be determined whether these differences are characteristic of each year's brood in the individual streams. Attempts to tag juveniles have been unsuccessful thus far, but further experiments are planned.

SHRIMP INVESTIGATIONS

MILTON J. LINDNER, *in charge*

With an annual catch averaging well over 100,000,000 pounds, the shrimp fishery is the most important marine food resource of the South Atlantic and Gulf States. The Shrimp Investigations are designed to provide a thorough knowledge of the life history, migrations, ecological relationships, and abundance of this first-ranking marine organism of the Southern States as a basis for its intelligent conservation.

All the members of the scientific staff which, in addition to Mr. Lindner, includes William W. Anderson and C. Howard Baltzo, have been associated at different times during the year with each of the various field investigations undertaken. In addition to the Bureau employees, Albert Collier, Marine Biologist of the Texas Game, Fish, and Oyster Commission, has been actively engaged in conducting a cooperative research program in Texas under the general direction of Mr. Lindner. The Louisiana Department of Conservation has continued to furnish office and laboratory space in New Orleans for the headquarters of the investigation. In October,

Commissioner Rankin, of the Louisiana Department of Conservation, kindly arranged to supply more spacious quarters for the staff and collections at 336 Chartres St., New Orleans, La. The city of Gulfport, Miss., has continued to furnish dockage space for the *Pelican* and a storage room for equipment. Arrangements have been made with Dr. A. E. Parr, of Yale University, for analyses of the water samples, and with Dr. Dana Russell, of Louisiana State University, for analyses of the bottom core and mud samples taken during the cruises of the *Pelican*.

In the course of the shrimp investigations, which have been under way since 1931, it has been found that the common shrimp spawns during the spring and summer in the open waters of the Atlantic Ocean and the Gulf of Mexico. The eggs are not carried by the female but are extruded directly into the water. The young enter the inland waters at an early stage in their development. The extensive inland water areas of the South are the nursery grounds of the shrimp, where the young feed and grow. Those young not successful in reaching the nursery grounds perish. As the immature shrimp increase in size they gradually leave the nursery grounds and return to the ocean. The growth rate of the shrimp is quite rapid, and by mid-June or July, depending upon the locality, the young are of sufficient size to appear in the commercial fishery. By September, practically the entire catch is composed of these immature shrimp, for the adults disappear from the fishery as spawning progresses. Sexual maturity is attained in 1 year. The movements and behavior of the shrimp are affected by temperature, salinity, and tides.

Tagging experiments have demonstrated that shrimp are migratory. During the fall and winter the larger shrimp move south along the Atlantic coast from North Carolina, South Carolina, and Georgia into the waters off the coast of central Florida. In several instances tagged individuals have been picked up more than 300 miles from the place of release. The smaller shrimp, however, tend to remain in local waters and are not subject to such extensive movements.

In the Gulf of Mexico it was suspected that the larger shrimp, from the Louisiana coast at least, move off into deeper waters during the winter. With a suitable vessel and the proper equipment it was considered highly probable that a new winter fishery could be developed off the Louisiana coast. The *Pelican* was transferred to the Shrimp Investigations in 1937 for this purpose, but, owing to lack of funds, operation of the boat was deferred until January 1938.

The major program of work undertaken during the year falls into three general categories, namely: Offshore scouting operations with the *Pelican* in the Gulf of Mexico, tagging experiments along the Atlantic coast and the Louisiana coast, and ecological studies in Texas.

OFFSHORE OPERATIONS

Among the results of the 1938 investigations, the event of outstanding importance to the commercial fishery was the discovery of a winter concentration area for large shrimp off the central Louisiana coast. The *Pelican* began operations in January and operated continuously until June, when the loss of the trawling cable necessitated

a lay-up of 1 month for replacement. The boat was again placed in operation in July, but was laid up for engine repairs and for the duration of the dangerous hurricane season from August through October. Operations were resumed for a short period in November.

The offshore area from Mobile, Ala., 60 miles north of Brownsville, Tex., was covered with the *Pelican*. In this region 402 trawl hauls were taken and 96 hydrographic stations were occupied. From each haul observations were made on the quantity, sex, length, and gonad development of the shrimp. At the hydrographic stations temperature and salinity observations were secured for various depths, and core-tube and Petersen grab samples were obtained for study of the types of bottom and organisms present. Trawling was done in depths up to 180 fathoms. It developed during the course of the work that a small 9-foot trawl, towed at full speed, was admirably suited for scouting. As much as 8 gallons of shrimp have been taken with this gear in a half-hour haul.

That a winter concentration point for the larger common shrimp occurs off the Louisiana coast, in the region between Ship Shoal Buoy and Trinity Shoal Buoy, is quite evident from the data collected with the *Pelican*. As a result of the discovery of this area by the Bureau, boats operating from Morgan City, La., initiated a commercial fishery based on this offshore group of shrimp. A number of the Florida shrimp boats, which are better suited for offshore operations than the smaller and less seaworthy Louisiana craft, have migrated to Morgan City and Berwick, La., and have developed this fishery to one of considerable magnitude.

No shrimp concentrations of any significant size were found between the Alabama coast and the mouth of the Mississippi River. Off Texas during April the common shrimp appeared to be scattered about the 10-fathom contour, but with no evident heavy aggregations. The less-abundant grooved shrimp was found in depths up to 70 fathoms but no commercial concentrations were encountered.

Inasmuch as a considerable amount of offshore work remains to be done in the Gulf, it is planned to continue these operations during 1939. The region between Mobile, Ala., and St. Marks, Fla., should be covered to determine the depth distribution of shrimp in this area and whether or not commercial concentrations occur. The Texas coast should be scouted as far south as the Mexican border during midwinter. The fishing grounds between Ship and Trinity Shoals should be covered at regular intervals during the spring, summer, and early fall to determine: (1) The extent and duration of the apparent onshore movement of the common shrimp during spring and early summer; (2) the fate of the adult spawning shrimp as the season progresses; (3) the magnitude of and the period covered by spawning; and (4) the time that the young shrimp begin to appear in this area after leaving the bays.

TAGGING EXPERIMENTS

For several years tagging experiments designed to provide information on migrations, growth rate, fishing intensity, and fate of the adult shrimp have been in progress throughout the South Atlantic shrimp fishing areas. Understanding of the fishery in this section depends largely upon the solution of these problems.

Previous tagging had established the fact that the larger shrimp move south along the coast during winter, concentrating in the waters between St. Augustine and Cape Canaveral, Fla. Indications of a return northward movement had been obtained from length-frequency distributions and prior tagging. Conclusive evidence, however, of this return movement had not been secured.

During 1938, 3,160 tagged shrimp were released from Cape Canaveral to St. Augustine in January, February, and March, a period representing the height and decline of the Florida winter fishery. From releases at Cape Canaveral returns were secured as far north as Fripp Island, S. C., a distance of some 250 miles. It is therefore evident that a return movement does occur. Whether this return movement is made at random or represents the return of shrimp to the region where they originated has not yet been determined.

Although the larger shrimp migrate to the southward during the winter, the small individuals remain in the local waters of Georgia. In January, February, and early March, 1,325 shrimp from this group were tagged and released in the area around Brunswick, Ga., in an effort to determine whether they also are migratory. The returns indicate that this class does not undertake any extensive movements. Additional tagging experiments in various areas along the entire coast would add materially to our knowledge of this group of so-called "local shrimp."

From April through August 3,200 tagged shrimp were released in the vicinity of Brunswick. The returns from these releases indicate that no extensive coastwise migrations were occurring at this season.

Because of the extensive and continuous migrations and movements of the shrimp, growth determinations by length-frequency distributions cannot be relied upon to present a true picture of the rate of growth over any considerable period of time. Neither can study of growth of confined individuals represent the true growth rate, owing to the extreme difficulty or impossibility of duplicating the widely varied changes in habitat that the shrimp undergo as they increase in size. Tagging experiments, therefore, provide the best source of information on the growth of the shrimp in its natural environment, as each shrimp is measured at release and upon recapture. Although many data have been accumulated, more tagging is required to arrive at an accurate approximation of the growth rate of shrimp during the different seasons of the year, and in different localities.

The determination of fishing intensity has long been a difficult problem. Although the percentage of returns from tagging experiments gives some indication of fishing intensity, detailed and accurate catch statistics are also necessary. None of the States in the area covered by the shrimp fishery has gathered catch statistics in a form suitable for analysis of the shrimp population density, a situation which is particularly deplorable in view of the magnitude of the fishery. Because of the lack of funds, personnel, and regulatory authority, it has been impossible for the shrimp staff to secure the necessary statistics. A serious effort was made during the year to secure voluntary cooperation of the fishermen in keeping daily catch records. Log books were provided to all boat captains willing to

maintain them. Results indicate that a venture of this nature can be successful only through frequent personal contacts with the men keeping the logs. One shrimp cannery in Georgia kindly allowed the transcription of its entire boat catch records from 1921 to 1937. These records, which were copied in 1938, should be of considerable value in tracing the progress of the central Georgia shrimp fishery during its period of most rapid development.

It is quite evident from the work done so far that if adult shrimp survive for 2 or more years in any quantities along the Atlantic coast, they must move into deeper offshore areas beyond the range of the present commercial fishery. This important information which is lacking in our knowledge of the life-history of the common shrimp can only be determined by thorough scouting of the offshore waters between Cape Hatteras and Cape Canaveral. Exact knowledge, which is not now available, of the depth distribution of the shrimp along the Atlantic coast during the spawning season is of particular importance in attempting to delimit the spawning areas. Tentative plans are being made for the use of the *Pelican* on the Atlantic coast after the completion of the Gulf survey.

The expansion of the offshore fishery in the Gulf has raised the important question of whether these shrimp are of local origin or whether they are migrants from other States. It was deemed advisable, because of the urgent need for knowledge of the movements of shrimp in the Gulf, to suspend activities at the Brunswick (Ga.) station in the fall and transfer *Launch 58* to New Orleans for tagging operations. The first of the Louisiana tagging experiments was inaugurated during December, when 2,300 shrimp were released between the Mississippi River and Ship Shoal. The objective of these experiments, which should be extended to cover the entire fishery, is to determine the migrations, growth, age, and fishing intensity of the Gulf shrimp. Tagging will be continued during the coming year as funds permit.

ECOLOGICAL STUDIES

The Texas Investigation is operated on a cooperative basis with the Coastal Division of the Texas Game, Fish and Oyster Commission. With the transfer of Kenneth H. Mosher to the Pacific Pilchard Investigations, the sampling of the commercial catch at Aransas Pass was discontinued. Albert Collier, of the Texas Commission, has conducted studies during the year to determine the relationship between the environmental changes and the distribution of shrimp in Aransas Bay. What effects do temperature, salinity, tides, currents, and food have on the reactions of the shrimp in its natural habitat? What determines the time when young shrimp leave the shoaler nursery grounds for Aransas Bay and later for the Gulf? Why does the success of the commercial catch fluctuate so greatly from day to day? Can these fluctuations be determined in advance? Is there actually a definite distribution pattern of shrimp in Aransas Bay, as appears to be the case from the commercial catch, and if such a distribution is present what is the cause? These and many other problems require solution for a better understanding and wiser utilization of the shrimp supply.

Stations were established at various points in Aransas and Copano Bays. These stations were occupied at regular weekly intervals when the weather and availability of boats permitted. At each station trawl hauls were made for shrimp, and temperature and salinity observations were taken. In the fall Mr. Collier instituted a weekly survey of the shrimp distribution in Aransas Bay. Hauls of 5 minutes duration were made with a small trawl in closely spaced parallel lines across the bay. From this work it appears that the shrimp follow a rather well-defined path across Aransas Bay in their movements from the more interior nursery grounds to the Gulf. During the coming year efforts will be directed toward determining the fundamental reasons for this distribution.

NORTH PACIFIC AND ALASKA FISHERY INVESTIGATIONS

DR. F. A. DAVIDSON, *in charge*

The North Pacific and Alaska Fishery Investigations, with headquarters in the Fisheries Biological Station at Seattle, Wash., are concerned chiefly 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 in 1937 were continued in 1938 with the exception of the Puget Sound sockeye investigation, which was discontinued in March 1938. An investigation of the Bristol Bay fisheries was undertaken in July 1938.

COLUMBIA RIVER SALMON FISHERIES

Investigations of the Columbia River salmon fisheries were continued during 1938 by J. A. Craig, A. J. Suomela, M. J. Hanavan, Z. E. Parkhurst, J. L. Wilding, W. M. Morton, and J. A. Coleman.

Stream surveys.—One of the factors contributing to the depletion of salmon runs in the Columbia River watershed is the fact that important spawning grounds have been rendered inaccessible or made unsuitable for migratory fishes by the construction of irrigation diversions and by other activities of man. With the primary purpose of classifying those areas which may be rehabilitated, and of discovering means of making them accessible to fishes, an extensive stream-survey program has been undertaken and is now well under way.

During the early part of the season these stream-survey activities were centered in the Willamette River system. In this area surveys were completed on the McKenzie River, the middle and coast forks of the Willamette and Long Tom Rivers, and the upper portions of the North and South Forks of the Santiam. The Clackamas River survey was partially completed. The McKenzie, Middle Willamette, and the Santiam Rivers are the most important spring chinook streams of the Willamette system.

The Payette River system in Idaho was surveyed during the month of August. In early years this river was one of the important salmon streams in Idaho. Chinook and blueback salmon and steelhead trout migrated to the headwaters of this river in large numbers.

Payette Lake, at the headwaters of the North Fork, is reported to have supported a run of blueback salmon. Dams without adequate fish protection are responsible to a great extent for the extinction of the salmon runs in this river. A dam constructed at Horseshoe Bend 30 years ago probably destroyed the blueback run which had entered Payette Lake, and limited the migration of chinooks and steelheads to the part of the river below this obstruction. In 1925 the Black Canyon Dam was constructed by the United States Reclamation Service. This dam is a complete barrier to all migratory fish, since no fish protection was provided. It is reported that there have been fewer salmon observed below the dam each year. The stream survey revealed that the amount of favorable spawning area in the Payette River system is great enough to provide facilities for a large run of fish, if access to the spawning grounds were provided.

Stream surveys were carried on in 258 miles of the Clearwater River, including the main river from the mouth to Kamiah Creek, Potlatch Creek, North Fork to Kelly Creek, Middle Fork, Sellway River to Meadow Creek, and the Lochsa to Fire Creek. Some 500 miles of this large river system remain to be examined.

Stream surveys were also started on the Klickitat River but only 38 miles had been surveyed when winter weather conditions forced the termination of the survey for the season.

A total of 1,177 miles of stream was surveyed during the season. Information obtained from these surveys was made available to various interested agencies.

Salmon redds and spawning habits.—An investigation was undertaken to study the spawning habits of spring and fall chinook, silver, and chum salmon as an aid in interpreting the results of the stream survey. The information gained as a result of this investigation is as follows: (1) The space required for each pair of spawning fish, (2) type of gravel selected, (3) depth of water preferred, and (4) temperature prevailing at the time of spawning. In addition, case histories of individual redds were recorded, including data on the longitudinal and horizontal measurements of the redds, the time of the male intervention, the deposition of the ova, and superimposition and succession of the redds. These studies were conducted in the Kalama, Ohanopecosh, Toutle, Grays, German, Abernathy, and Alochaman Rivers.

During the period of investigation information was obtained on 486 salmon redds in these rivers. The results of this study are now being analyzed and a report for publication will be submitted in the near future.

Tagging.—A series of 25 tagging experiments were conducted in the Columbia River on spring and fall chinooks which pass through the fishery from May 1 to the latter part of August and early September. The purpose of these experiments is to obtain data on (1) the rate of migration of the salmon upstream, (2) their distribution in the river system, (3) their appearance at hatcheries, and (4) some estimate of fishing mortality. These experiments will contribute invaluable information as a basis for regulation of the fishery and for stocking policies.

The experiments were carried out at three localities on the river, Sand Island, Woody Island, and in the vicinity of Oak Point. These

points are located 5, 25, and 45 miles, respectively, from the mouth of the Columbia.

During these operations 2,357 chinooks were tagged and liberated, of which 743, or 31.5 percent, were recovered from the commercial fishery, sport fishery, hatchery, and from the spawning grounds. The recovery from hatcheries was 48 tags, or 2.04 percent.

Information was obtained on the distribution of the spring chinook run in the tributaries of the Columbia, indicating that fish entering the river in the month of May are destined for tributaries in the Upper Columbia, Snake River, and Willamette River systems.

The results of this experiment will be included in a report which is being prepared for publication.

Construction of fish protective works.—On the 1st of July combination grants of P. W. A. and W. P. A. funds were made available for the construction of fish screens and other fish-protection works on certain Federal power and irrigation projects. These allotments authorized the expenditure of \$50,000 in each of the States of Oregon, Washington, and Idaho, and \$118,000 for the construction of one fish screen in the Wapato Canal of the United States Indian Service near Yakima, Wash., and one screen in the power canal of the United States Reclamation Service near Prosser, Wash. Surveys have been made and plans drawn for screens at the Wapato Canal, Prosser Canal, and Black Canyon Dam diversion of the Reclamation Service in Idaho, remodeling of screens in the Sunnyside Canal near Yakima, Wash., and construction of a screen in the Echo Feed Canal of the Reclamation Service on the Umatilla River in Oregon, as well as for several small projects in the State of Washington. Contracts have been let and work started on the construction of the steel screen drums for the above-mentioned projects. A contract has been made and work is well advanced on the concrete structure for the Wapato Canal screens. Excavation work has been going forward at the Black Canyon Dam site and at the Sunnyside Canal and considerable concrete and steel work has been done as well at Sunnyside. Concrete structures will be built at the remaining sites when the work can be done at the lowest cost and with the least interference with canal operations. This work has been done under the supervision of J. A. Craig and O. W. Lindgren, associate hydraulic engineer.

Special surveys.—An observer was stationed at the dam across the Clearwater River at Lewiston, Idaho, from late spring until late fall to observe the condition of the runs of migratory fish passing that point. It was found that a significant run of steelhead trout still enters the stream, but that salmon are no longer numerous in that watershed. Lack of adequate fishways is apparently the reason for this condition and the owners of the dam have drawn plans for two new fishways and the remodeling of the present single structure. As soon as this construction is completed, several hundred miles of spawning grounds will be made available again to salmon. Collection and tabulation of statistical data relating to catch records and abundance of salmon and steelheads of the river were continued.

COHO SALMON

The coho salmon investigation, the basic objectives of which are a study of the life history of this species under the varying conditions

found in the different streams of the Puget Sound region, the determination of the causes for the decline in its abundance, and the development of methods for rebuilding the runs was continued during the past year by George B. Kelez.

The series of three marking experiments undertaken during the fall and winter of 1937 at the Quilcene (Wash.) station of the Division of Fish Culture² was completed, during the month of May, with the marking of 17,094 coho fingerlings of the 1936 brood. These fish had been held for the purpose of releasing them at the approximate time of normal seaward migration. At the time of this last release, marked individuals from the lots released in September and December 1937 could still be observed in the Quilcene River in the vicinity of the hatchery. It is expected that comparative returns from these experiments will provide further information both on the success of various periods of hatchery rearing and on the relation of the additional costs of prolonged rearing to the increased survival rate of the fingerlings liberated.

No further recoveries of marked fish from the 1935 experiment on Voights Creek, tributary to the Puyallup River, were made during the late winter run, and none were taken from the Green River.²

Several tags from the 1937 Samish River experiment were returned to the laboratory during the spring and summer. This experiment was undertaken to test the practicability of marking fingerlings by the use of an internal celluloid tag in combination with the excision of the dorsal fin, as an alternative to the usual method of marking in which two or more fins are removed. If this method is successful, it will eliminate the present limitation on the number of possible experiments which the number of available fin combinations imposes.

Collections of scale samples and biological data from mature cohos taken in the commercial fishery were made during the season. Samples aggregating approximately 4,500 fish were taken during the summer fishery at Anacortes, Wash., and samples of more than 2,000 fish were taken during the fall fishery at Seattle. Supplementary samples and catch data were collected during the season from the sport fishery carried on in the vicinity of Seattle. Collections of coho fingerlings were also taken during the season from the sport fishery carried on in the vicinity of Seattle and the major streams tributary to Puget Sound.

During the spawning migration regular collections of scale samples were taken and estimates of population size were made on all streams tributary to Puget Sound on the eastern shore. It is believed that variations in early life history, as shown by the scale nuclei, will differ sufficiently between the colder northern streams and the warmer southern ones to afford a means of separating these populations on the basis of scale characteristics. Through a comparison of samples of scales taken from the commercial fishery with those from the two spawning areas, the relative contribution of these districts to the fishery may be determined.

Observations on the spawning grounds during the fall and early winter indicate that, although the total escapement of cohos was not large this year, spawners were well distributed in all the streams of the region.

² See "Progress in Biological Inquiries, 1937."

BRISTOL BAY SALMON FISHERIES

The Bristol Bay region of Alaska is the greatest red-salmon producing area in the world, providing, as it does, more than 60,000,000 pounds of first quality canned salmon a year. Sporadic studies of the salmon in this area have been carried on since 1922, and information has been obtained on the age and migration habits of some of the populations inhabiting the five major watersheds in this region.

The recent development of extensive offshore fishing has been considered a possible source of serious injury to this salmon fishery. The fact that there is little available knowledge of the life history of salmon in this area, and of the factors affecting the survival of the populations as a whole, made it imperative to inaugurate a thorough biological study of the fish of this region, their migration routes and the factors affecting their survival. An appropriation was made available on July 1 for the purpose of carrying on the first year's study of a 5-year program of investigation. The problems entailed in such an investigation are manifold and must necessarily include studies of a multitude of factors, biological, physical, and chemical, affecting the species from the time the eggs are deposited in the gravels in the upper reaches of the watersheds until the progeny from one year's spawning have completed their life cycle and have deposited the fertilized eggs from which another brood will result.

The investigation separates itself into two distinct though related divisions, the fresh-water and the marine, which are being carried on by George B. Kelez and J. T. Barnaby, respectively.

Fresh-water studies.—The principal activities of this phase of the investigation consist of the determination of the physical and biological characteristics of the fresh-water areas of the Bristol Bay region, the evaluation of the annual spawning populations, age analyses of the runs in the various rivers, and the measurement of factors influencing the mortality of the eggs and young fish in fresh water.

During the past season reconnaissance surveys of the five main river systems of the region were made, in which the general topographical features of the watersheds, the number and size of the headwater lakes and tributary streams, and the extent of the spawning areas were noted. From these observations thorough surveys of important spawning grounds have been planned and areas selected for carrying on marking experiments, migrant collections, and similar studies.

A number of small lakes, typical of the particular watersheds in which they lie, were inspected, and several suitable ones chosen for studies of the biological characteristics of the environment in which the young fish grow and develop. Here, also, the effect of varying climatic conditions on the survival of the stocks may be determined.

Methods of handling the commercial catch at the canneries were observed and plans were made for a complete annual program of random sampling of the catch in which scale samples will be taken for age analysis. Data on size, weight, and sex ratio will be obtained for population studies. These collections will be supplemented by similar sampling on the spawning grounds of each river system. From this material the age-group composition of each year's run, the

total return from each season's spawning brood, and the selective effects of the commercial fishery may be determined.

Marine studies.—The sockeye salmon, after migrating seaward, spend 2 or 3 years in the ocean and then return to fresh water to spawn. During this period they make over 98 percent of their growth in weight. Hence, environmental factors affecting the fish during their stay in salt water have a most important part in determining the condition and quality of the mature fish.

The United States Coast Guard very generously cooperated with the investigation by furnishing one of their large cutters, the *Redwing*, for the purpose of conducting an oceanographic survey of the waters of Bristol Bay and the contiguous waters in which salmon live during their ocean sojourn.

The program of oceanographic studies followed the general methods used by Dr. T. G. Thompson, Director of the Oceanographic Laboratories at the University of Washington, who has been making oceanographic studies of the North Pacific Ocean for a number of years. In this way the data will be in proper form for comparison with the results of the general survey.

During the season the entire area of Bristol Bay proper, comprising over 10,000 square miles, was crossed and recrossed and samples were collected at 164 stations. The oxygen and salinity content of the water were determined and temperature data collected for the purpose of calculating the direction and force of the ocean currents. As a corollary to these studies current meters were operated at various depths and data were collected on the type of bottom and the depth of water at each station. Plankton samples were collected to determine the type and abundance of food present for the fish.

The oceanographic surveys are to be continued and the migration routes of the fish are to be determined by extensive marking, tagging, and sampling programs. These data will also furnish information on the fluctuations in ocean mortality.

KARLUK RIVER RED SALMON

The investigation to determine the extent and causes of the fluctuations in the size of red salmon runs in Karluk River, Alaska, was continued in 1938 by J. T. Barnaby and Allan C. DeLacy. Field work was carried on from early April until the end of September.

Population studies.—The commercial catch of Karluk red salmon was sampled throughout the season to discover marked fish returning from marking experiments carried out in previous years. During the season 305,283 salmon were examined and 1,481 marked fish were found. The purpose of these experiments is to determine the mortality of the fish during their stay in the ocean. The results to date indicate that ocean mortality is fairly constant and that the variations in the ratio of return to escapement are mainly due to fluctuations in the environmental conditions affecting the fish during their stay in fresh water. The returns of marked fish during the past season were mainly from the experiments of 1936, in which year 26,700 fingerlings were marked by excision of the adipose and right ventral fins and 26,700 by excision of the adipose and both ventrals. Thus, in addition to the basic information desired, these experiments

served as a check on the relative value of the different marks used. Recoveries of fish in which only one ventral had been removed amounted to 663, while recoveries of the fish in which both ventrals had been removed totaled only 569. Apparently the fish marked by removal of the adipose and both ventrals had a lower survival value than did the other group. While complete returns from this experiment will not be at hand until 1940 these results indicate that caution should be exercised in comparing marking experiments in which different combinations of fins have been removed.

A counting weir was again operated in the Karluk River to determine the number of fish going up the river to the spawning grounds. Counting was continued until September 3, at which time 875,678 red salmon and 1,639,589 pink salmon had passed upstream. Owing to the large number of dead spawned-out pink salmon drifting downstream the weir had to be removed on September 4. While the escapement figures are consequently not quite complete, they are of considerable value. Data on the escapements and the returns from given escapements have been collected for a number of years and it is important that no breaks should occur in the series of data.

More than 11,500 scale samples were collected during the season for the purpose of calculating the age group composition of the escapement and the commercial catch. The number of fish returning from each brood year is determined in this way and credited to the proper year. This study is of basic importance because it indicates what variations may be expected in the returns from known escapements and what is the optimum sized escapement for this and other watersheds of a similar magnitude and nature.

Ovaries from fish ranging in size from 20 to 24 inches were preserved and counts are being made to determine the number of eggs produced by each fish. The results of the present investigation will be compared with similar work done in 1926 to determine whether or not any change is taking place in the fecundity of the species.

The seaward migration of red salmon fingerlings began on May 26 and continued intermittently until June 16. For the purpose of determining the age composition and the length frequency of the various age groups making up the migration, samples were collected on all days the migrants were in the river. The migration appeared to be of average magnitude and the fingerlings were of the usual strong, sturdy stock so characteristic of this watershed.

Predatory species.—As the char *Salvelinus malma*, or Dolly Varden trout, is very abundant in the Karluk watershed and is considered to be one of the most important salmon predators, a study of this species is being carried on in conjunction with the studies of the salmon population. In 1937 a series of marking and tagging experiments were initiated to aid in determining the size, homogeneity, growth rate, migration habits, and mortality of the population of chars inhabiting the Karluk River and Karluk Lake. During the past year three more experiments were started, in which external tags were used in lieu of the internal tags used in the 1937 experiments. To recover the internal tags and discover the distinguishing number it was necessary to kill and dissect the fish. The external tag has a marked advantage in that a recaptured tagged fish can be identified by the number on the tag, measured, and then released. Recaptures of chars from these experiments are conse-

quently expected to extend over several years, permitting accurate determination of growth and longevity of the species.

The results obtained from the 1937 and 1938 tagging experiments show that: (1) There is a slight amount of straying from one watershed to another but on the whole the chars return in the fall to the same streams from which they entered the ocean. (2) Many, if not all, of the chars that migrate seaward in the spring, return to fresh water in the fall of the same year and migrate seaward again in the spring of the following year. (3) There are at least two populations of chars in the Karluk watershed, those that live in Karluk Lake and those that live in the river. However, these populations mix to some extent. (4) The chars in Karluk Lake do not comprise a homogeneous population but are apparently divided into several rather distinct groups which intermingle to a slight degree. (5) The chars in this watershed have a relatively slow growth and are relatively long lived. (6) Sea-run chars make a faster growth during the time they are in the ocean than do the non-sea-run type during the same period of time. (7) Sea-run chars, on the average, make no growth in the 8- to 9-month period spent in fresh water between the upstream migration of one year and the downstream migration of the following year. Length-weight measurements made in the spring, and again in the fall, have shown that there is a marked difference in the condition factor of the downstream and upstream migrating chars. During the few months spent in the ocean these fish increase in weight from 60 to 100 percent, and about two-thirds of this weight increase is lost between the time of the upstream migration of one fall and the time of the downstream migration of the following spring. This loss in weight is attributable to the fact that these fish spawn during the period spent in fresh water and also in part to the limited food supply available during the winter months.

A cooperative observer's meteorological station was installed at Karluk in the latter part of June 1937. Data for the first fiscal year were complete by June 30, 1938. The collection of these data is of considerable importance in view of the marked effect climatic conditions have on the survival of salmon. The average monthly rainfall was 2.77 inches, the total for the fiscal year being 33.26 inches. There were 110 clear days and 255 cloudy or partly cloudy days. There was precipitation on 149 days. The highest air temperature during the year was 66° F. and the lowest was 6° F. The yearly mean average was 40.3° F.

PINK SALMON

The pink-salmon investigation during 1938 dealt with the factors contributing to the change in abundance and the time of appearance of the pink-salmon runs in Southeastern Alaska. This investigation was carried on by Dr. F. A. Davidson and Samuel J. Hutchinson. The work was confined to a study of the pink-salmon runs in Southeastern Alaska which comprise the bulk of the Alaska pink-salmon catches. The total 1938 catch fell below previous yearly packs and, according to all indications, the runs are maintaining themselves with difficulty under the intensive commercial fishery. If the condition of the runs is not improved in the very near future, drastic measures will have to be taken to rehabilitate these salmon populations or they will soon fall to a dangerously low level of abundance.

Studies pertaining to the continuation and well-being of the pink-salmon runs in Alaska were conducted at the Biological Station in Seattle and the summer field station at Little Port Walter, Alaska. The field station was opened on June 21, 1938, and continued in operation until October 20, at which time the season's work was completed. A number of factors pertaining to the life history were investigated, and stream surveys and other types of aquatic biological studies were carried out.

A tagging experiment was conducted to determine the migration routes of pink salmon passing through Lower Chatham Strait, Alaska. Some 2,095 mature pink salmon taken from the commercial fish traps in Tebenkof Bay, Kuiu Island, were tagged and released. Of the total number tagged, 637 were recaptured by the commercial fishery, a return of 30.4 percent. The experiment is to be repeated in the summer of 1939 and when all recovered tags are collected, information will be at hand covering the routes of migration taken by both the even- and odd-year pink-salmon runs.

The salmon-counting weir was installed across the stream at Little Port Walter, and a sexing pen was constructed in front of the counting gate to determine the number of male and female salmon in the run. The first of the run passed through the weir on August 28. This was the latest date for the appearance of the run since the installation of a counting weir at Little Port Walter, the run being a full week after the latest observations previously recorded. The males entered the stream in greater abundance during the early part of the season, but by the close of the season the females had almost equaled their number. A total of 3,283 males and 3,184 females entered the stream, bringing the total to 6,467 salmon on September 22, the close of the season. Previous weir-count totals of salmon entering the stream at Little Port Walter have consisted of 6,952 pink salmon in 1934, 6,073 in 1935, 5,164 in 1936, and 7,085 in 1937. From these figures it would appear that the run has been able to maintain itself at a more or less fixed level of abundance in this locality during the past 5 years.

After the adult salmon had entered the stream to spawn, a series of gravel samples were taken from 28 nests of spawning fish to determine the size and type of rubble selected. In computing a percentage mean for each gravel size, and using all of the samples, it was found that 6.38 percent was 3-inch gravel or over; 5.79 percent was 2½-inch gravel; 8.38 percent was 2-inch; 10.80 percent was 1½-inch; 14.82 percent was 1-inch; 7.57 percent was ¾-inch; 12.75 percent was ½-inch; 8.76 percent was ¼-inch; and 24.76 percent was sand aggregate that passed through a ¼-inch screen. Nesting areas composed of gravel over 3 inches in diameter are not selected when areas of the finer aggregate are available, but, owing to crowded conditions, nest building and spawning sometimes take place in large rubble.

In February 1938, a C. C. C. camp was moved from Juneau, Alaska, to Little Port Walter, under the supervision of the Forest Service. C. C. C. personnel worked at the station all spring and summer clearing ground, building a dock and float, moving buildings to higher ground, constructing 3 miles of forest trail, and building two shelter cabins on the headwater lakes at Little Port Walter.

On July 22 and 24 the Forest Service, Bureau of Fisheries, and C. C. C. personnel cooperated on an experimental trout planting program through the use of aeroplanes. Rainbow trout averaging 10 inches in length were flown from Sashin Lake, back of Little Port Walter, to Blue Lake near Sitka. Other plantings were flown to a number of lakes south of Red Bluff on Baranof Island. The C. C. C. camp completed its program at Little Port Walter by the first of September and was moved to Port Alexander.

The cooperative observer's meteorological records were continued during 1938 at Little Port Walter. Through these records it is possible to measure the climatic changes that have a direct effect on the salmon's fresh-water environment. An anemometer and a psychrometer were installed as additional equipment to measure wind and humidity which indirectly play a part in the salmon's life cycle. A total of 264.53 inches of rain fell during 1938 at Little Port Walter, which is an average of 22.04 inches per month. Rain was recorded on 261 days. The highest air temperature was 71° F., and the lowest was 13° F., with a yearly mean average of 43.08° F. Fifty-five clear days, 58 partly cloudy, and 252 cloudy days were recorded at the station during 1938.

ALASKA SALMON STATISTICS

Collection, tabulation, and analysis of the daily catch records from the various types of fishing gear operated by the salmon fishery in Alaska were continued in 1938 by Elizabeth Vaughan. All available catch records have been collected, and the files will be kept up to date in the future.

Analysis of these data consists mainly in determining average daily catches for each type of gear throughout each fishing season by districts. Indices of abundance and seasonal time of appearance of the salmon runs are determined from these daily averages. During the past year, the trap-catch records for 1937 in both Prince William Sound and Southeastern Alaska were analyzed and added to the previous compilations. This information, as in the past, was used as a basis for recommending changes in the fishing regulations in Alaska in order to provide for the conservation of the salmon resources. During the past year the gill-net records from the Bristol Bay area have been compiled for all years for which data are available.

From practically all parts of Alaska, fishermen and cannerymen have reported that pink salmon were very late in appearing during the 1938 season. It was felt that this phenomenon was unusual in all areas except Southeastern Alaska, where it was claimed the runs have been steadily getting later. Because of this belief, the industry demanded a revision of the fishing regulations. The statistics of the fishery, as collected and analyzed by this investigation, permitted an explanation of this phenomenon and a defense of the present regulations, which were embodied in a series of articles for publication in a commercial fishery journal.

The explanation of the change in the time of appearance of the Southeastern Alaska pink-salmon runs was made on the basis of the correlation between the abundance of the salmon, their average size, and the time of their appearance in the season.

HERRING

Investigation of the herring fisheries of Alaska was continued in 1938 by E. H. Dahlgren. Mr. Kolloen, who was assigned as a permanent assistant in this work beginning in July, carried out the field work of catch-record collection and of obtaining data on the size and age composition of the populations in the Kodiak and Prince William Sound areas during the season.

Previous tagging experiments have established the fact that, while the herring populations of Southeastern Alaska are divided into a series of separate populations, there are certain areas, notably at Warren Channel and at the west coast of Kuiu Island, where two of the major populations intermingle on the feeding grounds. The electronic detector was operated to search the fish taken for frozen bait from the Sitka spawning area during the spring. Only two tags were recovered, owing to the decline in the age class which had supported the fishery for the previous 4 years. The younger fish, which were available to the bait fishermen this spring, had not been available for tagging during the previous seasons. Nevertheless, the recovery of these two tags, affixed in previous years at this spawning area, definitely established the fact that the herring return to the same grounds year after year to spawn.

A controlled tagging experiment was carried on at the station at Little Port Walter in order to determine the maximum size of tag which a herring may carry without causing undue mortality. If it is proven that a tag of considerably increased mass can be carried, the difficulty of recovery will be greatly reduced. After an initial heavy mortality the herring appear to survive with a minimum of loss. However, the mortality increases in direct ratio to size of tag, with the largest tag showing an 87 percent mortality as compared to 34 percent for the smallest and 20 percent for the controls at the end of a 2-month period. The experiment is being continued through the winter with the watchman maintaining the records.

The Southeastern fishery declined to an all-time low since its great expansion in 1927. Since that year the fishery has depended, in some seasons almost exclusively, on the population which spawns in the vicinity of Sitka and which migrates during the summer to Cape Ommaney to support that fishery, and to Warren Island and the west coast of Kuiu Island, where it mingles with the population which spawns at Craig. Studies of the age composition of this population show the almost total failure of three successive brood years; that of 1932, 1933, and 1934. These failures, together with a too intensive fishery, caused a decline of this stock to a dangerously low level.

The measure used in evaluating the abundance of this population is a comparison of the catch per unit of gear per day's fishing, with the average catch per day's fishing established over a 9-year period. In deriving these indices the fleet has been divided into two groups (those of over 35 net tons and those under this capacity) to minimize the difference in efficiency of the larger and smaller vessels. The index for the 1938 season for the large vessels was 35, as compared to 71 for 1937 and 140 for the optimum season of 1932. The indices for the smaller vessels were 41 for 1938 as compared to 75 for 1937 and 164 for the optimum 1932 season. On the basis of these findings,

a closure of the Cape Ommaney area was recommended until the population shows definite signs of rehabilitation. The dangerously low level to which this population has been reduced was further evidenced by the failure of the normal number of spawners to appear at the Sitka area, which usually has had a large area heavily spawned.

The fishery in the Prince William Sound and Kodiak areas continues at a high level of abundance, as shown by continuing high yield and large catches per unit of gear. These areas are not yet as intensively fished as is Southeastern Alaska, but considerable expansion is contemplated in each area, and a close watch must be maintained to avoid over-exploitation and consequent depletion.

PACIFIC PILCHARD INVESTIGATIONS

O. E. SETTE, *in charge*

After 6 years of rapid and sustained increase in the total yield, the Pacific coast pilchard fishery experienced sharp fluctuations between 1937 and 1939. The season of 1937-38, for example, ended with a catch of 415,583 tons, which was 36 percent less than had been taken the previous year. In Washington and Oregon, on the other hand, though the summer season of 1938 was shorter than that of 1937, the total catch was greater than in any previous year, being 40,000 tons, or about 18 percent more than in 1937. Likewise, the fall season of 1938-39 in California was relatively successful, yielding by the end of 1938 a catch of 530,452 tons, which was 61 percent higher than that of the corresponding period of the previous year. Though other fluctuations had occurred during the relatively short history of the pilchard fishery, the sharp drop of last year's catch, following as it did an intensification of the fishery, caused concern among many as to the state of abundance of the pilchard stock. That there are fluctuations in the availability and even abundance of the stock, however, is one of the many elements that makes the problem of appraising the condition of the pilchard resource so elusive and complex.

This is a problem on which several organizations have been working for a number of years, namely, the fish commissions of California, Oregon, Washington, and British Columbia. In October 1937, the United States Bureau of Fisheries established a laboratory at Stanford University to cooperate with these agencies, to assist in the coordination of their results, and to investigate those features needed to supplement their findings. In May 1938, a conference of biologists, representing all the institutions working on pilchard research, was held at Stanford University. Past and current investigations were discussed and plans laid for future work.

Up to the end of 1937, a considerable body of information had been collected bearing on the migrations, spawning, age, and growth of the pilchard. Tagging experiments have demonstrated extensive migrations along the coast for as great a distance as between California and British Columbia. The spawning season has been determined in California, the principal spawning grounds surveyed, and the egg and larval stages described. The phenomenon of fluctuating year classes has been well established, individual dominant year classes having been recognized and traced through several years.

The basic problem remaining for solution is this: What is the optimum level of catch below which the stock would go to waste through underutilization, above which it would become reduced to commercial unimportance through overexploitation? Before this level can be determined, three questions must be solved: (1) How much is the stock reduced by the fishing? (2) How has the relation in the stock of income to outgo changed during the growth of the fishery? (3) How much does fishing in specific areas affect the stock in other areas?

Answering these questions necessitates the determination of abundance, age, reproductive success, and of the importance of intermigration. These necessities determined the program of the South Pacific Investigations during 1938.

STUDIES OF ABUNDANCE

Since the conventional method of estimating abundance from the performance of fishing fleets is limited to the range of fishing operations, attempts were made to measure directly the size of the pilchard population by aerial observations. This work, done in planes of the United States Navy and Coast Guard from January to May, covered an aggregate of 13,000 miles of flying distance, extending from Cape San Quentin on the south to Santa Barbara on the north, and several hundred miles to sea, and covering the more important schooling grounds of the pilchard a number of times. Although schools were sighted frequently and identified as pilchards, it was found to be unfeasible to estimate their size because their limits could not be defined. Also, judging from the time and places of occurrence, it was concluded that they did not appear near the surface by day in proportion to their abundance. Night observations were even less satisfactory, and the aerial method had to be abandoned.

Consequently, a measurement of changes in relative abundance by an analysis of the commercial catch, begun in 1937, took on added importance. The catches of boats delivering pilchards to the floating reduction plants, operating off San Francisco since 1931, were made available for this purpose by the plant owners; and the shore landings of the fleet considered were furnished by the California State Fisheries Laboratory.

Obviously, the boat catches alone are not directly indicative of the availability or abundance of the fish, for the activities and success of fishing boats are modified by the weather, the number of hours of darkness, since pilchard fishing is carried on in California only in the dark, and by other less tangible influences. Consequently, it was necessary to treat the data statistically so as to account, as far as possible, for the effects of these influences. Transcription of the records was completed and the analysis was under way during 1938. It is anticipated that a report on this subject will be completed in 1939. The findings in relation to comparable work being carried on for the ports of Monterey and San Pedro by the California State Fisheries Laboratory, and for Oregon and Washington by the Fish Commission of Oregon, should answer question 1.

AGE AND GROWTH

The second question can be answered by determining the ages of the fish making up the population each year, thus learning the relative abundance of the individual broods of previous years (income) and how fast they are removed by fishing and by natural mortality (outgo). To begin with, the relationship between age and size must be established. Once that is done, the findings can be applied to past records to detect any changes in the balance between income and outgo.

Age determination is being attempted by interpreting marks in hard structures, by observing the growth of young pilchards, and by identifying modes in frequency distributions of the adult population. During 1938, a series of frequency curves of young fish measured in southern California was collected, from which the growth rates of the first two or three age classes may be traced. A sample of young was also collected for comparative purposes at Magdalena Bay, Lower California, and others from Coos Bay, Oreg., and from various points in Washington.

Scales and otoliths were collected through the year from the young fish samples. Most of these, numbering over 10,000, have already been mounted by a W. P. A. project, and they are now being studied to learn the time of appearance of a year-mark and the extent to which pilchard scales can be used for age determination. During 1938, sampling of young fish was carried on at San Pedro, Newport Beach, and San Diego. This work will be continued in 1939 so as to complete at least one year's cycle of growth.

For studies on various phases of the biology of the commercial-sized fish, the South Pacific staff sampled the catch at Grays Harbor during the summer at Washington, and during the subsequent fall and winter at San Francisco. In addition to age and growth studies by analysis of the frequency curves, these data will be examined to determine the extent to which the populations of the two regions can be identified with each other. The work will be much facilitated by comparable samples from Oregon, taken by the Oregon Fish Commission.

A history of the size composition of the pilchard population in California, going back almost to the beginning of the fishery, has been kept by the California State Fisheries Laboratory, whose staff has sampled the catch systematically since 1919. Thus is recorded the rise, growth, and decline of the various dominant year classes that have appeared since then. This vast amount of data is being made available to the South Pacific Investigations for use in connection with current studies. During the year part of these records have been transcribed to a punch-card sort system. Through the aid of a W. P. A. project, it is expected that the remainder of the transcription will be completed during 1939. The records will be treated statistically in an effort to recognize homologous component age groups, to measure the rate of their removal, and hence to compare the effect of the lower fishing intensities of former years with higher current intensities.

EARLY LIFE HISTORY

The study of the data on size composition has already shown a relation between temperature and incoming successful year classes, warm years being associated with their appearance in the fishery 3 years later, cold years with their nonappearance. A report on this subject was prepared during 1938 for publication.

Further investigation of the relation between temperature, or other environmental elements, and successful year classes should make it possible to predict 3 years in advance the relative size of year classes, and hence facilitate greatly an intelligent management of the fishery from the conservation as well as industrial viewpoint.

Such knowledge requires a boat for the quantitative sampling of the young during their stages of random distribution, and for the study of conditions on the actual spawning and nursery grounds. For 1939, arrangements have been made with the Scripps Institution of Oceanography for a joint expedition on the research boat *E. W. Scripps* during May and June off the coast from California to British Columbia. The northern and western limits of the spawning range of the pilchard will be sought by the Bureau. Parallel observations on the hydrographic conditions will be made by Scripps Institution. This first cruise must of necessity be of a preliminary nature, and can be of far-reaching significance only when related to cruises made in other years and covering the entire pilchard-spawning season. It seems unlikely that such a program of marine work can be carried out unless a boat is at the year-round disposal of the investigation.

ORIGIN OF THE COMMERCIAL SUPPLY

To determine whether the stock in northern waters is self-perpetuating, young pilchards were sought along the Washington and Oregon coasts during the year. The stomachs of salmon and albacore, both predaceous, which presumably feed to some extent on pilchards, were examined at frequent intervals between March and December. In this manner young fish were found in April and, later, additional ones were collected by a beach seine in Willapa Bay, and others in a trap at Coos Bay. Though these collections may indicate some spawning in northern waters, the importance of such spawning in perpetuating the population found there is yet to be investigated.

It is hoped to appraise the contributions from various spawning areas through study of the sculpturing on the scales. Preliminary examination has shown that the spacing of the ridges on scales appears to differ among young fish caught in different localities. If further work confirms preliminary observations, this would be a characteristic established early and preserved throughout life. It would constitute, in effect, a marking on the fish according to areas of origin, and suitable interpretation of it would provide an answer to question 3. This will require additional collections of young fish during 1939 in various localities from Mexico to British Columbia. The studies on the scales will be continued so as to determine the significance and utility of ridge measurements and age determinations.

The program of work was carried out by a staff consisting of O. E. Sette, in charge of the investigations, Dr. L. A. Walford,

Kenneth Mosher, Ralph Silliman, and Earl Palmer. The prosecution of these investigations over so large an area was made possible by the cooperation and assistance of several organizations and persons. Stanford University contributed spacious laboratories for the central office, and extended the privileges of the University to staff members. The California Institute of Technology provided space for the southern field station at its marine laboratory in Corona del Mar. The California State Fisheries Laboratory furnished records essential to various phases of the work. Various branches of the Government service gave much valuable cooperation during the year. The aerial observations were carried on in planes of the United States Navy and Coast Guard. Space was provided a member of the Bureau on board the United States Coast Guard Cutter *Hermes* for experimental work on collecting apparatus at sea and for a cruise to Magdalena Bay, where samples of young fish were obtained. Also, the Coast Guard, as well as the United States Weather Bureau, furnished weather data for points along the Pacific coast. During the year the staff enjoyed the advice of members of these organizations, particularly of Drs. Frank W. Weymouth, Willis H. Rich, and Hugh H. Skilling of Stanford University, and Lt. Comdr. C. W. Thomas and Lts. S. C. Linholm and W. E. Sinton of the United States Coast Guard. The extensive sampling of the catch was made possible by the willing cooperation of members of the fishing industry from San Diego to Seattle.

GREAT LAKES FISHERY INVESTIGATIONS

DR. JOHN VAN OOSTEN, *in charge*

The critical depletion of the more valuable commercial species continues to be the major problem of the Great Lakes fisheries. The extent of this depletion is apparent from comparison of the present-day production of certain species with that of earlier years. As an illustration, if normal production in Lake Michigan is given an index value of 100, the present productions of important species are as follows: Wall-eyed pike, 62; lake herring, 59; lake trout, 58; whitefish, 58; yellow perch, 43. Similarly, the production indexes of perch and chubs in Lake Huron are only 44 and 36, respectively, and the production of the renowned Lake Superior whitefish is only 10 percent of normal. The preceding examples are only representative; in Lake Erie the production of nearly all important commercial species is without question on the decline, and the present total production of Lake Ontario is only 20 percent of normal.

The downward trend in the production and abundance of important commercial species of the Great Lakes has by no means reached its limit, except, of course, for such forms as the sturgeon, the Lake Ontario bloater, the blackfin of Lakes Michigan and Huron, the bluefin and longjaw of Lake Superior, and the Lake Erie cisco, all of which have become commercially unimportant. With most species, present conditions represent only a stage in a process of depletion that will certainly lead to the complete ruin of the fishery unless immediate and drastic measures are taken to halt present abuses.

As proof of the contention that depletion is even now proceeding rapidly, it may be pointed out that trout fishermen of Lake Superior

have found it most difficult to operate at a profit during the past 2 seasons; that the production of whitefish in Lake Michigan dropped to an all-time low in 1936 and failed to show significant improvement in 1937; that the production of chubs in the State of Michigan waters of Lake Michigan decreased more than 40 percent from 1935 to 1937; that the 1937 production of whitefish in Lake Huron was only 1,120,000 pounds as compared to a 1930-34 average of 3,394,000 pounds; and, finally, that the production of yellow perch in Lake Erie decreased from 14,219,000 pounds in 1934 to 2,051,000 pounds in 1936. It is true that the production of some species has at times shown temporary improvement, but these increases have merely constituted irregularities in the general downward trend.

Decades of bitter experience have demonstrated conclusively that the depletion of Great Lakes fishes cannot be halted under the present system of divided control, in which each State frames its own laws for the regulation of the fisheries within its boundaries.

The possibility that adequate and uniform regulations for Great Lakes fisheries will ultimately be attained was increased greatly in 1938 by the active support of two influential organizations, the Council of State Governments and the National Resources Committee. At a Great Lakes Fisheries Conference called by the Council at Detroit February 25-26, 1938, a resolution was adopted recommending the establishment, by treaty with Canada, of an International Board of Inquiry into conditions of the Great Lakes fisheries. A Special Committee on Lake Michigan Fisheries was organized and held its first meeting at the time of the Great Lakes Conference. The Special Committee held a second meeting in Chicago on May 6.

Both the Great Lakes Committee and the Special Committee on Lake Michigan Fisheries held meetings in the late autumn in Chicago, at which time they reviewed progress made during the year and elaborated their program for coordinated action by Canadian, Federal, and State agencies. As an immediate goal both committees will attempt to secure the enactment of discretionary power acts whereby the conservation departments of the several Great Lakes States will be authorized to regulate Great Lakes Fisheries by executive order.

The appointment of Dr. Van Oosten in October 1938, to membership in the Water Resources Committees, of the National Resources Committee, of the Upper Great Lakes (Superior, Michigan, and Huron) and Lake Erie basins marked the first representation of Great Lake fisheries interests on these committees. Dr. Van Oosten was later made a member of a subcommittee of each of the basin committees on water as related to industry and navigation. The Upper Great Lakes and Lake Erie Basin Committees plan to cooperate fully with all agencies interested in the development of a sound conservation program for Great Lakes fisheries.

An executive order drawn up by the Wisconsin Conservation Commission and signed by the Governor on January 21, 1938, constituted an outstanding advance in the regulation of Great Lakes fisheries. The order contained provisions for substantial increases in the mesh size of commercial gear and in the size limits of lake trout and whitefish in the Lake Michigan waters of the State. These changes, which brought the Wisconsin regulations nearer the standards maintained by the State of Michigan, are an important step toward the attainment of uniform regulations for all Lake Michigan waters.

The activities of the Great Lakes staff were again characterized by active cooperation with State and Federal officials and with sport and commercial fishermen. Certain of the cooperative projects will be described later in this report. During the year Dr. Van Oosten acted in an advisory capacity at 19 meetings and conferences in which Great Lakes fisheries problems were under consideration. He also continued to assist State conservation officials in the drafting of proposed fisheries regulations.

The Bureau gratefully acknowledges the cooperation of the University of Michigan in providing laboratory space and extending numerous other courtesies to the staff.

STUDIES OF ABUNDANCE

Dr. Ralph Hile has completed the routine computation of 1937 indexes of production, abundance, and fishing intensity for important commercial species in each of the 20 statistical districts of the State of Michigan waters of the Great Lakes. The assignment of a W. P. A. project to the Great Lakes laboratories has made possible the tabulation of valuable production statistics for the several fishing districts over the 18-year period, 1891-1908. These compilations are being made from original records loaned to the Bureau by the Michigan Department of Conservation.

AGE AND GROWTH STUDIES

Lake Huron whitefish.—A study (in press) of the Lake Huron whitefish, *Coregonus clupeaformis*, by Dr. Van Oosten included information on growth rate, growth compensation, the age and year-class composition of the stock, the sex ratio, age at maturity, the relationship of total and standard length, the length-weight relationship, and the coefficient of condition. The Lake Huron whitefish grows most rapidly in the first year of life, but a secondary period of rapid growth occurs in the fourth year. Growth compensation occurs during at least the first 7 years of life. The collection of the summer of 1923 was dominated by age-group IV (1919-year class), and the fall collection of 1924 was dominated by age-group VI (1918-year class). The sexes were equally abundant in the collections as a whole, although the males tended to become relatively less numerous with increase in age. Sexual maturity was attained by nearly all males in the fifth year and by females in the seventh year. A single curve was found suitable to express the length-weight relationship of both males and females. There was, nevertheless, a noticeable tendency for females to be heavier than males of the same length, and for whitefish taken in the summer of 1923 to be in better condition than those collected in the fall of 1924.

Lake Champlain whitefish.—A paper entitled "The Age, Growth, and Food of the Whitefish of Lake Champlain" by Drs. Van Oosten and Deason is now in press. The materials consisted of scale samples and records of weights and measurements of 120 whitefish taken in northern Lake Champlain in 1930, and 175 individuals taken in southern Lake Champlain in 1931, and of the stomachs of 141 whitefish, also collected from southern Lake Champlain during the fall of 1931. The data suggested that the natural size and age compo-

sition of the Missisquoi Bay population was disturbed by the early fall seining of 1930. The size and age distribution of the southern Lake Champlain fish indicated that no disturbance through exploitation had taken place. The two populations were more or less distinct also as to growth rate, the length-weight relationship, and the location of spawning grounds. Autumn is apparently a season of reduced feeding activity, for 86 percent of the 141 stomachs examined were empty. The food consisted almost exclusively of invertebrates (99.1 percent) which were made up principally of mollusks (92.8 percent).

Lake Erie yellow perch.—Mr. Jobes has completed the preliminary draft of a manuscript on the growth of the Lake Erie perch. Much of the information obtained in this study has been presented in past reports. The most important new development was the determination of a method for the calculation of growth from scale measurements. Lengths at the end of the second and later years can be computed by direct proportion, that is, on the assumption that the body-scale ratio is constant. First-year lengths, however, must be determined from an empirical curve of the body-scale relationship.

SPECIAL SURVEYS

Red Lakes and the International Lakes.—At the request of the Office of Indian Affairs of the Department of the Interior, Drs. Van Oosten and H. J. Deason conducted a 3-week survey of the fisheries of Upper and Lower Red Lakes in northern Minnesota during late August and early September 1938. The principal purpose of the investigation was to obtain information for the settlement of various controversies concerning the regulation of the commercial gill-net fishery that is conducted by the Indians on Lower Red Lake and by white citizens on Upper Red Lake. The survey included the quantitative analysis of commercial catches as to species and size composition, a study of the variations in the size of gill-net mesh employed, and the collection of biological data for the study of the life histories of the principal species. All available statistical records of the commercial fishery and of the artificial propagation of wall-eyed pike and whitefish were transcribed for later analysis. Conservation and Indian Agency officials, fishermen, and other interested persons were interviewed.

A large portion of the work preparatory to the submission of a formal report has been completed. The report will contain recommendations, largely for the guidance of officials of the Red Lake Indian Agency, for the regulation of the commercial fisheries which constitute one of the principal sources of income for the Indians.

Following the Red Lakes survey Dr. Van Oosten made a brief survey of the boundary waters of northern Minnesota and southwestern Ontario, at which time he interviewed fishermen, transcribed statistical records, and collected biological data on the principal commercial species.

Potagannissing Bay investigation.—The investigation of the relationship between the sport and commercial fisheries of Potagannissing Bay, Lake Huron, conducted under the joint supervision of Dr. Van Oosten and F. A. Westerman of the Michigan Department of Conservation, has been concluded and a formal report has been pre-

pared. The allegedly harmful effect of the commercial trap-net fishery of the area on the population of game fishes, particularly smallmouth bass, in the region apparently has been overestimated. The occurrence of large numbers of bass in the trap nets is distinctly seasonal and confined to relatively limited areas. Consequently, only minor restrictions on the commercial fishery for coarse fish are necessary in order to afford adequate protection to the game-fish stock. The report contains specific recommendations for the regulation of the fisheries.

Lake Champlain investigation.—The report of the International Fact-Finding Commission, consisting of Dr. Van Oosten of the Bureau and of James A. Rodd of the Department of Marine and Fisheries, Ottawa, Ontario, on fisheries controversies on Lake Champlain was largely completed during the past year and will soon be submitted to the respective governments. The report will contain a discussion of the fisheries controversies, a tabulation and analysis of all available information concerning commercial fishing and angling, descriptions of the natural history of the principal species, a critical historical review of the artificial propagation of wall-eyed pike and yellow perch, and recommendations for the regulation of the commercial and sport fisheries of Lake Champlain. Appendices to the report will contain original studies of the feeding habits of the principal species as independent contributions of Dr. H. J. Deason and F. W. Jobs of the Bureau, and Dr. R. H. M'Gonigle of the Fisheries Research Board of Canada.

SHELLFISH INVESTIGATIONS

DR. PAUL S. GALTISOFF, *in charge*

Although the difficulties experienced by the oyster industry in past years were greatly alleviated during 1938 by the general improvement of economic conditions in the country, the decreasing supply of good oysters continued to present a serious problem endangering the future progress of the industry. Scientific and technical knowledge concerning the oyster and its method of cultivation shows that this difficulty can be overcome by increased cultivation of oysters, improvement of the quality of oyster meat, and standardization of the raw and canned product offered to the consumer.

Practical application of this principle meets, however, with many legal and technical difficulties. In many States the introduction of oyster-cultural methods on a large scale necessitates the reorganization of existing policies and systems of operation and abandonment of the practice of exploiting natural oyster resources. Personnel capable of directing and supervising oyster-cultural activities is required to introduce systems of cultivation into States where exploitation of the public bottoms has been the traditional method of the oyster industry since its establishment. Inasmuch as the development of methods of oyster culture suited to the varying conditions of local waters depends upon scientific studies of the physiology and life history of the oyster, it is apparent that the accumulation and dissemination of such information among interested persons is of great practical importance to the oyster industry.

Studies on the propagation of the oyster, its cultivation on public and privately owned bottoms, and the protection of valuable fishing

areas against the attacks of natural enemies and pollution have continued to be the principal fields of shellfish investigation conducted by the Bureau in Massachusetts, Connecticut, Virginia, North Carolina, South Carolina, and Florida.

To determine the practicability of various methods of oyster culture suggested by laboratory experiments, steps have been taken to establish experimental oyster beds in localities set aside for this purpose by State authorities. In cooperation with the South Carolina Board of Fisheries and the Works Progress Administration an experimental project of this nature was undertaken in South Carolina. Experiments on the control of starfish were conducted in Long Island Sound and studies of the parasites of the oyster were continued in Beaufort, N. C. The work on pulp-mill pollution in York River was continued with the cooperation of the Virginia Department of Fisheries with the view of determining the chemical nature of the substance present in the effluent which was shown by previous investigation to be harmful to oysters.

PHYSIOLOGY OF THE OYSTER

Propagation.—Since successful propagation depends upon the presence on oyster beds of a large number of specimens of both sexes capable of spawning, the sex changes in the adult oyster present a problem of practical importance to the oyster farmer. Study of this problem was continued by Dr. Galtsoff and staff at the Woods Hole (Mass.) laboratory and at Milford, Conn., where experimental mollusks individually marked are kept in the outdoor tanks. During the first year (1937) 8.0 percent of the males changed to females and 13.1 percent of the females changed to males, total change in either direction being 9.7 percent. In the second year (1938) 11.2 percent of the males changed to females and 12.1 percent of the females became males, total percentage of changes in either direction being 11.5. Sex reversal among oysters that have already changed their sex occurs much more often. Out of the total of 32 oysters which changed their sex at any time between 1936 and 1938, 22 (69 percent) reversed their sex. The results suggest the presence in the population of a group of animals with unstable gonads.

Development of spawning reactions, which are different in the two sexes and are characterized in females by the rhythmicity of muscular contractions and discharge of eggs through the gills, fails sometimes to keep pace with gonadal changes and results in physiological intersexuality. Some of the sex-reversed males, possessing ripe ovaries, reacted in typically male fashion by discharging eggs through the cloaca. A complete female spawning reaction occurred, however, at the end of the reproductive season, at which time the intersexuality had disappeared.

Survival and aging of eggs and sperm.—Experiments on fertilizability of eggs and their survival in water after being discharged by the oyster were carried out at Woods Hole by Dr. Galtsoff. It has been found that more than 50 percent of the eggs will cleave if sperm is added after 12 hours, but a very small percentage cleave normally if 24 hours elapse between their discharge and insemination. The life of sperm depends to a certain extent upon its concentration in sea water. In sufficient concentration (0.2 g. in 50 ml. of sea

water) good sperm is still effective after 24 hours. In greater dilution the sperm perishes sooner. These experiments indicate that simultaneous spawning of the majority of adult specimens and crowding of spawners on spawning beds are essential for the successful propagation of the oyster.

Respiration.—The study of oyster respiration was undertaken with the view of determining the effect of environmental conditions on this fundamental living process. An understanding of the factors controlling the uptake of oxygen by an aquatic mollusk is especially necessary for the study of its carbohydrate metabolism and of other metabolic processes which result in the accumulation of glycogen, heavy metals, calcium, and other elements which, from the nutritive point of view, are important food constituents of the oyster meat.

Using the metabolism chamber specially designed for this work and employing the technique perfected during the previous summer, Dr. Galtsoff and G. I. Mishtowt carried out a number of experiments studying the effect of lowered salinity and increased CO₂ tension on oxygen consumption. It has been found that in all the experiments with diluted sea water the oyster used an average of 13.6 percent more oxygen in a salinity of 24 parts per thousand than in a salinity of 32.

Experiments with CO₂ consisted in bubbling this gas through sea water and determining the rate of oxygen consumption. It was found that CO₂ has a depressive effect on oxygen consumption, which begins to decrease with the decrease of hydrogen ion concentration. The maximum effect is obtained at pH 6.0 or lower, the oyster under these conditions using practically no oxygen and presenting all the appearances of being narcotized.

Further plans for this investigation comprise the determination of respiratory quotients of oysters at different times of the year and under various environmental conditions, and a study of the effect of various pollutants on respiration.

OYSTER CULTURAL STUDIES

Propagation of oysters in Long Island Sound.—The oyster industry of Long Island Sound and adjacent waters depends upon an abundant supply of seed oysters for its perpetuation. Since the rate of survival of Connecticut seed oysters transplanted to other waters is high, and their growth in a new environment is rapid, there is always an extensive demand for them, and seed producing has become a profitable industry of the State. However, owing to the frequent failure of oysters to set, the industry has not been in a position to supply the much needed seed oysters. In addition to the poor natural setting, the destruction of spat and seed oysters by various pests, especially starfish, is tremendous. The protection of young oysters from their enemies constitutes, therefore, another vital problem for the oyster-men. Both problems have been under investigation by Dr. V. L. Loosanoff and James B. Engle at the Fisheries Laboratory at Milford, Conn.

Spawning and setting.—Continuing the investigations begun in 1937, spawning and setting of oysters were observed at a chain of 15 stations extending from Bridgeport to Morgan Point and east to New Haven, thus covering the most important part of the Connecti-

cut seed-oyster producing section. The methods employed in this study were identical with those used the previous year.

Observations of the past 2 summers on the spawning of oysters in Long Island Sound indicate that, contrary to common belief, spawning may take place at temperatures several degrees lower than 20° C. (68.5° F.). The first spawning of oysters occurred on June 28, far in advance of the expected time and at a temperature of only 16.4° C. (62° F.). The highest temperature recorded on this day at any of our sampling stations, distributed over a distance of 30 miles of the oyster-producing section of the Sound, was 18.3° C. (66° F.). The average bottom-water temperature of all 15 stations was 17° C. (63° F.). To avoid any errors in recording the water temperature, measurements were taken simultaneously with four deep-sea reversing thermometers, their correctness was verified by the United States Bureau of Standards, and the temperature was read by two investigators.

These observations indicate the need for modifying previous methods for predicting the time of spawning which have been based upon the assumption that oysters do not spawn at a temperature below 20° C. It is evident that other factors, undetermined at present, are involved in inducing the spawning of oysters at low temperatures. Until these factors and their role in stimulating the shedding of sex cells is ascertained, no infallible method for predicting the spawning time of oysters living under natural conditions can be advanced.

Throughout the summer systematic observations on the setting of oyster larvae were made at some 37 stations located in different sections of the Connecticut oyster-growing area. In general the setting occurred late and was extremely light. During the course of these surveys information on the condition of oysters and the prospects of obtaining set was supplied to oystermen at regular intervals through a bulletin distributed by the Connecticut Shellfish Commission.

Observations on vertical distribution of oyster set in 1938 fully support conclusions reached during the previous year to the effect that in Milford Harbor setting occurs in the zone extending from the bottom to a point 2 or 3 feet above low-water mark. Above this level to high-water mark, a distance of about 4 or 5 feet, no setting occurs.

Chemical control of starfish.—A method for the control of starfish by chemical means was tested during the year in large-scale experiments in the Long Island Sound area. Early results of these field experiments and of previous laboratory tests indicate that important progress has been made toward effecting the control of the most important enemy of the oyster in the New England area.

Since mechanical control of starfish on oyster beds is expensive and only partially effective, the advantages of employing some toxic substance for the eradication of these pests have been obvious. Laboratory experiments on the use of calcium oxide, or quicklime, for the destruction of starfish were therefore initiated at the Milford Laboratory in 1937 by Dr. Loosanoff and Mr. Engle. During the spring and summer of 1938 the method was also tested under natural conditions on the oyster beds of Long Island Sound, where starfish are abundant.

In one test where 25 acres of starfish-infested oyster bottom were treated with calcium oxide at the rate of 480 pounds per acre, as many as 80 percent of the starfish were found to be affected by the chemical 1 week after the beginning of the experiment. In an area where 280 pounds of calcium oxide per acre were used, the chemical acted upon 74 percent of the starfish. It is believed that much better results will be achieved when a suitable mechanical method insuring uniformity of distribution of the chemical over the treated area has been developed.

Observations in the Milford Laboratory show that the particles of lime must come into direct contact with the body of the starfish to be effective. Particles of the chemical falling on the upper surface of the starfish imbed themselves in the delicate skin and rapidly cause its disintegration through caustic action. Lesions so created rapidly increase in size, spreading in all directions and involving the delicate respiratory and other structures found on the dorsal surface of the starfish. After several days the lesions penetrate the body wall, exposing the internal organs. Death usually follows very shortly. Starfish which are not hit by falling particles as the chemical is being applied may eventually come into contact with it by crawling on the bottom. Lime spread on the bottom retains its effectiveness for some time.

Laboratory experiments conducted in large tide-filling concrete tanks indicated that coarse grades of lime, even when used at the rate of 3 barrels (840 pounds) per acre, do not cover the bottom evenly but permit many starfish to escape. Finely powdered lime was found to be much more effective, even in concentrations as light as 280 pounds per acre.

To determine the effect of quicklime on other animals, experiments were carried out with oysters, flatfish, and lobsters, which support the most important fisheries in Long Island Sound.

Oysters which were subjected for a period of 5½ months to a very strong concentration of quicklime survived, although their growth and increase in weight were somewhat retarded. It must be considered, however, that the concentration of lime in the tank was much greater than that expected to be used on natural beds, and that even if such a concentration were used, it would persist only a short time. It appears, therefore, that lime may be used without endangering the oyster population. Seed oysters survived in lime solutions as well as the adult oysters.

Claims that spreading lime over oyster bottoms will restore the normal color of green oysters were not substantiated by field or laboratory observations. Treatment with lime had no effect on the green color of the oysters.

Large numbers of hard clams, soft clams, and two species of mussels kept in tanks to which a large quantity of lime was added at monthly intervals survived this exposure for a period of 6 months. Mortality among these animals was not noticeably higher than in the control tanks. Field experiments also showed that there was no mortality which could be attributed to the effects of lime among mollusks dredged from the beds where experiments in the eradication of starfish were conducted.

Experiments performed at the State Hatchery at Noank, Conn., showed that the fry of flatfish will survive for 1 hour in a 1:1000 concentration of lime provided they do not come in contact with solid

particles. In the latter case death quickly results. Experiments with flatfish eggs obtained from the State Hatchery and taken to the Milford Laboratory showed that exposure in concentrations of 1.0 gr. of lime in 250 cc. of water did not materially increase the rate of mortality, but when the eggs were allowed to come in contact with particles of undissolved lime a mortality of almost 100 percent ensued.

Observations on the effect of lime on lobster larvae of the first, second, and third stages were carried out at the Noank Hatchery in June. In the filtered 1:10 solution the larvae of all stages survived for 4 hours. Similar results were obtained when larvae were subjected to a concentration of 1 part saturated lime solution to 2 parts of sea water. However, in a solution of 1 part of lime water to 1 part of sea water, a mortality of about 25 percent resulted at the end of 4 hours. All three larval stages appeared to be affected equally. In a saturated solution of lime all the animals died in 3 hours or less. In this solution the larvae of the first or earliest stage appeared to be the most resistant. Direct contact of lobster larvae with particles of lime resulted in death.

These experiments indicate that the use of quicklime on oyster bottoms should be restricted to seasons when no larvae of commercial species are present in the water, thus avoiding the danger of destroying them.

Distribution of starfish in Connecticut waters.—In cooperation with the Connecticut Shellfisheries Commission two surveys were made to determine the abundance of starfish on oyster bottoms between New Haven Harbor and Penfield Reef. The results of these surveys were immediately communicated to the oystermen, permitting more efficient eradication of this pest by private planters. It is planned to expand this service in the future by making surveys every 3 months and issuing the results in bulletin form to be distributed among the interested parties.

Improvements at the Milford station.—During the past fiscal year the Bureau obtained title to property at Milford, pursuant to the provisions of an act of the General Assembly of Connecticut, for the erection of a laboratory building and the establishment of grounds for experimental work on oyster culture. A special allotment of \$35,000 was made by the Public Works Administration for the construction of a two-story brick laboratory. Work will begin early in 1939. Additional funds granted by the Works Progress Administration and Public Works Administration are being used for the construction of a sea wall and pier, filling the grounds, construction of tidal tanks, and other improvements.

Oyster propagation in North Carolina.—In the South Atlantic region there is great need of the development of oyster cultivation, and of special methods whereby oysters of good marketable size and quality can be grown on the extensive tidal flats. Although generally favorable conditions for oyster growth are found in these areas, the product obtained there is of inferior size and quality because of the overcrowding that results from prolific natural reproduction. One of the chief problems is the development of a practical procedure whereby seed oysters placed on the tidal flats can be protected from crowding and "fouling" of the shells by attachment of oyster spat, barnacles, etc., and grown to marketable size as single individuals of good quality. The three principal lines of investigation conducted

by Dr. H. F. Prytherch during the past year at Beaufort, N. C., in the study of this problem, were to determine (1) the rate and character of growth of seed oysters fastened to panels of cement, wood, and wire placed at different tidal levels, (2) the practicability of using devices of this type for intensive oyster culture, and (3) the possibility of utilizing specially constructed salt marsh ponds for concentrated growing of oysters by controlling setting, and preventing injury to the shells by the boring sponge.

One hundred and eighty seed oysters were attached to cement panels and studied individually with respect to growth in weight, volume, length, and width in relation to their position above and below low-water level and their orientation on the panels. The seed used were 1 year old, uniform in size and shape, and showed the following average measurements per oyster: Weight, 15.5 g.; volume, 95 cc.; length, 51 mm. ($2\frac{1}{4}$ in.); and width, 30 mm. ($1\frac{1}{4}$ in.). Three series of panels were placed at the main pier in Beaufort Harbor so that series No. 1 was 1 foot above mean low-water mark, series No. 2, 1 foot below this level, and series No. 3 on the bottom, or 6 feet below low-water mark. Each series consisted of 60 seed oysters that were cemented in groups of 10 on 6 panels and oriented in the following 6 different positions: Horizontal with left valve down, horizontal with left valve up, vertical with hinge up, vertical with hinge down, sideways with mouth up, and sideways with mouth down. Special care was taken to arrange the panels so that all the oysters in each series had the same environmental conditions.

The principal results of these experiments, briefly summarized, demonstrate that (1) the growth of oysters is most rapid in the tidal zone immediately above low-water level and slowest on the bottom, (2) the greatest increase in weight and size occurs in seed placed in a vertical position with the hinge uppermost, regardless of tidal level, (3) the next best growing position is sideways with the mouth of the oyster upwards, which produces the finest shape and depth of shell, and (4) the procedure of attaching seed to panels, screens, etc., and placing them in the most favorable tidal zone and individual positions, as indicated above, will yield an increase in volume of over 400 percent during the first year.

The remarkable growth obtained with the best group of oysters of the entire series showed the following increase during the first year: Weight, 360 percent; volume, 410 percent; length, 100 percent; and width, 94 percent. Every oyster of this group attained a good size and shape and exhibited unusual individual growth that ranged from an increase of 190 to 575 percent in weight, and from 210 percent to over 660 percent in volume. The results obtained thus far by the panel method of intensive oyster culture are encouraging as they indicate that a yield of over 5 bushels of marketable oysters, with a value of \$5.00, may be obtained from 1 bushel of seed having an initial cost of 25 cents. This permits an expense of several dollars to cover the operations of placing each bushel of seed on panels and caring for them over a 2-year period. Studies are being continued to perfect an inexpensive type of panel that can be used indefinitely, and to improve the temporary coating that was applied to the shells of the oysters to protect them from attachment of spat, barnacles, boring sponge, etc.

Construction of a series of tidal ponds in the salt marshes has been completed with the aid of W. P. A. labor. Here principles of oyster culture similar to those described above are being tested on a small commercial scale. Several hundred bushels of seed oysters have been planted in the ponds and ditches, where, by control of water levels and tidal currents, it may be possible to produce oysters of good marketable size under protected conditions. This work may have important practical applications in demonstrating how the extensive salt marshes in the South Atlantic region may be converted into oyster-producing areas.

Oyster destruction by starfish in South Atlantic waters.—In the coastal waters of North and South Carolina destruction of oysters and other shellfish by starfish occurs to a limited extent in the more saline waters of sounds and bays adjacent to inlets. At the Beaufort Laboratory studies of the oyster-consuming ability of this pest were conducted over a period of 1 year by Dr. Prytherch. During the first 6 months (January–June) the 10 starfish in the experimental tanks devoured over 1,750 oysters ranging in age from 1 to 3 years. The number of oysters eaten per month over this period ranged from 183 to 456 and was greatest during March and least during June, when the starfish were undergoing the processes of gonad development and spawning.

After July first only large oysters, 3 and 4 years old, were kept with the starfish and during the following 6 months a total of 470 were eaten, the number per month increasing rapidly with the lowering of water temperature. The starfish were frequently observed to leave a partly consumed oyster and almost immediately begin an attack on another specimen, especially after they had been well fed for several weeks. Records of oysters attached to kymographs show that starfish are able to open large specimens in 3 or 4 hours. Analyses are being made of the secretions of starfish stomachs, as they are supposed to be an effective agent in opening shellfish.

Establishment of experimental farms in South Carolina.—Early in November the Bureau, in cooperation with the South Carolina State Board of Fisheries and the Works Progress Administration, initiated a program for rehabilitating and developing the oyster resources of the State through the establishment of a series of small experimental oyster farms. The primary purpose of this undertaking is to enable tide-water residents in the lower income brackets to obtain their subsistence, in whole or in part, by leasing and cultivating small plots of from 2 to 10 acres of oysters. The program differs from all previous experiments in presupposing that capital requirements will be at a minimum, and that primary materials, equipment, and supplies may be obtained or produced by the labor of the oyster farmer himself.

As early as 1890, interested persons were instrumental in having a survey of State oyster bottoms made by the Bureau of Fisheries, but only within the last few years have leasing laws permitted or encouraged extensive private holdings. A considerable acreage is now so held, but full development of the bottom cannot be accomplished until three major problems are solved.

The first requires development of an inexpensive method for obtaining single seed oysters in place of the massed clusters occurring naturally. This is essential to production of high quality oysters.

In the second place, variations in local water conditions must be understood so that advantage may be taken of those areas where growth and fattening occur most readily. On account of the long spawning season resulting from high water temperature, fattening occurs very late in the season. Southern growers are thus placed at a disadvantage in supplying fat oysters early in the season when the market is usually most favorable. Finally, methods must be devised for using suitable bottom below low-water mark. Under natural conditions, oyster spat attach themselves only between high and low water marks, with consequent restriction not only in the areas available for cultivation, but also in the number of hours the oyster may remain open for feeding.

In view of the importance of these and related problems to the Southern oyster industry, on November 1 the Bureau began an examination of available tidal streams in Beaufort County, S. C., with the view of selecting several areas suitable for small experimental oyster farms of several acres each. This work, in cooperation with the South Carolina State Board of Fisheries, was carried out by R. O. Smith, and several localities were marked for experimentation.

During 1939, various types of bottom will be tested to determine the most suitable treatment for seed and market oysters, and experiments will be carried out to find practical methods of seed collection on a small commercial scale.

Oyster investigations on the Gulf coast.—The oyster industry of the Gulf coast in general has for several years been in a relatively unsatisfactory condition, owing in part to the fact that it depends largely upon natural oyster beds which have been depleted by predators and by too intensive harvesting. The problems will apparently have to be solved by establishing oyster farms on privately leased or owned grounds and by studying the fundamental biological problems concerned before the industry of the coast can be conducted economically.

The program of oyster investigations which has been undertaken at the Pensacola (Fla.) Laboratory consists primarily of the following phases: (1) Establishment of an experimental oyster farm on a semicommercial scale to determine rates of growth and fattening, productivity annually per unit of bottom, and costs of production, including a study of natural hazards and predators of the Gulf coast. It is planned to compare the results with those of similar projects conducted by the Bureau in Atlantic waters. (2) Experimental laboratory and field studies of factors influencing the growth and fattening of oysters under conditions characteristic of most oyster-producing areas of the Gulf coast, particularly with reference to fluctuations in salinity.

Pending establishment of the experimental oyster farm, Dr. A. E. Hopkins has been working in close cooperation with the Florida Department of Conservation and the Works Progress Administration in a program of oyster planting and rehabilitation of exhausted natural beds in portions of Pensacola Bay. Observations to date indicate that East Pensacola Bay is very favorable for experimental study. Programs were also organized for the rehabilitation of natural oyster grounds in Apalachicola Bay, St. Andrews Bay, and Choctawhatchee Bay. In addition Dr. Hopkins made a number of trips to Mobile Bay at the request of the Alabama Oyster Com-

mission to advise on immediate problems and assist in forming a general policy of control of the natural beds.

During the year it has been demonstrated that the location of the Pensacola Laboratory, on Santa Rosa Sound, is most satisfactory for its purposes. The water was almost always clear and the salinity varied from about 20 to about 27 parts per thousand in ordinary weather to as low as 12 to 15 parts per thousand during 2 short periods of extreme spring freshets. The water temperature throughout the year followed closely that of the air, and averaged in mid-summer about 74° F., in mid-winter about 60° F. Oysters, fish, and other organisms have thrived well in the laboratory aquarium.

With the assistance of relief funds from the Works Progress Administration and the Public Works Administration a program of development of the station was undertaken at the end of the summer. It is expected that early in 1939 the Pensacola station will be adapted to any type of fishery research.

Effect of pulp-mill pollution on oysters.—Investigations carried out by the Bureau between 1935 and 1937 at the Yorktown Laboratory have clearly indicated that pollution of the river by pulp-mill wastes has been responsible for the decline of oyster production. During 1938, Dr. Walter A. Chipman, Dr. H. N. Calderwood, R. O. Smith, and Lloyd R. Garriss have attacked the problem of determining what chemical or chemicals present in the pulp-mill effluents are the cause of the altered physiology of oysters. The investigators will later attempt to develop a means of eliminating such harmful substances.

The work has been continued on a cooperative basis with the Virginia Commission of Fisheries, which contributed \$5,000, and with the cooperation of the College of William and Mary which granted the use of the chemical laboratory and office space in the college building at Williamsburg. In addition to the work in Virginia, special phases of the York River pollution problem were investigated in the Washington Laboratory by Dr. Galtsoff, with the assistance of Dorothy B. Hamilton. These were the abnormal shell structure and other pathological conditions found in oysters from the polluted areas of the York River.

In testing the effectiveness of pulp-mill wastes in reducing the amount of water pumped by oysters, it has been observed that only one of the various effluents entering the York River from the pulp and paper mill at West Point has a marked physiological action—that arising from the pulping process. This mill has three main sewer ditches; one draining a sludge deposit, one receiving wastes from the paper mill and causticizing section, and one carrying the wash waters from the diffuser and the digester building and evaporators.

Frequent sampling of the discharges from the sewers has revealed wide and irregular fluctuations in the character and physiological activity of the effluents. However, these effluents have been grouped under three main categories for the purpose of study; crude sulphate soap, foam from the mill sewer outlets, and weak black liquor.

At times considerable quantities of crude sulphate soap find their way into the effluents, being washed in from the ground surrounding the black liquor storage tanks. These soaps have a marked physi-

ological action in reducing the rate at which water is pumped by oysters. Fractionation of crude sulphate soaps has yielded portions both physiologically inactive and physiologically active. Studies are under way for the purpose of isolating, if possible, the single active constituent. A future study will be the determination of the part the physiologically inactive materials may play in the distribution and duration of the potency of the active portions.

Frequently large quantities of foam are observed in ditches leading to the river. Examination of the foam indicates the likelihood of its being a soap rather than a saponin. Further work is planned on the chemical nature and the effect on oysters of this material.

Tests of material entering one of the sewer ditches from an overflow of foam from the weak liquor storage tanks indicate that this material is chiefly a dilute form of the so-called "black liquor" which results from the digestion of the wood chips, with possibly an addition of a small amount of soap.

Chemical investigations are planned on black liquor samples for the purpose of finding whether any correlation exists between the alkalinity and volatile sulfide content of the various black liquor samples and the variations in effect on oysters exhibited by these samples. Fractionation of the black liquor will be undertaken, and efforts to develop a reliable method for the detection and determination in river waters of constituents of the black liquor will be continued.

Tests on the physiological effectiveness of pulp-mill effluent have shown that storage of weak black liquor in air brings about a slow loss in potency. It seems that this change is chiefly in oxidation, since agitation in the presence of pure oxygen under pressure rendered the material physiologically inactive, whereas the effluent stored under hydrogen held its potency at a constant figure for periods of from 2 to 3 months.

SPECIAL SURVEYS

Under the direction of Dr. Galtsoff, a study of the sequence of fouling organisms on experimental panels exposed by the United States Navy at Cavite, P. I., and Guantanamo Bay, Cuba, was completed by G. Robert Lunz, Jr., and the report was prepared and submitted to the Navy Department. Preliminary experiments on the nature of the fouling film were carried out at Langley Field, Va.

At the request of the United States Engineers, Dr. Galtsoff made a survey of oyster bottoms in Onset Bay claimed to be affected by dredging operations in the Cape Cod Canal. Numerous samples of water and oysters were taken for examination. Certain areas were found to be covered with recent deposits of sand and mud and contained large numbers of dead oysters. Since the examinations were made long after the completion of dredging operations in this section, the cause of the mortality of oysters could not be ascertained.

Another survey of similar nature was made in Narragansett Bay at the request of the United States District Engineer in Providence. Fortunately, in this case, the survey was made while the dredging operations were still in progress. Samples of oysters were obtained from 16 stations on both sides of the canal. Examination of oysters

revealed no ill effect from the dredging operations. There was no accumulation of mud on oyster shells or in the shell cavities. The oysters appeared to be healthy and normal. It is planned to continue these surveys in Narragansett Bay as long as the dredging operations last.

Mortality of shellfish, Myrtle Sound, N. C.—At the request of the North Carolina Department of Conservation and Development, Dr. Prytherch made a survey of an unusual mortality of clams and oysters in the waters of Myrtle and Masonboro Sounds. It was found that hydrographical and biological conditions in these sounds had changed considerably since the construction of the Intra-coastal Waterway and had proved to be detrimental to the growth and propagation of shellfish in this coastal region. The most important modification is the connection of the Cape Fear River with the southwest end of Myrtle Sound by means of a canal, approximately 100 yards wide, known as Snows Cut. This canal, being open at all times, permits a considerable quantity of fresh water, or water of low salinity, to flow into Myrtle and Masonboro Sounds. During flood stages of the river especially large quantities of fresh water, heavily laden with mud, pass continuously through these sounds for extended periods and enter the ocean at Masonboro Inlet. During the early part of August the unusual floods occurring in the Cape Fear River Basin produced such extreme freshening of the water in these sounds as to cause destruction of the natural supply of clams and oysters.

The value of the oyster crop of this region, which prior to 1932 was approximately \$3,000 annually, decreased to less than \$400 in 1936 and 1937. It is evident that the clam and oyster resources of this section, which have a combined value of \$15,000 annually and serve as a means of food and livelihood for a large number of local people, should be restored after some satisfactory flood control devices have been installed to control the flow of fresh water from the Cape Fear River.

AQUICULTURAL INVESTIGATIONS

DR. H. S. DAVIS, *in charge*

It has long been recognized that our inland waters constitute one of the great natural resources of the country which, like other resources, are now suffering serious depletion. Industrial and agricultural development have so changed the nature of many waters that they are no longer suited to fish, while the majority of those that are still capable of supporting game and food fishes are badly overfished. These conditions can best be corrected by wise management combined with artificial propagation.

The work of the aquicultural investigations has developed along three principal lines. One deals primarily with field problems and the provision of much-needed information on the best means of obtaining the maximum production of game and food fishes consistent with environmental conditions. A second line of investigation is concerned with problems relating to the artificial propagation and rearing of fish, while the third deals with fish parasites and diseases, and their control.

TROUT

It is the purpose of the investigations on trout waters to obtain definite information on the annual drain to which the trout population is subjected by anglers, and the value of artificial stocking in maintaining a stable fish population. Attention is also being given to the correlation between normal production and the available food supply and other factors which must be given consideration in developing management policies.

Test streams.—The scientific work at the Pittsford (Vt.) station, under the direction of R. F. Lord, was again chiefly concerned with studies on test waters. Waters set aside for this purpose include three streams and one lake operated in cooperation with the State Fish and Game Service. On one of these streams, Furnace Brook, a State game warden was stationed each week end to examine anglers' catches for marked fish and to obtain data on the lengths and weights of all trout taken from the stream.

On both Furnace Brook and the South Branch of Middlebury River the total catch for the season was considerably less than in previous years. Unfavorable conditions during the winter of 1937-38, when heavy winter rains raised the streams to flood stage with much damage from floating ice, are believed to have been the cause of the exceptionally poor stream fishing throughout the State.

The superiority of rainbow over brook trout in contending with adverse conditions is again brought out clearly in the results from Furnace Brook. As pointed out in previous reports, no rainbows have been planted in Furnace Brook for years, while the stream is heavily stocked each year with fingerling brook trout and, for several years past, with yearling brook trout as well. Nevertheless, the catch of brook trout has shown a gradual decrease each year while the decrease in the catch of rainbows has been comparatively slight, with the result that the proportion of rainbows rose from 34 percent in 1935 to 38 percent in 1937. In 1938 this trend was accelerated; rainbows increased to 62 percent, while brook trout provided only 38 percent of the catch. Furthermore, the average catch of rainbow trout per angler, which had remained constant during the preceding years at 2.4, in 1938 jumped to 3.7.

The returns from 5,200 yearling brook trout planted in Furnace Brook in the fall of 1937 were very disappointing, only one percent of these fish being reported by anglers. The 1937 record of only 12 percent recovery was thought low but it remained for adverse wintering conditions to show how a fall plant of yearlings could be a total loss.

Fish population studies were made on the three test streams in cooperation with the United States Forest Service. The procedure was to block off a section of the stream with seines at the upper and lower ends. These were weighted with stones so as to prevent any fish entering or leaving the section. A dam of burlap sacks filled with sand was then constructed across the upper end of the section so as to divert the water into another channel. Any pools that could not be drained were pumped dry so that every fish present could be captured. The average number of trout per acre in three sections of Furnace Brook was 835, with a total weight of 35 pounds, 11

ounces. Only 15 percent of the trout were of legal size, 10 percent of these being brook trout.

In the South Branch of the Middlebury River the average number of fish (based on two sections) was 1,650 brook trout per acre, with a total weight of 54 pounds, 10 ounces. As in Furnace Brook, 15 percent of these fish were of legal size. There were no rainbow in Middlebury River and fish other than trout were too few to be of any significance.

The West Branch of the White River was found to have a much smaller population of trout. Three sections of this stream yielded an average of 376 trout, weighing 14 pounds, 10 ounces, per acre. This stream also supports considerable numbers of sculpin, dace, and suckers which, when added to the trout, give a total of 20 pounds, 14 ounces of fish per acre.

Studies on St. Marys River.—Monthly collections of bottom and chemical samples on the St. Marys River, Virginia, were continued during the spring, summer, and fall of 1938, to determine the effect of different current velocities on abundance of bottom animals in riffle areas. Samples collected during the past 2 years have been very uniform, with an average weight of slightly over one gram per square foot. In contrast with streams in the Southern Appalachians, there were fewer organisms in summer than at other seasons.

It is evident that stocking St. Marys River with fingerling trout has not produced worthwhile results and that rainbow trout disappear before they reach legal size.

Investigations in Pisgah National Forest.—The experimental fish-management program in Pisgah National Forest, North Carolina, was conducted for the second year in cooperation with the United States Forest Service. The project sustained an irreparable loss on January 4, 1939, in the death of Wm. M. Keil, who had been in charge of the project for the Forest Service since its inception. The work will be continued by Thomas K. Chamberlain, who has been conducting the biological studies for the past 2 years.

During the late summer and early fall of 1937 the streams of the Wildlife Management areas of the forests were stocked for the first time under the new program. After determining the carrying capacity of these streams, brook, brown, and rainbow trout were planted by the most approved methods. In order to develop and maintain satisfactory fishing it had been decided to plant larger fish and to develop some system of rotating the open season on the several watersheds in order that each stream might have a period of rest after being fished and restocked. Several of the streams were opened to a limited amount of fishing during the summer of 1938.

The danger of overstocking when streams are not rich in food has been demonstrated in several small streams of this area. In one instance a planting of brook trout averaging over 6 inches long was made in the fall. These fish remained in excellent condition through the winter but in early spring they began to decline, and, in late summer, 10 months after planting, their average weight was less than when first put into the stream.

Stream studies were carried out by Mr. Chamberlain to determine the rate of stocking for the various waters. Quantitative collections of food organisms were made from 977 square feet of trout-stream bottom in the Pisgah Forest alone. Observations were also made on

the trout present and on stream conditions in general. While streams in the Pisgah Forest received most attention, a start was made in studying the main streams of the Cherokee, Chattahoochee, and Nantahala National Forests, where food conditions appear to be much the same as in streams of the Pisgah Forest.

In general, the forest streams in this region may be classified as medium to poor. Most of them still suffer from excess of sediment, due largely to road construction and in some parts of the Pisgah Forest to overbrowsing by deer. However, conditions appear to be improving and were it not for uncertainties in future road construction the outlook would be distinctly encouraging.

Feeding experiments.—Extensive feeding experiments with fingerling, yearling, and adult trout were carried on at the Leetown station, supplemented by experiments with fingerlings at the Pittsford station. These experiments were designed primarily to determine the effect on growth, mortality, and egg production of dry meals fed at different levels and in different combinations.

In general, it was found that fresh meat is more efficiently converted into fish flesh than dry feeds but, owing to the lower cost of the latter, it is more economical to incorporate a considerable percentage of these products into the diet. Using a mixture of the better dry meals, best results were obtained when the meals were fed at a level of 40–50 percent.

One of the most striking results was the marked increase in growth following the addition of 3 percent cod-liver oil to a diet composed of sheep-liver and whitefish meal. Overfeeding failed to produce high mortality or any evident pathological effects.

Experiments with brood fish showed considerable variation in the hatchability of eggs from fish on different diets, amounting in some cases to over 50 percent. Overfed lots produced twice the number of eggs per female obtained from underfed fish on the same diet but the percentage of eyed eggs was more than 10 percent greater in the underfed lot.

Cooperative nutrition studies.—Studies on the nutrition of trout were continued under the cooperative agreement between the Bureau of Fisheries, the New York Conservation Department, and Cornell University. These investigations are carried out at the Laboratory of Animal Nutrition of the New York State College of Agriculture at Ithaca, N. Y., and at the Cortland (N. Y.) Hatchery of the Bureau of Fisheries. The staff conducting these studies consists of Dr. C. M. McCay, A. V. Tunison, A. M. Phillips, E. O. Rodgers, and C. R. Mitchell. Inasmuch as detailed reports of the progress of these investigations are published annually by the New York Conservation Department, only a summary of the results is included in this report.

The study of the growth rates of four species of trout during a period of more than 5 years (March 10, 1933–September 16, 1938) has been terminated. The trout used were lake, brown, rainbow, and brook. In this study the best survivors were the lake trout. These continued to grow, but at a very slow rate, until discarded. The brook trout were the poorest from the point of view of survival. The growth curves of these four species ran parallel throughout.

During the past few years many new vitamin concentrates have been made available, opening new possibilities for determining the needs of animals for vitamins. During the past year new studies

were made employing synthetic diets supplemented with liberal supplies of vitamin concentrates. All recognized vitamins were included in these supplements but this mixture could not replace the factor H of fresh meat. Present knowledge about the part any of the vitamins play in the growth and well-being of trout is extremely limited.

New attempts were made to prepare concentrates of factor H from liver but with little success. Ten percent of fresh liver added to a synthetic diet seems to satisfy the requirements of trout for all vitamins. In accordance with our earlier studies it seems that liver retains part of its factor H when dried in vacuo.

Studies with meats and fish preserved in various ways have been continued. Some success has resulted from feeding meat such as spleen preserved with salt. No injurious effects have resulted from feeding high levels of salt to brook trout.

Since ordinary dry feedstuffs contain about 10 percent of moisture, an attempt has been made to dehydrate fresh meat by mixing it with very dry feed mixtures. By starting with a very dry diet sufficient fresh meat can be added to bring the mixture to its normal content of about 10 percent. Preliminary tests with this method indicate that part at least of the factor H is preserved.

Intermountain Region.—Fish management work in the Intermountain Region in cooperation with the United States Forest Service and the fish and game commissions of the several States, which had been discontinued for several years, was resumed with the appointment of Dr. Stillman Wright as regional biologist. Dr. Wright established his headquarters at Logan, Utah, on June 9, where the State Agricultural College has very generously provided adequate laboratory facilities for him and his assistants. Since entering upon his duties Dr. Wright has spent considerable time familiarizing himself with conditions in this region, in the course of which he has traveled approximately 17,400 miles by automobile.

Trout are the principal game fishes of this region in which, as elsewhere, the number of anglers and consequent intensity of fishing is increasing very rapidly. Failure of the fisheries to maintain themselves under the heavy demands of the public is evident in the streams, particularly those near centers of population. In lakes and reservoirs excessive removal of trout is usually followed by a great increase in the less-desirable species. Factors other than overfishing are, however, involved in the general decline of the fisheries in this region. Silting, resulting from overgrazing and accelerated erosion, makes streams less suitable for trout. In many streams hydroelectric and irrigation projects interfere with normal migrations, while fluctuations of the water level in reservoirs interferes with normal spawning and may have other detrimental effects. Because of the variety and critical nature of the many problems involved, it is evident that for some time investigations in this region must be directed toward the formulation of management plans for waters showing possibilities of immediate improvement of fisheries resources.

During the past summer special attention was given to Fish Lake, Utah, which formerly supported a highly productive fishery for rainbow, mackinaw, and brook trout. Some years ago the Utah club was introduced and has since become extremely abundant. As the

chub increased in numbers the brook trout decreased in abundance and average size until it is now a negligible item in the catch. There is reason to believe that the rainbow and mackinaw are also on the decline.

The results of earlier studies combined with those of last summer have made it possible to formulate a program of management which gives promise of improvement in the fishery. The following recommendations have been made to the State Department of Fish and Game: (1) That a program of eradication of the Utah chub be instituted, (2) that a forage fish especially suited to the needs of the mackinaw trout be introduced, (3) that plantings of rainbow and mackinaw trout be continued, (4) that the present catch limit be drastically reduced and that attempts be made to develop other lakes for fishing, so as to decrease the fishing intensity in Fish Lake.

In the search for a forage fish to meet the needs of the mackinaw trout, attention was directed to Bear Lake, Utah and Idaho, which has three species of Coregonidae found nowhere else. One of these, the Bonneville cisco (*Leucichthys gemmifer* Snyder), may prove to be a valuable forage fish, and a study of its life history has been begun. A more detailed study of Bear Lake is planned for 1939. At the present time the trout fishery in this lake is in a deplorable condition and a number of factors conspire against improvement.

California trout investigations.—The work of this research unit has remained under the direction of Dr. P. R. Needham, with headquarters at the Natural History Museum of Stanford University. Dr. Osgood R. Smith was appointed to the staff in the position of Assistant Aquatic Biologist. The cooperative agreement that had been in effect since 1932 with the California Division of Fish and Game was abrogated by mutual consent on July 1, 1938.

Cooperation with the United States Forest Service was continued, but lack of funds limited the extent of the work. Angling catch records were taken for a second season on Fish Lake, in the Umpqua National Forest, Oregon. Lack of funds caused abandonment in August of the survey of the North Fork of the Umpqua River and its tributaries when only partially completed. The survey of lakes in the Willamette National Forest was completed and a report covering the entire three years' work and containing stocking policies for all lakes suitable to fish life is now being prepared. A survey of lakes in the Columbia National Forest in Washington was begun, and it is planned to continue the work next season if funds are available.

Complete catch records were secured for a second season on Squaw Creek in the Shasta National Forest, Calif., and a report is being prepared that will cover the 2 seasons' activities.

Loss of Mexican trout.—The flood of March 2, 1938, in southern California completely destroyed the Forest Home State Fish Hatchery, near Redlands, and with it both the adults and eggs of *Salmo nelsoni* brought to California from Baja California, Mexico, in the spring of 1937. An attempt will be made to secure another lot of these fish for breeding purposes.

Convict Creek experimental stream.—Experiments to determine the survival rates of hatchery-reared trout planted under controlled conditions were continued. Fifteen plants of marked rainbow and

brown trout were made in the experimental stream, 13 of which were successful. The survival from plants of advanced fry and eyed eggs gave further confirmation of last year's results. From a plant of 3,000 eyed cutthroat eggs, 465 fish, or 15.5 percent, survived after 51 days. A slightly higher survival of 21.7 percent was obtained from a plant of 2,000 unfed fry. These results were obtained under light predation, and survivals are slightly higher than any obtained last year. In contrast, a plant of 1,000 unfed fry showed a survival of only 1.4 percent under heavy predation, 64 wild trout being taken from this section at the end of the experiment.

Brown trout fingerlings, planted at the usual size at which they are planted from State hatcheries, showed surprisingly high survivals after 3 months. For instance, in one section a survival of 76.4 percent was obtained after 94 days, in spite of the fact that 117 wild trout were also present in the section. These fish were planted at a length of 1.5 inches and averaged 3.2 inches at the end of the experiment. By way of comparison, wild brown trout of the same age, netted from Convict Creek, showed a survival of over 89 percent after 97 days under heavier predation.

Small rainbow trout, averaging 1.7 inches in length, planted in two experimental sections, showed survival rates of 75.6 and 83.1 percent, respectively, after 95 days. These fish were planted without removing wild fish and no effort was made to protect them from other predators.

One of the most surprising results has been the large numbers of naturally spawned fish that are found in the experimental sections at the end of the season. This year a total of 1,123 wild brown, rainbow, and eastern brook trout were removed from the 15 experimental sections, an average of 74 wild fish per section.

Some much-needed improvements were made during the past year, including the construction of a small cabin for living quarters, and a few changes in the experimental section. Floodwaters in late June interfered with the experiments to some extent. Late in the fall a flood diversion ditch was constructed which will make it possible to divert at least a portion of high water out of the main channel and around the experimental area.

Shasta Dam survey.—A party of four biologists, employed by the United States Reclamation Service, has been engaged in an investigation of the salmon-salvage problems resulting from the construction of the Shasta Dam on the Sacramento River. This work is under the immediate direction of Dr. Smith. During the summer most of the spawning areas above the dam were located and measured to determine the extent of such areas that will be destroyed upon completion of the dam. Streams below the dam were also examined for suitable spawning areas.

On the basis of counts made of salmon passing over the fish ladder at the irrigation dam at Redding, it is estimated that there are approximately 20,000 salmon in the fall run alone, which would indicate a potential deposition of over 70 million eggs in the area that will be cut off by the dam.

Dam debris survey.—Late in June a crew of four men was employed by the United States Engineer Corps to make a study, under the direction of Dr. Smith, of the fisheries problems arising from the

construction of three dams on the American and Yuba Rivers in California. Data were gathered during the summer by standard stream survey methods and, in addition, two men were employed to count salmon ascending the rivers. The counts were incomplete and do not include a reputedly sizeable steelhead trout run. They do, however, indicate that it will be mainly sport fishing and not the commercial salmon fishery that will be affected by the dams and mining debris.

Survey of Pyramid Lake, Nevada.—A survey of Pyramid Lake and its fisheries problems was made between March 7 and June 8 at the request of the Indian Service. Francis H. Sumner was stationed at the lake to gather biological, physical, chemical, and historical data on the lake and on Truckee River, which formerly was the spawning ground of great runs of cutthroat trout. With the aid of Indian wardens a record was kept of the commercial catch made by the Indians, which has declined greatly in recent years. Length-frequency and age studies show that the run is at present made up almost entirely of old fish, averaging 34 to 35 inches long, and that the younger age groups are not represented. This age and frequency is the reverse of that usually found in an over-exploited fishery. It appears that the run was but a remnant of a race that has practically ceased to reproduce, from lack of spawning facilities. Overfishing by the Indians has probably been a factor in depleting the run, but it is evident that the diversion of the Truckee River water has been the major cause. It is considered doubtful that rehabilitation could be effected by any means.

BASS

Studies on streams in Virginia and West Virginia.—Field work on bass streams, begun in 1936, was continued at the Leetown (W. Va.) station by E. W. Surber and George E. Klak.

These studies are designed primarily to determine the extent and efficiency of natural propagation of bass and the effect of intensive fishing on the bass population. They show that, even in heavily fished waters, there is little danger of the bass population being seriously depleted if adequate spawning facilities are available. Intensive fishing frequently results in excessive numbers of small bass, with consequent reduction in the abundance of forage fishes. It is apparent that the remedy is to build up the food supply and that stocking with young will only tend to intensify the unbalanced condition.

Monthly series of bottom samples were collected from the experimental sections of four streams, namely, the Cacapon River, South Branch of the Potomac River, North Fork of the Shenandoah River, and the Shenandoah River. This series of samples duplicates those taken in previous years. Special attention was given to measurements of current velocities at all sampling stations. Laboratory work on the bottom samples has been completed, but the data have not yet been analyzed.

Studies of the extent of natural propagation were continued in these four rivers. In contrast with previous years, interruption of the spawning season by cold weather and muddy waters brought about a second spawning early in June. In previous seasons spawning was completed by the 1st of June. The number of bass nests

per mile was 70.7 in the Cacapon River, 81 in the South Branch of the Potomac, 24 in the North Fork of the Shenandoah, and 11 in the Shenandoah River proper. It is believed that in ordinary years an excessive number of fry are produced in the first two rivers. During the past year, however, high and muddy waters destroyed the fry as they rose from the nests and there was a decided scarcity of fingerling bass throughout the season. Routine monthly collections of fishes showed that a reduction in the numbers of fingerling bass is accompanied by an increase in the forage fish population. After July, collections of bass fingerlings for study became increasingly difficult or impossible because of their scarcity.

As in previous years, conditions in each stream were found to differ in many respects and each would require different treatment to bring about improvement in fishing. Minnow surveys were made in 11 experimental sections in an attempt to determine whether reasonably reliable data could be collected on the size of the forage fish populations in the four rivers concerned.

Investigations in Florida waters.—In recognition of the need for extensive studies on black bass and other fresh-water game fish in Southern waters, and their propagation by artificial means, headquarters for this work was established at the hatchery recently acquired by the Bureau at Welaka, Fla. This station, located on the banks of the St. Johns River, is admirably adapted to experimental work. There are a large number of ponds, ranging from seven-eighths to 2 acres in area, which have recently been remodeled to make them more suitable for experimental work. New buildings have been constructed which will provide adequate laboratory, office, and living facilities for biologists working at the station. Opposite the station, on the west side of the St. Johns River, is the Ocala National Forest, which contains several streams and a large number of lakes rich in aquatic life. Through a cooperative agreement with the United States Forest Service and the Florida State Commission of Game and Freshwater Fish, eventual management and control of all lakes in this area is contemplated.

Investigations in this area, both at the Welaka station and in the field, are being conducted under the direction of O. Lloyd Meehan. Mr. Meehan began his work on the waters of the Ocala Forest in April 1938, and later moved his headquarters to Welaka.

A survey of the principal lakes in the Ocala Forest was carried on during the summer of 1938 to provide information to be used in developing a management program for these lakes. The survey included plane-table mapping of the lakes by a crew of C. C. C. enrollees, complete soundings of each lake, and the determination of the species of fish present and their relative abundance. From this survey maps have been prepared showing bottom contours, the location, kind, and extent of weed beds, and other pertinent information.

Based on this survey, a stocking program has been worked out for 19 lakes that are fully controlled by the Forest Service. Most of the lakes are to be stocked with bass and sunfish, but several which appear ideally suited to crappie have been reserved for this species.

To determine the fishing demand to be expected on lakes of the forest, checking stations were set up on two of those most accessible

to anglers. At these stations a complete census was started on May 21, the opening day of the fishing season, and will continue until the close of the season on March 21, 1939. Bottom samples, two types of plankton samples, and chemical data are also being collected on these lakes.

In addition to the lakes under management, seven ponds have been set aside for experimental work. This number will be increased as needed. These ponds will be utilized for stocking experiments and study of methods to increase the food supply of game fish in these waters, as the basis for improvement in the management program.

In the Choctawhatchee National Forest there are a number of streams that are inhabited by largemouth bass at the lower end where they enter coastal bays, but which contain no game fish higher up. These streams are peculiar in that the temperature of the water is about the same throughout the year. A study is being made of the physical conditions and life in these streams to determine how they can best be utilized.

Experiments relating to hatchery problems will be started early in 1939 when the remodeled ponds at the Welaka station will be ready for use.

PARASITES AND DISEASES OF FISH

Facilities at Seattle, Wash., for the study of problems relating to fish diseases were greatly increased during the past year. These studies are under the direction of Dr. F. F. Fish. Two experimental laboratories are now available, each operated for a slightly different purpose. One is an enlargement of the field laboratory constructed at the Quilcene (Wash.) hatchery in 1937. The original temporary structure has been replaced by a permanent building constructed by the Division of Fish Culture according to plans provided by Dr. Fish. As this laboratory was planned primarily for testing scientific discoveries under controlled field conditions, it is not suited to all types of experimental work.

A second experimental hatchery has been provided, through the generous cooperation of the University of Washington, in the basement of one of the university buildings. This laboratory is supplied with chlorinated water, which is subsequently dechlorinated by passage through an activated carbon filter, thus assuring a disease-free source of water. The laboratory contains 24 small troughs which have proved highly satisfactory for this type of research. The main water supply to the troughs is controlled by a manually operated master valve and mixing chamber which permits the maintenance of any desired temperature in the troughs. When finances permit, the water supply of 10 of the experimental troughs will be additionally controlled by automatic thermostatic valves.

Much of the long-term scientific program of the Seattle Laboratory had to be considerably modified during 1938 because of the lack of suitable facilities during the construction period. As long as the original Quilcene Laboratory could be used, a series of toxicity studies was maintained to determine the maximum nontoxic concentration of disinfectants which fish could withstand for various

lengths of time. The value of these concentrations in preventing certain diseases was then tested at producing hatcheries by means of routine 1-hour applications at weekly intervals.

During the course of the experiments, which extended over a period of 3 months, a serious outbreak of the Western type of gill disease occurred at the Birdsvew (Wash.) Hatchery, and a mild outbreak at the Quinault hatchery. Prolonged treatments with malachite green, potassium permanganate, and chlorazene failed to exert any beneficial effect in preventing the disease. A considerable drop in the mortality followed treatments with copper sulphate and boric acid, but further experiments with both chemicals will be necessary before any conclusions concerning the prophylactic or therapeutic values of these disinfectants are justified.

During 1938 a new technique was developed for treating fish in relatively large volumes of water, such as are found in circular pools and in raceways. In this method the water supply to the pond is shut off and the amount of predissolved disinfectant necessary to attain the desired concentration is added. The water is kept mixed and aerated during the treatment by means of a centrifugal pump.

After completion of the new laboratory at Quilcene, a series of controlled infection experiments with the protozoan parasite *Cyclochaeta* were initiated. The purpose of the experiments was not only to trace the development of the disease under controlled conditions but primarily to determine the relationship between daily losses and the actual degree of infection present. The results indicate that while daily losses are by no means an accurate index of the degree of parasitism, and are unsuitable for experimental purposes, they are sufficiently accurate to serve all practical purposes.

Pathological studies on *Henneguya salminicola*, a myxosporidian parasite in the body musculature of several species of Pacific salmon, and similar studies on *Myxobolus inornatus* n. sp., a myxosporidian found in the body musculature of the black bass, were completed and the results prepared for publication.

At the Leetown station E. W. Surber completed a study of a peritrichous ciliate of the genus *Scyphidia*, which occurred in large numbers on the gills and bodies of black bass at this station. This parasite was discovered on a lot of largemouth fingerlings which suddenly stopped feeding. No attempt was made to control the infection and within a few days the fish suffered a sudden and almost complete mortality. Although a few *Dactylogyrus* and *Cyclochaeta* were also found on the fish the *Scyphidia* are believed to be the principal cause of the mortality. This is borne out by the fact that the same pond contained numbers of golden shiners which were more heavily infected with *Dactylogyrus* than the bass, yet suffered only a slight mortality. No *Scyphidia*, however, could be found upon these fish.

Dr. Davis continued his studies on a suctorian parasite of the smallmouth black bass which has been the cause of considerable mortality at Leetown among bass of all ages. This parasite is evidently widely distributed, since it has been found at several hatcheries in New York, New Jersey, and Maryland.

The "Disease Service" continued to function during the past year, about the same number of specimens being received for diagnosis as

in previous years. One very gratifying feature is that some of the hatcheries have ceased to be steady clients of the service, which would indicate that the common diseases are now under better control.

Dr. Davis spent some time at the York Pond (N. H.) station in connection with an outbreak of furunculosis. In an effort to eradicate the disease the trout were either removed or destroyed and the ponds and hatchery disinfected with chlorine and hydrated lime. Owing to the nature and extent of the ponds this was a very difficult task but it is believed that it was accomplished successfully.

INVESTIGATIONS IN INTERIOR WATERS

DR. M. M. ELLIS, *in charge*

POLLUTION STUDIES

Headquarters for the pollution studies have continued at Columbia, Mo., where the University of Missouri has courteously provided laboratory space and facilities. A subsidiary laboratory at Fort Worth, Tex., has also been maintained. The various phases of the pollution investigations are so organized that they contribute to the central purpose of determining the suitability of particular waters both in the stream and in the hatchery for different types of fishes, the detrimental action of many substances which enter streams or water supplies either naturally or through pollution, and reliable means for measuring the condition of the fish themselves. In this work cumulative effects and impairment of vital functions are receiving more attention than the immediate lethality, as the former are both more insidious and far reaching than the latter.

Three major lines of investigation are in progress at the Columbia field unit and the Fort Worth Laboratory.

Analytical studies.—Waters, muds, and aquatic organisms collected in the field are sent to the central laboratory for detailed analysis. Determination of these samples is carried out by Dr. B. A. Westfall and assistants. In addition to the materials collected in the course of field work conducted by the staff, a large number of samples are sent in for analysis by the various State agencies.

Bioassays.—The specific effects of materials found in waters, muds, and pollutants, on living fish and other aquatic animals, are determined by the bioassay method. The bioassays of pollutants sent to the Columbia unit by State authorities and other sources have grown to be an important activity of the laboratory, with 50 to 200 such assays constantly in progress. Equipment and procedures have been so standardized that it is possible to assign a considerable portion of this work to analytical assistants who carry on these tests as routine tasks.

Physiological investigations.—The underlying causes for the actions of the various substances found in natural waters and pollutants on living fish are sought through studies of the physiology of fish. This phase of the work is under the direct supervision of Dr. Ellis and is conducted both in the Columbia Laboratories and at Fort Worth. A major field of physiological investigation during the year was a study of the effects of various components of larvacides and herbicides on fresh-water fishes and associated aquatic food

organisms. As the biochemical and physiological tests are quite exacting, each fish is maintained and studied as a separate patient, frequently for a period of several months. More than 200 such fish are under observation at Columbia, and upwards of 500 catfish are being studied as part of this investigation at Fort Worth. These studies have progressed to the point where it is possible to conclude that there is impairment of the growth and nutrition of fishes in waters treated with even small quantities of arsenicals and several other materials commonly used as mosquito larvacides. A separate report on this subject will be prepared early in 1939.

During the latter part of the year physiological studies were begun to determine the effects of several substances dangerous to fish life which were found in natural waters in the West in the course of the summer's field investigations. These studies are being carried out in both the Columbia and Fort Worth Laboratories.

Summer field surveys.—During the summer of 1938 intensive studies of stream pollution were made throughout the greater part of Western United States, and many new data were collected on the nature and effects of polluted waters. Observations were made in the States of Texas, Arizona, Nevada, California, New Mexico, Oregon, Washington, Idaho, Wyoming, Montana, Minnesota, North Dakota, and Nebraska. About 5,000 analyses were made in the field and additional material was returned to the laboratory at Columbia, Mo., for further analysis.

After leaving Columbia early in the summer, Dr. Ellis and field party proceeded to the Fort Worth (Tex.) Laboratory where particular attention was given to the catfish investigations in progress there. From Fort Worth the party proceeded to Uvalde, Tex., where a study of water conditions indicated the source of at least one of the difficulties hampering pond operations, not only at Uvalde but also throughout the Southwest. While in Texas, the party had an opportunity to make direct observations on the silt and salt loads of floodwaters, obtaining valuable data.

Studies of impounded waters continued at Elephant Butte Reservoir in cooperation with the United States Reclamation Service and the National Research Council, and at Lake Mead in cooperation with the same agencies and the National Park Service. At Elephant Butte opportunity was afforded to use a new piece of apparatus recently developed in the Columbia Laboratories by means of which direct determinations of silt, turbidity, water temperature, and light transmission were possible inch by inch throughout the entire depth of the lake. This new apparatus gave valuable detailed data confirming previous observations made by less accurate methods. Application of various new methods and pieces of apparatus to surveys of these western impounded waters is proving very profitable and is providing a wealth of new information on water problems which has not been available previously. A manuscript on Lake Mead is planned, comparable to the one on Elephant Butte now nearing completion.

After completing the work at Lake Mead the party proceeded to the geyser fields and the Hot Creek region in California where a large series of observations were made. At Gold Beach, Oreg., work carried on during the previous summer on the Rogue River mining problems was checked and extended.

In the Mount Rainier section studies of glacier waters were continued. In addition to making observations on the three major glacier fields, Nisqually, Puyallup, and Edmonds Glaciers, the party studied a large number of streams receiving glacier waters. After completing the work in the vicinity of Mount Rainier the field party moved over into the Columbia drainage and made extensive observations on the Columbia River and its tributaries above and below Rock Island Dam. These data form parts of series collected in previous years which it is believed will ultimately be of service in answering some of the questions concerning the establishment of new salmon runs in these streams.

Dr. Westfall, who carried on laboratory experiments at Columbia during the months of June and July, and looked after the field material as sent in, joined Dr. Ellis' party at Lake Mead the second week in August. Enroute to Lake Mead Dr. Westfall, with field truck and equipment, covered various streams in northern New Mexico and Arizona. Dr. Westfall remained with the main party from Lake Mead to Glacier Park, then proceeded east through Montana and North Dakota to check water conditions in the Fort Peck Dam area, the headwaters of the Missouri, and at Jamestown and Valley City, N. Dak., where proposed hatcheries are being considered. From North Dakota he proceeded east through Minnesota and made an investigation of the pollution situation on the Rainy River.

The main field party proceeded south from Glacier Park through the lead district of north Idaho and the copper district of Montana to check observations at regular stations, thence through Yellowstone Park and Wyoming, giving particular attention to streams from geyser fields or from heavily mineralized districts. Reaching the southern Wyoming line, the party was again split so that two sets of streams, one across Colorado and one across Nebraska, were sampled by the returning parties enroute to the Columbia (Mo.) station.

Because of improved apparatus and new methods used, summer field studies were much more detailed during 1938 than heretofore. Special apparatus was carried, by means of which physiological studies of the fish were made in the field. This innovation proved very successful and yielded not only valuable but also surprising data in many cases. It is well known that moving fish or other animals from their natural habitat, even under the most rigid precautions, frequently results in physiological changes so that the examination of these live animals in the laboratory often fails to give a true picture of their conditions in the field. With the special physiological and biochemical apparatus carried the physiological observations and tests were made immediately at the stream in which the fish were living. It is believed that these data will supply a much truer picture of the physiology of our fresh water fishes than has hitherto been available.

Summary of progress during 1938.—Studies of stream pollution during the past year have demonstrated more clearly than ever before the fact that high dilutions of many substances, introduced by man into streams, lakes, and reservoirs, or entering these waters from natural sources, have cumulative actions and seriously impair the vital activities of food and game fishes. By continued action these substances, even though they be present in the water in very small

quantities, are often more insidious and far reaching in their effects on fish life than other more obvious pollutants which kill fish at once. Collectively, therefore, the pollution investigations determine the suitability of particular waters, both in the stream and in the hatchery, for various types of fishes, the detrimental actions of specific substances, and reliable means for measuring the condition of the fish themselves.

This year's work has shown, among other things, that very small quantities of arsenicals and several other materials introduced into or placed on waters as mosquito larvacides, impair the growth and nutrition of fishes in these waters in addition to building up serious hazards of lethal poisoning; that certain combinations of some of the less common minerals which are found in small quantities in various western streams are responsible for internal injuries to trout and other fishes in these waters, and that these internal conditions are correlated with decline in weight and finally with the death of the fish in such streams; and that small quantities of several inorganic salts quite widespread in southern and western waters are the cause of low productivity and on occasion of the sudden death of large numbers of fishes in fish hatcheries, streams, and reservoirs receiving such waters.

Because of these findings, and other similar studies in progress, the listing of streams throughout the United States which can be designated as unsuitable for fish plantings, or in which low productivity may be expected because of these biochemical factors, is in progress.

As impounded waters are particularly subject to concentration of the various minerals and other compounds which constitute natural hazards to fish and other aquatic life, the detailed chemical and biological studies which have been in progress for some time at Elephant Butte Reservoir, N. M., and Lake Mead, Nev., have been continued throughout the past year.

Acute pollution problems continue to claim considerable attention, and specific cases of paper-mill pollution have been studied in Florida, South Carolina, North Carolina, and Minnesota; of phosphate-mine pollution in Florida; of copper, lead, and zinc mining operations in Idaho, and Montana; of combined industrial pollution in New York and Mississippi; and of placer gold mining in Oregon. Reports on these investigations have been submitted or are now in preparation. This unit has continued to advise both public and private agencies on matters of pollution and water conditions, and many State officials, various industrial concerns, and numerous private individuals have been given specific answers to particular problems throughout the year.

ICHTHYOLOGICAL INVESTIGATIONS

Fishes of the Canal Zone and Panama.—The study of specimens and data collected in 1935 and 1937 was continued by Dr. Samuel F. Hildebrand. The study of the fresh-water material was completed, and the results have been embodied in a publication entitled "A New Catalogue of the Fresh-Water Fishes of Panama." In this catalogue 127 species are listed, including 9 new ones. The origin and distri-

bution of the fishes of the Isthmus of Panama are discussed, and considerable life-history data are given. A section is devoted to the successes and failures of introduced fishes, setting forth precautions that should be taken and outlining a plan for future introductions.

The study of specimens and data collected in the locks of the Panama Canal, as well as elsewhere in the Canal, was completed. A full report was prepared, listing the animals taken and containing special information on the use of the Canal, especially its locks, as passage-ways for fishes.

American anchovies.—The taxonomic revisional studies of the American anchovies by Dr. Hildebrand were continued, especially in connection with the work set forth in the preceding paragraph. The study of the Atlantic forms has been carried about as far as the material available will permit, but only a few of the Pacific coast species have been studied.

Fishes of Tortugas, Fla.—The editorial work and study of specimens necessary in completing and getting ready for publication an unfinished monograph on the fishes of Tortugas, Fla., left by the late Prof. William H. Longley, has been far advanced during the year by Dr. Hildebrand. The points of chief interest in this work are the underwater observations and photographs of the shallow-water fishes, and the numerous additions of West Indian fishes to the American fauna.

General systematic studies.—Revisional studies of the systematics of American fishes were continued by Isaac Ginsburg, with special reference to the Gobiidae. New species were described, based chiefly on material studied from the gobies obtained by Dr. Hildebrand in Panama; material submitted for study by the Bingham Oceanographic Foundation; and material from the Hancock Collection, Stanford University, and from the National Museum.

INDEPENDENT ACTIVITIES OF THE FISHERIES BIOLOGICAL LABORATORIES

WOODS HOLE, MASS.

Owing to the lack of a special appropriation, the Woods Hole station was opened last summer to only a limited number of investigators. In addition to Dr. Galtsoff, Acting Director, and his staff, who were engaged in shellfisheries studies, the following persons occupied laboratory space: Dr. H. M. Smith, Associate Curator in Zoology, United States National Museum, working on otoliths of local fishes and a report on fresh-water fishes of Siam; Dr. Edwin Linton, University of Pennsylvania, helminth parasites of fishes; Dr. Raymond W. Root, College of the City of New York; and Dr. Clark Black, of Swarthmore College, the effect of carbon dioxide upon the oxygen-combining power of marine fish blood; Dr. d'Alto A. Welch, Johns Hopkins University, the variations and distribution of Hawaiian tree snails; Milton J. Lobell, United States Bureau of Fisheries, age composition of the winter flounder population and general studies of the life history; Julian G. Griggs, George Washington University, fertility in the oyster under various conditions.

In September the laboratory sustained considerable damages from wind and a tidal wave which swept the grounds, flooding the basement of the hatchery and the residence and destroying the seawall and pier. No serious damage was done to the floating equipment or to the scientific apparatus.

BEAUFORT, N. C.

Research facilities for the study of marine fishery problems in the South Atlantic region were provided throughout the year at the Beaufort Laboratory. The chief investigations conducted here by the Bureau's staff, under the direction of Dr. H. F. Prytherch, consisted of experiments and studies with reference to oyster culture; destruction of oysters by starfish; the propagation of diamond-back terrapin; the utilization of salt-marsh pools for propagation of fish and shellfish; and mortality of shellfish in Myrtle Sound, N. C.

Assistance and advice was given to the following agencies, as indicated, on matters pertaining to the marine fisheries and fishery industries of the South Atlantic region; United States Engineer Department, construction of new inlets in the vicinity of Cape Lookout for improvement of the fisheries of Core Sound, N. C.; North Carolina Department of Conservation and Development, continuation of oyster-planting programs and investigation of oyster mortality in Myrtle Sound; Duke University, construction of five building units and pier of biological laboratory on property adjacent to the Beaufort stations; Union Carbide and Carbon Corp., continuation of corrosion tests with stainless steel cable under marine conditions; Aluminum Company of America and the United States Navy, antifouling and corrosion tests on aluminum panels; Fordham University, Chemistry Department, tests of the antifouling value of special paints for marine use.

Laboratory facilities for biological research have been provided for 27 independent investigators from other institutions who were engaged in the following studies: Dr. H. V. Wilson, professor in the University of North Carolina, cellular reactions to drugs; Dr. A. S. Pearse, Duke University, assisted by James W. Littler and Henry A. Walker, polyclad worms and crustacean parasites; Dr. Frederick F. Ferguson, University of Virginia, the marine turbellaria; Dr. M. A. Stirwalt, University of Virginia, assisted by Frances C. Smith, morphology of marine rhabdoceles; Dr. George H. Girty, United States Geological Survey, the ecology of living mollusks; Dr. W. C. George, University of North Carolina, comparative hematology; Dr. Bert Cunningham, Duke University, effects of temperature on the rate of development of turtle eggs; Dr. Katherine R. Jeffers, Duke University, the effect of pituitary hormones on the ovaries of marine fishes; Dr. Arthur E. Woodhead, University of Illinois, trematode parasites of fish, especially larval forms in oysters; Dr. F. J. Brinley, North Dakota State College, physiological studies of fish embryos; Dr. William L. Engels, University of North Carolina, terrestrial vertebrate fauna of the coastal banks; A. B. Hardcastle and Margaret S. Hardcastle, a protozoan parasite of the menhaden; Sidney Shapiro, Columbia University, differential growth in the Scombroidei; Coit Coker, University of North Carolina, embryology of echinoderms; Roscoe E. Hill, University of Illinois, ecological studies of marine fauna; Nelson G. Hairston, University of North Carolina,

development and reproduction in hydroids; Russell A. Huggins and Sara E. Huggins, Western Reserve University, the scale size of fish in relation to body size; Gordon H. Tucker, University of North Carolina, gonad development in ascidians; J. Albert Fincher, University of North Carolina, spermatogenesis in sponges; Stephen W. Gray, University of Illinois, physiology of the invertebrate heart; H. J. Lewis and Hervey Lewis, Narragansett Bay Oyster Co., spawning and larval development of oysters.

Propagation of the diamond-back terrapin.—A record hatch of 13,600 young diamond-back terrapins was obtained during the past summer at the United States Fisheries Biological Station at Beaufort, N. C., which operates the world's largest hatchery for the propagation of these salt-marsh turtles. The greatest annual production prior to this time was that obtained in 1935, when a brood of 13,245 was produced in the 5 concrete breeding pens surrounding the station. Artificial propagation of terrapin was first undertaken here in 1909, and since then has yielded over 128,000 young diamond-backs for restocking the coastal salt marshes of North Carolina and other Southern States. The 1938 brood has been placed in special hibernating boxes in the large rearing house and next spring will be distributed throughout the South Atlantic region in cooperation with the various State conservation departments.

This year's high production is attributed to improvements that were made in breeding pen arrangements as a result of experimental studies conducted under the direction of Dr. Prytherch and Capt. Charles Hatsel. Since these studies indicated that production of young might be considerably increased by allowing the brood stock greater room for feeding, egg laying, etc., two large pens were constructed to relieve the crowding of adult terrapin in the other five enclosures. In the new pens, in which the brood stock was allowed approximately twice as much space as during the previous year, the production of young by each group (consisting of 400 females and 100 males) increased from 1,200 and 2,480, respectively, in 1937 to 3,360 and 3,616 in 1938. In two other experiments, in which the number of adult terrapin per pen was reduced 50 percent, there were increases of 25 and 40 percent in production of young in 1938. In the various experimental pens in which crowding was reduced, the average production of young per female terrapin showed increases of 3.0 to 5.2; 3.0 to 8.41; 6.2 to 8.4; and 8.0 to 10.1, as compared with the previous year. A most encouraging aspect of these improvements in terrapin propagation is that general conditions in 1938 were apparently less favorable for breeding than usual, as two of the "control" pens that were not changed in any respect showed decreases in egg production of 20 and 50 percent.

The total brood stock at present consists of 570 males and 2,025 females, most of which have been in captivity for periods ranging from 10 to 25 years. Last season 320 wild terrapin were added to this stock and are being kept under observation in a separate pen to determine the length of time required to reach satisfactory egg production. During the first summer these terrapin produced only a few young but showed an increased output of 460 for 1938. In experiments conducted in cooperation with Dr. Bert Cunningham, of Duke University, several hundred eggs were successfully incubated under artificial laboratory conditions by keeping them in holders of

moist filter paper instead of in a layer of sand, as in nature. This new technique will be valuable in future experiments to determine the relative importance of various environmental factors such as temperature, humidity, oxygen supply, etc., on the rate of incubation and survival of young of the diamond-back terrapin.

Utilization of salt-marsh ponds for propagation of fish and shellfish.—Investigations have been undertaken to determine the possibility of using improved marsh areas in the South Atlantic coastal region for breeding and growing mullet, oysters, and other marine species of commercial importance. In cooperation with the Works Progress Administration the construction of a large tidal pond, 2½ acres in extent, for experimental rearing of mullet was completed by the fall of 1938. This was stocked with over 3,000 fish ranging in size from roe mullet, weighing over 5 pounds, to immature fish having a length of 6 to 8 inches and which are approximately 1 year old. Less than 1 percent of the fish died from injuries sustained during collection and transportation to the pond by live car. The tidal circulation renews over half the water in the pond every 12 hours and apparently has maintained, during the first 3 months of operation, satisfactory conditions for breeding and feeding of the mullet. This is indicated by the discovery of thousands of very young mullet in the pond during the latter part of December which had attained lengths ranging from one-half to three-fourths of an inch. Representative samples of these small mullet are being collected at intervals of 1 month in order to obtain a record of their rate of growth in this experimental area. Observations are also being made of the growth of the large mullet and the time required for the various age groups or schools to reach marketable size. The experiments thus far have shown that tidal ponds of this type can also be used for the temporary storage of comparatively large quantities of live fish until conditions for marketing are most suitable.

Construction operations were continued on marshland adjacent to the mullet-rearing pond to provide shallow canals and small ponds for experiments in oyster culture. These were planted in the early fall with several hundred bushels of seed oysters gathered from nearby beds where overcrowding produces an inferior quality of oyster. In the artificial ponds the oysters have shown rapid growth during the first 3 months, October through December, but the real test as to the practical value of this procedure will come during the summer of 1939, when arrangements will be put into effect to protect these plantings from attachment of spawn and subsequent crowding. Detailed observations of the rate of growth of the seed oysters in weight, volume, etc., are being made by the use of cement panels to which representative groups of oysters have been fastened, in order that individual measurements may be obtained at regular intervals. Different conditions are being maintained and studied in the various ponds with respect to temperature, depth, and circulation of water in relation to the density of oyster plantings and time required for the seed to reach marketable size.

APPROPRIATIONS

The funds for the work of the Division of Scientific Inquiry in the calendar year 1938 were approximately the same as for 1937 insofar as the basic appropriation is concerned. The lifting of the require-

ment for administrative saving, however, made available \$30,000 which was held in reserve the previous year. The sum of \$76,000 was added to the appropriation in order to finance the new Bristol Bay salmon investigation. An appropriation specifically for conserving fish by screens and ladders was provided in the amount of \$20,000. By means of special deposit funds made available by the States of Virginia and Maine, investigations were conducted on the oyster and lobster fisheries, respectively. Large allotments of Public Works Administration and Works Progress Administration funds made possible the construction projects undertaken by the Division to improve the biological stations at Milford, Conn., Beaufort, N. C., and Pensacola, Fla., as well as to construct fish screens in the States of Washington, Oregon, and Idaho. In addition to these projects statistical work on old fishery records was conducted at Cambridge, Mass., Ann Arbor, Mich., and Stanford University, Calif. About one-third of the emergency funds and about one-half of the two regular appropriations was spent in the calendar year 1938. A statement of funds available for biological investigations is given below:

Project	1938	1939
Regular appropriations:		
Commercial fishery investigations.....	\$133, 181	\$222, 300
Oyster cultural investigations.....	50, 579	50, 620
Aquiculture investigations.....	42, 500	46, 880
Conserving fish by screens and ladders.....	1, 500	20, 000
Water quality studies.....		11, 100
Washington laboratory and administration.....	4, 240	7, 100
Total.....	232, 000	358, 000
Allotment for travelling expenses.....	27, 000	31, 620
Allotment for maintenance and operation of vessels.....	29, 000	30, 450
Special funds:		
Marine fouling studies.....	1, 500	-----
State of Virginia oyster fund.....	-----	5, 000
State of Maine lobster fund.....	-----	2, 500
Public Works Administration projects.....	-----	281, 050
Works Progress Administration projects.....	-----	127, 645



U. S. DEPARTMENT OF COMMERCE
HARRY L. HOPKINS, *Secretary*
BUREAU OF FISHERIES
CHARLES E. JACKSON, *Acting Commissioner*

Administrative Report No. 36

**ALASKA FISHERY AND FUR-SEAL
INDUSTRIES IN 1938**

By **WARD T. BOWER**

**APPENDIX II TO REPORT OF COMMISSIONER OF FISHERIES
FOR THE FISCAL YEAR 1939**



**UNITED STATES
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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.

ALASKA FISHERY AND FUR-SEAL INDUSTRIES IN 1938¹

By WARD T. BOWER, Chief, Division of Alaska Fisheries

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¹ Administrative Report No. 36, Appendix II to the Report of the U. S. Commissioner of Fisheries for 1939. Approved for publication June 24, 1939.

INTRODUCTION

The Bureau's work in Alaska, which pertains primarily to fishery and fur-seal management, was continued in accordance with the usual plan. The Commissioner of Fisheries spent several weeks in the Territory in July, inspecting both branches of the service.

Regulations for the protection of the fisheries were revised early in the year to meet conservation requirements in various localities, and few additional restrictions were necessary during the progress of the season. In certain places where the salmon runs were late and sufficiently large to assure more than an ample escapement for seeding purposes, the regulations were relaxed to permit from 1 to 4 days additional fishing. Although somewhat below the record output for 1936, the yield of salmon in Alaska in 1938 was well above average.

Weirs for counting the escapement of brood fish were operated in 11 representative salmon streams as a means of determining the ratio of escape to catch. Observations were made also of the numbers of breeding salmon in various important streams where no weirs were maintained.

Under the authorization granted by the Act of August 2, 1937, for the protection of oyster culture in Alaska, two applications were made for lease of bottoms in Territorial waters of southeast Alaska for the bona fide cultivation of oysters. The leasing of such bottoms is on liberal terms, with a view to encouraging the development of this industry.

A patrol of the fishing grounds was maintained by the Bureau's 14 vessels, 5 speed boats, and 14 other small power boats, supplemented by a number of chartered boats and launches. Some use was made also of chartered airplane service, both for patrol and for investigational work. There were 134 persons employed for varying periods as stream guards and special workmen in connection with the enforcement of the fishery laws and regulations, in addition to the regular personnel of approximately 60 persons, principally wardens and vessel operators.

Incidental to fishery-patrol duties, attention was given to the clearing of salmon streams in order to make additional spawning areas accessible for seeding. The improvement of conditions for the natural propagation of salmon involved also the destruction of predatory trout that feed upon salmon eggs and fry. This work was carried on chiefly in the Bristol Bay and Cook Inlet regions, through funds contributed by the Territorial legislature and the salmon packers.

Biological studies of salmon, herring, and trout were continued. The studies of the salmon this season were extended to include a comprehensive investigation of the red salmon of the Bristol Bay area.

No change was made in the regulations for the protection of walrus and sea lions.

There were 58,364 fur-seal skins taken on the Pribilof Islands, an increase of 3,184 over the number obtained in the preceding year. Computations of the fur-seal herd as of August 10, 1938, showed a

total of 1,872,438 animals, as compared with 1,839,119 in 1937. Killings were from surplus male seals, chiefly 3-year-olds, provision being made for a sufficient breeding reserve. The feeding and management of blue foxes on the islands were continued. During the 1938-39 season 1,029 fox pelts were obtained, and a suitable number of animals were marked and reserved for breeding stock.

The operation of the byproducts plant at St. Paul Island for the utilization of fur-seal carcasses resulted in an output of 30,587 gallons of oil and 178½ tons of meal. Except for limited quantities retained at the islands, these 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 as fish food at the hatcheries.

A few additional buildings for the natives and the fur-seal industry were constructed at the Pribilof Islands, and improved roads between the curing stations and hauling grounds were repaired and extended. Some new structures and equipment were added to the substation for sea-otter patrol in the western Aleutians.

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 fur-seal skins on the return trip. The Coast Guard again rendered valuable assistance in maintaining a patrol for the protection of the fur-seal herd and in performing other service.

Acknowledgment is made of the assistance by members of the Bureau's staff in the preparation of this document.

VISIT OF COMMISSIONER OF FISHERIES AND OTHER OFFICIALS TO ALASKA

The Commissioner of Fisheries sailed from Seattle aboard the *Brant* on July 2 to inspect the Bureau's fishery and fur-seal activities in Alaska. The party accompanying the Commissioner on this trip included Congressman Millard F. Caldwell, member of the House Appropriations Committee, Dr. Ernest H. Gruening, Director, Division of Territories and Island Possessions, and Mr. John B. McColl, chairman of the fisheries committee of the California State Senate.

The Commissioner's party arrived at Cordova on July 9, after stopping en route at various points in southeast Alaska. From Cordova the trip was continued by airplane to Anchorage and the Matanuska colony and thence to Naknek. At this point the party boarded the Coast Guard cutter *Ingham* and proceeded to St. Paul and St. George Islands to observe the fur-sealing operations there. The Commissioner had planned to return to Seattle aboard the *Brant*, following his visit to the Pribilof Islands, but owing to an accident to that vessel at Kodiak on July 15, the Commissioner's party completed the return trip on the *Ingham*, arriving in Seattle on July 22.

Ward T. Bower, Chief of the Division of Alaska Fisheries, represented the Department on the special fisheries cruise of the Coast Guard cutter *Ingham*, sailing from Seattle on June 24 and returning on July 22. Calls were made at many of the fishing centers and at several Bureau stations en route to Bristol Bay and return. Senator Robert R. Reynolds, of North Carolina, was to have made the trip aboard the *Ingham* but was unable to leave Washington at that time.

Later in the summer, however, Senator Reynolds proceeded to Alaska, and called at St. Paul Island when the Coast Guard cutter *Northland* stopped there on July 28.

Seton H. Thompson, Assistant Chief of the Division of Alaska Fisheries, departed from Seattle aboard the *Penguin* on June 11 to study the fur-seal industry at the Pribilof Islands and to inspect the Bureau's fisheries activities in other sections of Alaska. Following extensive observations at St. Paul Island, Mr. Thompson paid particular attention to the fisheries of Bristol Bay, Cook Inlet, and Prince William Sound before returning to Seattle on August 14 aboard the *Penguin*. Harold B. Carr, Editor and Photographer of the Bureau, accompanied Mr. Thompson to St. Paul Island to obtain official pictures of fur-sealing operations. He returned to Seattle with the Commissioner's party aboard the *Ingham*.

JAPANESE VESSELS IN BEBING SEA

In the spring of 1938 assurances were given by the Japanese Government that it would suspend the official survey of salmon resources in the waters of Bristol Bay which it had begun 2 years previously, and that it would continue to suspend the issuance of licenses for vessels to fish for salmon in those waters. This disposition of the matter was arranged after prolonged diplomatic negotiations between the countries involved, inasmuch as the expansion of Japanese activities with respect to the salmon fishery had alarmed Bristol Bay packers, and strong protests had been made against the threatened encroachment on Alaska salmon fisheries.

Only one Japanese crab cannery, the *Toten Maru* (2,951 tons), was operated in Bristol Bay in 1938. It was accompanied by 3 50-foot trawlers and 10 launches about 30 feet long, and left the district before the salmon runs began. Thus there was no interference with the salmon fishery in this region.

The scouting ship *Hakuho Maru*, of the Department of Agriculture and Forestry, cruised in the vicinity of the Aleutian Islands the latter part of May for the purpose of investigating the migration route of fur seals. The vessel was reported as having arrived at Atka from the westward on May 29 and departed for Japan on June 1, owing to engine trouble.

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 northward 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.

ALASKA FISHERIES LEGISLATION

Under date of April 7, 1938, the President approved an act amending the Act of August 14, 1937, which prohibited commercial salmon fishing by means of stake or set nets in the Bristol Bay area except by persons having resided continuously for a period of at least 5 years within a radius of 30 miles of the place of set-netting. The new act permits such fishing by persons residing continuously within the said area for a period of 2 years and, in the 1938 season, by persons residing there continuously after June 1, 1937.

The Act of June 14, 1906, entitled "An act to prevent aliens from fishing in the waters of Alaska," was amended by an act approved by the President on June 25, 1938, whereby all fishing in Alaska is limited to citizens of the United States, or to persons owing allegiance thereto, and to certain residents of the Territory. Under this act only the following persons may fish in the waters of Alaska:

1. Citizens of the United States.
2. Bona fide residents of the United States who have declared their intention to become citizens of the United States.
3. Natives of Alaska.
4. Aliens owing allegiance to the United States, i. e., Filipinos.
5. Bona fide residents of Alaska who have been residents for a period of three consecutive years prior to June 25, 1938, and who since June 25, 1935, have been continuously or seasonally engaged in commercial fishing in Alaskan waters. Aliens in this category, however, may continue to fish only until June 25, 1941, unless in the meantime they declare their intention to become citizens of the United States.

The text of the amendments is as follows:

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That Public Law Numbered 282, Seventy-fifth Congress, entitled "An Act making further provision for the fisheries of Alaska," approved August 14, 1937 (50 Stat. 639), is amended to read as follows: "That section 1 of the Act approved June 6, 1924, entitled 'An Act for the protection of the fisheries of Alaska, and for other purposes' (43 Stat. 464), as amended, is further amended by inserting in said section at the end of the first proviso thereof another proviso to read as follows: 'Provided further, That in the area embracing Bristol Bay and the arms and tributaries thereof, no person shall at any time fish for or take salmon with a stake net or set net, for commercial purposes, unless such person shall be a citizen of the United States and shall have theretofore continuously resided for the period of at least two years within said area; but for the salmon fishing season of 1938, residence within said area continuously after June 1, 1937, shall be deemed sufficient compliance with the residence requirements of this proviso:'"

Approved, April 7, 1938.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That section 1 of the Act of Congress approved June 14, 1906 (34 Stat. 263), entitled "An Act to prevent aliens from fishing in the waters of Alaska", is amended to read as follows:

"That it shall be unlawful for any person not a citizen of the United States, or who has declared his intention to become a citizen of the United States, and is not a bona fide resident therein, or for any company, corporation, or association not organized or authorized to transact business under the laws of any State, Territory, or district thereof, or for any person not a native of Alaska, to catch or kill, or attempt to catch or kill, except with rod, spear, or gaff, any fish of any kind or species whatsoever in any of the waters of Alaska under the jurisdiction of the United States: Provided, however, That nothing contained in this Act shall prevent those lawfully taking fish in the said waters from selling the

same, fresh or cured, in Alaska or in Alaskan waters, to any alien person, company, or vessel then being lawfully in said waters: *Provided further*, That nothing contained in this Act shall prevent any person, firm, corporation, or association lawfully entitled to fish in the waters of Alaska from employing as laborers any aliens who can now be lawfully employed under the existing laws of the United States, either at stated wages or by piecework, or both, in connection with the canning, salting, or otherwise preserving of fish: *Provided further*, That any person owing allegiance to the United States shall not be considered an alien for the purpose of this Act: *And provided further*, That any person who is a bona fide resident of Alaska and has been such a resident for the period of three consecutive years prior to the date of approval of this Act, and who during such three-year period has been continuously or seasonally engaged in fishing in the waters of Alaska for commercial purposes, may continue to engage in fishing in the waters of Alaska for commercial purposes for the period of three years after the date of the approval of this Act, although not a citizen of the United States."

Approved, June 25, 1938.

NEW FISHERY REGULATIONS

The regulations for the protection of the fisheries of Alaska, issued February 15, 1938, were amended by the following regulations issued by the Secretary of Commerce under the dates indicated:

[April 27, 1938]

SOUTHEASTERN ALASKA AREA SUMNER STRAIT DISTRICT

Salmon fishery.—1. Regulation No. 15 (d) is amended to read as follows: Koscusko Island: West coast within 1,500 feet of a point at 55 degrees 55 minutes 56 seconds north latitude, 133 degrees 48 minutes 22 seconds west longitude.

2. Regulation No. 15 (m) is amended to read as follows: (1) Prince of Wales Island: North coast within 3,000 feet westerly of Point Colpoys; and (2) within 1,500 feet of a point on an unnamed island at the entrance to Port Protection, at 56 degrees 26 minutes 41 seconds north latitude, 133 degrees 38 minutes 4 seconds west longitude.

[June 7, 1938]

KODIAK AREA

Herring fishery.—Regulation No. 3 prohibiting commercial fishing for herring from 6 o'clock antemeridian of Saturday of each week until 6 o'clock postmeridian of the Sunday following is rescinded.

PRINCE WILLIAM SOUND AREA

Herring fishery.—Regulation No. 2 prohibiting commercial fishing for herring from 6 o'clock antemeridian of Saturday of each week until 6 o'clock postmeridian of the Sunday following is rescinded.

SOUTHEASTERN ALASKA AREA SUMNER STRAIT DISTRICT

Salmon fishery.—Regulation No. 2 (2) of supplement No. 251-24-1 issued on April 27, 1938, is amended to read as follows: Within 1,500 feet of a point on an unnamed island at the entrance to Port Protection, at 56 degrees 20 minutes 41 seconds north latitude, 133 degrees 38 minutes 4 seconds west longitude.

CLARENCE STRAIT DISTRICT

Salmon fishery.—Regulation No. 15 (m) (3) is amended to read as follows: The Bronaugh Islands south of 55 degrees 7 minutes 10 seconds north latitude and west of 131 degrees 43 minutes 30 seconds west longitude.

U. S. BUREAU OF FISHERIES

[July 21, 1938]

BRISTOL BAY AREA

Salmon fishery.—Regulation No. 13 is amended to read as follows: Commercial fishing for salmon in the Ugashik district with nets less than 8½ inches stretched measure between knots is prohibited except in the period from 6 o'clock antemeridian June 30 to 6 o'clock antemeridian August 1.

[August 4, 1938]

PRINCE WILLIAM SOUND AREA

Salmon fishery.—Regulation No. 10 is amended to read as follows: Commercial fishing for salmon is prohibited during the remainder of each calendar year after 6 o'clock postmeridian August 9: *Provided*, That this prohibition shall not apply (a) to trolling and gill netting through August 22 in the waters along the western coast from the outer point on the north shore of Granite Bay (known as Granite Bay Point) to the light on the south shore of the entrance to Port Nellie Juan, and (b) to trolling in the period from 6 o'clock antemeridian August 9 to 6 o'clock postmeridian September 20 in the waters of Prince William Sound east of 147 degrees west longitude, exclusive of all waters of Valdez Arm north of Point Freemantle. All trap leads from shore to entrance of hearts must be removed prior to 6 o'clock antemeridian August 13.

[August 15, 1938]

SOUTHEASTERN ALASKA AREA
EASTERN AND WESTERN DISTRICTS

Salmon fishery.—Alaska general regulation No. 1 is hereby amended so as to permit the holding of salmon in traps in the Eastern and Western districts of the Southeastern Alaska area 72 hours after the termination of the fishing season.

[August 18, 1938]

SOUTHEASTERN ALASKA AREA
EASTERN DISTRICT

Salmon fishery.—Regulation No. 7 is amended so as to permit commercial fishing for salmon north of 57 degrees north latitude until 6 o'clock postmeridian August 20.

SOUTHERN DISTRICT

Salmon fishery.—Regulations No. 6 and No. 7 are amended so as to permit commercial fishing for salmon until 6 o'clock postmeridian August 20.

[August 19, 1938]

SOUTHEASTERN ALASKA AREA
WESTERN DISTRICT

Salmon fishery.—Regulations No. 8 and No. 9 are amended so as to permit commercial fishing for salmon south of 58 degrees north latitude from 6 o'clock postmeridian August 19 to 6 o'clock postmeridian August 20.

[August 23, 1938]

SOUTHEASTERN ALASKA AREA
CLARENCE STRAIT DISTRICT

Salmon fishery.—Regulations No. 8 and No. 9 are amended so as to permit commercial fishing for salmon south of a line extending from Approach Point to Caamano Point from 6 o'clock postmeridian August 23 to 6 o'clock postmeridian August 25.

[August 25, 1933]

SOUTHEASTERN ALASKA AREA

CLARENCE STRAIT DISTRICT

Salmon fishery.—Regulation No. 7 is amended so as to permit commercial fishing for salmon between a line extending from Narrow Point to Ernest Point and a line extending from Approach Point to Caamano Point, from 6 o'clock postmeridian August 25 to 6 o'clock postmeridian August 27.

[August 27, 1933]

SOUTHEASTERN ALASKA AREA

CLARENCE STRAIT DISTRICT

Salmon fishery.—Regulation No. 7, as amended by supplementary regulation No. 251-24-9, is hereby further amended so as to permit commercial fishing for salmon between a line extending from Narrow Point to Ernest Point and a line extending from Approach Point to Caamano Point, from 6 o'clock antemeridian August 29 to 6 o'clock postmeridian August 30.

[August 29, 1933]

SOUTHEASTERN ALASKA AREA

CLARENCE STRAIT DISTRICT

Salmon fishery.—Regulation No. 6 is hereby amended so as to permit commercial fishing for salmon north of a line extending from Narrow Point to Ernest Point from 6 o'clock postmeridian August 29 to 6 o'clock postmeridian August 31.

[August 30, 1933]

SOUTHEASTERN ALASKA AREA

SOUTH PRINCE OF WALES ISLAND DISTRICT

Salmon fishery.—1. Regulations No. 6 and No. 7 are hereby amended so as to permit commercial fishing for salmon from 6 o'clock antemeridian August 31 to 6 o'clock postmeridian September 2.

2. Alaska general regulation No. 1 is hereby amended so as to permit the holding of salmon in traps in the South Prince of Wales Island district 72 hours after the termination of the fishing season.

[September 8, 1933]

SOUTHEASTERN ALASKA AREA

SUMNER STRAIT DISTRICT

Salmon fishery.—Regulation No. 6 is amended so as to permit commercial fishing for salmon by means of gill nets and beach seines in Wrangell Narrows, exclusive of all waters within one statute mile of the mouth of Petersburg Creek, from 6 o'clock antemeridian September 12 to 6 o'clock postmeridian September 30.

[September 26, 1933]

KODIAK AREA

Salmon fishery.—Regulation No. 11 is amended so as to permit commercial fishing for salmon between Old Harbor and Kodiak in the period from 6 o'clock antemeridian October 1 to 6 o'clock postmeridian October 15.

ANNETTE ISLAND FISHERY RESERVE

The lease of the fishing and canning privileges of the Annette Island Fishery Reserve by the Annette Island Canning Co. under contract dated April 4, 1933, expired on April 3, 1938. The cannery was again offered to competitive bidders, new proposals being opened on December 15, 1937.

On February 10, 1938, the Assistant Secretary of the Interior, on behalf of the inhabitants of the reserve, entered into a new contract,

effective April 4, 1938, with the Annette Island Canning Co. for the lease of the cannery for 5 years. Under the terms of this contract the Indians are to receive 76 percent of the net profits from the operation of said cannery, and the company 24 percent. The contract provides for a minimum guarantee of \$25,000 to the Indians, regardless of whether or not their share of the profits amounts to that figure, except that this provision shall not be effective if the cannery cannot operate because of strikes, lockouts, or stoppage of labor, or from any other cause legitimately beyond the control of the company, or by reason of action by the Government. There is, however, an unconditional guarantee of \$10,000 to be paid to the lessors, regardless of the net profits during any year in which the \$25,000 guarantee is ineffective due to the above-mentioned causes.

The contract also provides that not to exceed 20 percent of the net profits may be expended by the lessee each year for additions, betterment, and improvement of the cannery, subject to the approval of the Council of the Annette Island Reserve, such expenditures to be repaid to the lessee from the portion of profits accruing to the Indians from the cannery operations.

In 1938 the company operated eight traps within the reservation the catch of which totaled 1,607,595 salmon, and 35,130 salmon taken in purse seines and gill nets were purchased from the natives. In addition, 1,252,705 salmon were purchased from independent operators of traps and seines outside the reserve. Of the total number of fish obtained, 137,370 were sold to other canneries, and the remainder were packed at the company's plant. In the operation of the cannery and of the fish traps employment was given to 69 whites and 368 natives.

Profits to the Metlakatlan Indians of the reserve on the cannery operations for 1937, under the provisions of the lease then in effect, amounted to \$79,024.41. Preliminary estimates for the year 1938 under the new lease place the figure at about \$63,500.

OYSTER CULTIVATION

Under the authority conferred by the act of August 2, 1937, amending the Fisheries Act of June 6, 1924, with the object of lending appropriate encouragement to the development of oyster culture in Alaska, a 15-year lease, effective July 1, 1938, covering about 100 acres of tide flats in Shoal Cove, Carroll Inlet, southeast Alaska, was executed by the Assistant Secretary of Commerce in favor of William W. Whitcher, of Ketchikan, for the bona fide cultivation of oysters for commercial purposes. This was the first lease of bottoms in Territorial waters under the provisions of the above-mentioned act. A nominal charge is made for such leases, the consideration being at the rate of 10 cents per acre annually.

Application for another lease of oyster bottoms in Alaska was received in December, and a lease was subsequently executed, effective January 1, 1939, covering 75 acres of tidelands in certain waters of George Inlet, Carroll Inlet, Blank Inlet, and Pond Bay, in southeast Alaska, in favor of Celia Fairbanks and Jud Conkle, of Ketchikan.

Beginning in 1931, considerable experimental work has been done in Alaska to determine whether seed oysters may be grown, and the results obtained give fair promise that an industry to supply the local market may be developed.

STREAM IMPROVEMENT

The improvement of salmon spawning streams in Alaska in 1938 was limited, for the most part, to that carried on by stream watchmen in connection with their regular patrol duties, although in the Cook Inlet area some stream-clearing work was accomplished under an allotment of Territorial funds available for this purpose as well as for bounty on predatory trout. The work consisted chiefly in clearing out log jams and other obstructions that hindered the passage of salmon to the spawning grounds. In the removal of obstructions, care is exercised to avoid accelerating the current so as to cause destruction of gravel bottoms used as spawning areas.

In the Kafia Bay stream, where salmon were having difficulty in ascending long stretches of swift shallow water, construction of additional pools at intervals was undertaken by the Bureau to break the force of the current and facilitate the progress of the salmon upstream.

Increasing numbers of beaver, especially in parts of the Kodiak and Cook Inlet areas, present an important conservation problem. Where necessary, beaver dams have been opened to allow the salmon to ascend to the spawning beds. It is evident, however, that such measures are but temporary, and it is thought that a satisfactory solution to the problem can be found only after due investigation of the potential value of the two natural resources.

CONTROL OF PREDATORY TROUT

The destruction of trout that feed upon salmon eggs and fry has been carried on for a number of years in the Bristol Bay region through funds derived from the Territory and the Bristol Bay packers, the expense being shared equally. Not only has this work resulted in a marked improvement in the runs of red salmon in the region, but it is of material benefit in providing a means of livelihood to residents by furnishing them profitable employment during the winter months. During the year 1938 approximately \$17,000 was expended in the Bristol Bay region for bounty on Dolly Varden trout at the rate of 2½ cents per fish.

In the Cook Inlet area, also, stream improvement and predator-control work have been accomplished through an allotment from the Territorial appropriation and contributions of salmon packers. For the years 1937 and 1938 the sum of \$5,000 was available for this work. In the destruction of predatory trout, efforts were confined to the Kasilof River and English Bay and Kalgin Island streams in order to determine what the possibilities might be. A bounty of 2½ cents each was paid, as in the Bristol Bay region. Less than 10,000 trout tails taken in the Cook Inlet district were vouchered in the summer of 1937, and the number in 1938 to August 26 was 36,388.

Trout traps for the catching of Dolly Varden trout were operated in connection with the four salmon-counting weirs on Kodiak Island. The number of trout taken in these traps was as follows: 51,385 in Karluk River, 54,317 in Red River, and 17,000 in Olga Bay streams.

Scientific studies of Dolly Varden trout in the Kodiak area were continued.

OIL DRILLING IN BRISTOL BAY AREA

Observations were made by Bureau employees of experimental oil-drilling operations in 1938 at the headwaters of Salmon Creek, tribu-

tary to Becharof Lake of the Egegik River system, and the measures that were taken to prevent stream pollution which might impair valuable salmon runs.

These drilling operations were carried on by an association of the Standard, Union, and Associated Oil Companies. During the progress of drilling in July, a pocket of salt water was encountered at a depth of 500 feet. The pressure in the well shaft was 150 pounds per square inch at the surface, necessitating capping of the well, building of sump pools to prevent leakage into Salmon Creek, and cementing-in of the well casing to a point below the water stratum to cut off further flow. The salt water that was collected in the pools was later gradually released under direction of the Bureau at the period of high water run-off in the stream. The dilution by fresh water was sufficient to prevent any harm to salmon eggs or fry. In order to assure full protection to the salmon populations in the event that further similar deposits should be encountered, the drilling association voluntarily installed more than a mile of 6-inch pipe to carry any wastes from the well to a point on the Pacific side of the peninsula where they may be disposed of without danger to salmon runs.

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 134 men in 1938 as stream guards, weir operators, and special workmen in connection with law-enforcement duties. Of these, 57 were stationed in southeast Alaska, 45 in central, and 32 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 21 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 10 guards were stationed in the Seward-Katalla district, 8 on Cook Inlet, 16 in the Kodiak-Afognak district, 3 at Chignik, and 8 in the Ikatan-Shumagin district. Eight of these guards, most of whom were in the Seward-Katalla district, furnished their own launches.

In western Alaska 29 were on Bristol Bay and 3 in the Yukon-Kuskokwim district.

There were also 11 special employees engaged in scientific work—3 on herring and 8 on salmon investigations. This work was carried on in southeast and central Alaska, as heretofore, and in addition an extensive study of the salmon was begun in the Bristol Bay region.

In addition, there were 12 statutory employees, 50 men on the Bureau's vessels, and 2 on the chartered boat.

The foregoing makes a grand total of 209 persons identified with fishery protective work in Alaska in 1938, as compared with 236 in 1937.

VESSEL PATROL

Fourteen vessels of the Bureau were engaged in the patrol for the protection of the Alaska fisheries in 1938. Of these, the *Auklet*, *Kittiwake*, *Merganser*, *Murre*, and *Widgeon* were used in southeast Alaska; the *Eider* was in the Kodiak area, the *Ibis* at Chignik, the *Red Wing* in the Alaska Peninsula area, and the *Coot* on the Yukon River.

The *Blue Wing* was based in the Icy Strait district for a short time in June, then engaged in the patrol and stream survey work on Prince William Sound until August 28, when it was again assigned to southeast Alaska for a brief period before returning to Seattle. As in the previous year, the *Crane* carried part of the Bristol Bay crew and supplies north from Seattle in May and then patrolled the Alaska Peninsula area until the end of July, after which it returned the Bristol Bay crew to Seattle. The *Teal* operated on Cook Inlet from May to August, carried on stream survey work in the Prince William Sound area during most of the month of September, and was used in stream survey and general patrol of the Ketchikan district of southeast Alaska during the fall season until October 19.

The *Scoter* conducted the general patrol of the Bristol Bay area from May 22 to August 3 and then relieved the *Crane* in the Alaska Peninsula area until August 14, after which it returned to Seattle. In the spring, from March 17 to April 12, the *Scoter* assisted in the fur-seal patrol off Cape Flattery, Wash., during the northward migration of the fur-seal herd.

The *Brant* was used in general supervisory work, chiefly in southeast Alaska. In July it made a trip westward as far as Anchorage. On the return trip to southeast Alaska the *Brant* on the morning of July 15 ran aground on Williams Reef, about 8 miles east of Kodiak, causing considerable damage. The Navy vessel *Teal* rendered assistance, towing the *Brant* to Kodiak and later to Hoonah, in southeast Alaska. The *Brant* was towed by the Coast Guard patrol boat *Alert* from Hoonah to Ketchikan, and by the Bureau's patrol vessel *Crane* from Ketchikan to Seattle, where it was laid up for a number of months. In December, the *Brant* made a round trip between Seattle and southeast Alaska in connection with hearings on the Alaska fishery regulations at Ketchikan, Petersburg, and Wrangell.

A minor accident reported during the season was the striking of an uncharted rock in Moira Sound by the *Kittiwake* on July 30. The vessel was able to proceed under its own power to Ketchikan, where repairs were made. The work of the *Eider* in the Kodiak district was cut short on August 19 by a broken crankshaft in the main engine, and the vessel was out of commission for the rest of the season. It was towed by the Bureau's vessel *Teal* to Hoonah, and thence by other Bureau craft to Seattle.

Five speed boats were in operation: No. 1 on Bristol Bay, No. 4 in Prince William Sound, and Nos. 3, 5, and 6 in the Wrangell, Ketchikan, and Juneau districts, respectively. Speedboat No. 6, equipped with a 225-horsepower engine, was in operation this year for the first time. A new 150-horsepower engine, installed in August, greatly improved the service of speedboat No. 4, which had previously been equipped with the 80-horsepower engine salvaged from speed-

boat No. 2 at the time it was destroyed by an explosion in 1935. Fourteen other small power boats were in use also, of which 5 were on Bristol Bay, 1 at Chignik, 2 in the Kodiak area, 2 on Cook Inlet, 2 in the Seward-Katalla district, 1 at Yakutat, and 1 on the west coast of Prince of Wales Island.

In addition to the foregoing, the *Wingham* was again chartered for patrolling the Copper River flats and, at the close of activities there, for operation on Prince William Sound, and the chartered launch *Marie S* was used on the Kuskokwim River.

AERIAL PATROL

Supplementing the regular operations by Bureau vessels and small boats, some use was made of aircraft in the general patrol of traps and fishing grounds. The latter is considered a very effective means of enforcing the fishery laws and regulations, particularly from the standpoint of deterring illegal fishing. Rough water may at times prevent the landing of a plane for making proper investigation when violations are noted, but the possibility of apprehension, when it is known that airplanes are being used for patrol purposes, makes the fishermen more careful to observe the regulations for the protection and conservation of the fisheries.

Chartered airplane service for the patrol of the fisheries in 1938 was furnished by six companies on 23 days. The total flying time was 56 hours, during which the planes traversed 6,246 miles. This patrol included three trips made from Anchorage, covering sections most extensively fished on the east and west coasts of the Cook Inlet area. Twelve and one-half hours flying time were used in the Copper River and Prince William Sound areas, and from 6 to 10 hours each in the Ketchikan, Juneau, Wrangell, and west coast of Prince of Wales Island districts of southeast Alaska.

In addition, chartered airplane service was used for survey and photographic work in connection with scientific investigations of the salmon which were conducted in the Bristol Bay region in western Alaska from July 23 to October 13, 1938. Transportation was furnished on approximately 25 days during this period, and the total flying time amounted to 102 hours, in which the distance covered was about 9,200 miles.

COMPLAINTS AND PROSECUTIONS

In southeast Alaska a floating trap of Libby, McNeill & Libby near Pulizzi Island was found fishing on July 3 during a weekly closed period. The head watchman claimed he thought the day was Saturday, instead of Sunday. The company, through its attorney, pleaded guilty before the U. S. Commissioner at Juneau and was fined \$600. The following week a floating trap of the Pacific American Fisheries, Inc., at Pt. Alava was found fishing on Sunday. Complaint against the company and the 2 watchmen, Jack Toner and Roger Davies, was filed before the Commissioner at Ketchikan, who fined the company \$500 and sentenced each man to 3 months in jail.

Fourteen purse seine boats were apprehended for illegal fishing in southeast Alaska, and the operators were tried before local U. S. Commissioners, 2 cases being brought before the court at Hoonah, 7 at Ketchikan, and 5 at Craig. In the case against Reuben Eskeberg,

operator of the *Cascade*, apprehended for fishing within 500 yards of the mouth of a salmon stream in Excursion Inlet, a fine of \$60 was assessed; while in the case of the *Louise*, found fishing at the mouth of a salmon stream in Tenakee Inlet, the 5 operators, namely, John Kane, Captain; George Paul, William Thomas, Andrew Ibona, and Nicholas Johnson, were fined \$25 each, and fish aboard the vessel were seized and sold for \$23.08.

Of the defendants tried at Ketchikan, Alex Bryant, captain of the *Mary Lou*, was fined \$100, and crew members James Scott, John Davis, Jr., William West, and Henry Littlefield were fined \$50 each, for fishing in closed waters at the mouth of Smeaton Creek. Henry Benson, operator of the *Joycelyn*, was fined \$25 for fishing within 500 yards of the mouth of a salmon stream in Harry Bay after the beginning of a seasonal closed period. A similar fine was imposed upon Ben Ridley, operator of the *Empress*, for like violations in the same locality, and the salmon aboard the vessel at the time of the apprehension were confiscated and sold for \$94.14.

Fines of \$25 each were assessed against Ronald Leask and M. M. Dunlap, operators of the *Sea Lad* and *Helen H*, respectively, for fishing within 500 yards of a salmon stream in Thorne Arm during a seasonal closed period, and salmon taken from them were sold for \$26.76 and \$79.95. Lars Larson, operator of the *Deloma*, was fined \$25 for fishing during a closed period within 500 yards of the mouth of a salmon stream in George Inlet, and his illegal catch of salmon was surrendered and sold for \$112.78 for the account of the Government. A fine of \$25 was assessed against Everett Hudson, operator of the purse-seine boat *Mary Eleanor*, for fishing in closed waters at the mouth of a salmon stream in Weasel Cove, Boca de Quadra, during a seasonal closed period, and his forfeited catch was sold for \$39.11.

Of the purse-seine fishermen arraigned before the Commissioner at Craig, fines of \$25 each were assessed against Robert Crawford, captain, Lincoln Crawford, and George Mills, of the *Spray*, for fishing about one-half mile inside the markers at Shipley Bay, and against Alfred W. Willard, captain, Orville C. Jones, and Melvin M. Jole, of the *31A655*, apprehended at Shipley Bay for carrying shorter seines than the minimum length specified by the regulations. These short seines were ordered sewn together to make one legal seine, and after this was done the seine was inspected by the Bureau's warden.

Three operators of the *Lois W*—Harry Whitten, captain, Clarence Keily, and Eddie Kahaipo—were fined \$50 each for fishing within 500 yards of the mouth of the Essowah Lake outlet, a red salmon stream on the west coast of Dall Island, and five operators of the *Silver Wave*, namely, Sid Carle, captain, William Carle, Hugh Baden, Dewey Dudley, and Paul Ozawa, were fined \$75 each for fishing on Sunday at the mouth of a salmon stream in Klakas Inlet. The confiscated fish from these two boats were sold for \$13.30 and \$165.95, respectively. The seine boat *31A985* with a crew of three men—Hermi Valdez, captain, Roy Dado, and Marciana Canote—was found fishing after the beginning of a seasonal closed period in a restricted area in Klawak Harbor, although no fish had been caught. The fine in this case was \$20 each, or a total of \$60, which was paid by the Ocean Packing Co.

Lewis Duval, of Petersburg, was apprehended for fishing in closed waters in Kah Sheets Bay and during a closed period with a beach

seine 30 fathoms long, an illegal type of fishing apparatus in this locality. The above case was dismissed after the defendant was found guilty on another charge and sentenced to 6 months in jail. Another fisherman, Ed Haynes, illegally using a 45-fathom beach seine in closed waters of Lake Bay, was sentenced by the Commissioner at Wrangell to 60 days in jail and fined \$50. At the same time an additional sentence of 30 days in jail, together with a fine of \$50, was imposed against this defendant for fishing without a license, in violation of the Territorial law.

Norman Tate and Hugh Harris, operators of the boat *Ann*, were apprehended for fishing at the head of Shipley Bay with small-mesh net, which they claimed was a gill net, although it was really a beach seine, not permissible in this locality. In Commissioner's court at Craig the men pleaded not guilty and subsequently, upon recommendation of the Assistant District Attorney, the case was dismissed in view of the fact that the regulations did not specify the size of mesh to be used in gill nets. The operators were warned against further use of illegal apparatus.

O. R. Batterson, operator of the trolling boat *Arline B*, apprehended for fishing during a weekly closed period near Cape Chacon, pleaded guilty in Commissioner's court at Ketchikan and was fined \$50, which fine was suspended. Pascual Roma Niere, who engaged in trolling for salmon commercially during a weekly closed period, pleaded guilty before the Commissioner at Wrangell and was fined \$50 and sentenced to 30 days in jail. Four king salmon taken by him were seized and sold for \$3.63. This defendant also was found guilty of violation of the Territorial law on two counts, namely, being an alien and fishing without a license, for which he was fined \$50 and sentenced to 30 days on each count, the jail sentences to run concurrently with that imposed for violation of the Federal law.

Two cases were brought before the local Commissioner against residents of Yakutat for fishing with set gill nets less than 100 yards apart. One of these violations involved nine persons, as follows: Henry Shodda, Moses Milton, Ned Williams, David Henry, Paul Henry, Jack Reed, Eugene George, Richard Reese, and Tom John. In the other, the following four persons were concerned: David Abraham, Mary Henninger, Sam Bagge, and George Valle. All were found guilty, and fines of \$30 each, with costs, were assessed. In the case of Henry Shodda, however, the fine and costs were suspended pending good behavior, as he was new in the area.

George Anderson and Oscar Peterson were apprehended in the vicinity of Monte Carlo Island, Keku Strait, for possessing illegal fishing gear consisting of a 25-fathom beach seine. Each was given a 90-day suspended sentence, and the seine was destroyed.

Several pieces of fishing apparatus were found that were evidently being used in violation of the fishery laws and regulations, but the owners were not apprehended. This apparatus included a 20-fathom seine found cached on the bank of a stream tributary to Calder Bay; a trap constructed across the Essowah Lake stream and a 25-fathom seine nearby; a piece of old gear stretched across Andrews Creek near Wrangell; a small gill net, a 10-fathom line, and about 10 fathoms of chicken wire in Klakas Lake stream; and a 75-fathom gill net in Sumner Strait. Except for the last-mentioned gill net, which was turned over to the marshal, this apparatus was destroyed.

The case against the Lindenberger Packing Co., of Craig, for canning fish more than 48 hours after their capture in the 1937 season, which was continued until the spring term of court in 1938, was dismissed. In the case pending at the close of 1937 against Frank Richardson, charged with fishing with a small seine at the mouth of Blind River, Wrangell Narrows, a trial by jury, at the defendant's request, was held on August 8, 1938. The defendant was acquitted on the plea that the markers were not at the mouth of the stream but that the tide backs up $1\frac{1}{2}$ miles above them.

In the Seward-Katalla district, 11 cases of illegal fishing, involving 14 persons, were brought before Commissioner's court, and convictions were obtained and fines imposed in all instances except one. Of these cases, one involved the taking of undersized clams for commercial purposes by A. W. Marcus, who was fined \$25. His forfeited catch, amounting to 452 pounds, was sold for \$24.86. There were four cases of illegal seine fishing for salmon, as follows: Jack Brady, fishing with a skiff and seine during a weekly closed period, fined \$100; Oscar Donaldson, fishing aboard the *Katherine L* during a weekly closed period in a restricted area at the head of Eaglek Bay, fined \$75; Arthur G. Clark and William Imlach, fishing with seine boat *31B839* in the mouth of a salmon stream in Hawkins Cutoff, fined \$50; and William Stears and Clarence Betchel, fishing with the *Cambria* inside markers at the mouth of lagoon in Eaglek Bay, fined \$50.

Six violations in the Seward-Katalla district involved the illegal use of stake or set gill nets in sloughs of the Copper River area which were closed to commercial fishing. In one case, that against William P. Smith, operator of the boat *31D463*, observed in Pete Dahl Slough by the Bureau's warden while on airplane patrol on June 11, the defendant denied any knowledge of the set net, and the case was dismissed for lack of sufficient evidence. In the other cases pleas of guilty were entered in Commissioner's court and a fine of \$75 was assessed against each defendant, as follows: Harold Couzins, operating stake net in Walholla Slough on May 24; Charles Christensen, set netting in Pete Dahl Slough with the boat *31B540* on June 11; Otto Tiedeman and Emil Freeman, using set nets in Pete Dahl Slough on June 11; and Wilbur Platt, with the boat *31A956*, and Gilbert Young, with the boat *31B353*, using set nets inside Mountain Slough on July 8. One hundred and twenty-one red salmon in the possession of Harold Couzins at the time of his apprehension were sold for \$33.28. A catch of 451 red salmon was surrendered also by Messrs. Tiedeman and Freeman and sold for the account of the Government for \$124.03.

In the Cook Inlet area six cases of violations of the regulations were reported, most of which were observed by means of airplane patrol. A trap owned by the Cook Inlet Packing Co. and located about 15 miles north of Ninilchik Village was found with the tunnel not closed and the heart walls not lifted or lowered during a weekly closed period in accordance with the method prescribed by section 5 of the Act of June 6, 1924. Complaint was filed before the Commissioner at Seldovia against both the company and the trap watchman, Simeon Oskolkoff. The latter admitted the charge but claimed his timepiece was wrong. He was fined \$100. The company, through its managing owner, pleaded guilty and was fined \$200.

Otto Rensing, operator of power boat *31C40*, found fishing with a beach seine inside markers at the mouth of Chinik Creek on July 13,

was taken before the Commissioner's court at Seldovia, where he pleaded not guilty. As he had been apprehended with others earlier in the season fishing in McNeil Creek and had been dismissed with a warning, he was bound over to the District Court under \$500 bond. When the case came before the Grand Jury in November, it returned a nontrue bill.

Fines of \$50 each were assessed by the Commissioner at Anchorage against Buster Ephin and George Johnson, apprehended for operating set gill nets during a weekly closed period in Cook Inlet, the former having three set nets about 5 miles southwest of Point Possession on June 13, and the latter using a set gill net on June 6 and two of such nets on June 13 in Lewis River Slough.

Prosecutions were brought before the Commissioner at Seldovia against Michel McDonough and Frank Manton for operating three set gill nets about three-fourths mile south of Cape Kasilof during a weekly closed period. The latter claimed sole responsibility for the violation and pleaded guilty as charged. The court assessed a penalty of 30 days in jail and suspended the sentence. An anchored gill net, found fishing between Beluga River and Three Mile Creek during a weekly closed period, was seized and 10 king salmon therein were sold for the account of the Government. Later it was learned that the net belonged to Mrs. T. B. Ryan and that she was fishing for her dogs. After due investigation and conference with the United States Attorney, the net and the money received from the sale of the salmon were returned to the owner.

In the Kodiak area, two gill-net fishermen, Frank Marshall and Mike Naumoff, were arraigned before the Commissioner at Kodiak for fishing in Olga Bay during a weekly closed period. They pleaded guilty and were fined \$25 each. Operators of three purse seine boats in this area also were brought before the Commissioner's court at Kodiak, where they pleaded guilty and were fined, as follows: Pat Gowan and L. Rachford, fined \$25 each for setting seine from the *Jaquelin* alongside another purse seine in the Karluk district, after having been warned to observe the 100-yard distance interval; and Edwin Liljegren, operator of the *L & W*, and Ben Durkee, operator of the *Triton*, fined \$75 and \$100, respectively, for fishing along Seven Mile Beach during a seasonal closed period. Seized fish, consisting of 2,411 pinks and 160 chums, from the *L & W* were sold for \$123.70, and 3,439 pinks and 803 chums from the *Triton* were sold for \$195.03.

In the Alaska Peninsula area, the purse seine boat *Blanche*, commanded by John Bacoka, was apprehended on June 17 for fishing about one-quarter mile from a salmon trap in East Anchor Cove. Upon trial before the Commissioner at Squaw Harbor, the defendant pleaded guilty and was fined \$75, with a warning also that any future violations by operators in the district would receive sterner action. Fish aboard the vessel at the time of the seizure were valued at less than \$3 and were not confiscated. Andrew Hotovitsky, beach seiner commanding the gas boat *Swinomish*, was apprehended on July 22 for fishing in closed waters at the mouth of a salmon stream in Little Canoe Bay. He pleaded guilty in the Commissioner's court and was fined \$200. His forfeited fish, consisting of 1,238 chums and 294 pinks, were sold for \$82.37.

Evidence of illegal fishing in Thin Point Lagoon resulted in investigation of Andrew Hotovitsky and Alex Bendixsen. Circumstances

surrounding the cases prevented any conviction. Mr. Bendixsen was released with a warning, and Mr. Hotovitsky was ordered to appear some time later in Commissioner's court at Squaw Harbor, although his fishing gear was not seized and he was allowed to continue fishing. Meantime the case was reviewed by the Commissioner and, owing to insufficient evidence, it was dismissed without a hearing.

No violations of the Federal fishery laws and regulations were reported for Bristol Bay. In this area, however, 115 complaints were filed against alien fishermen under the Territorial law (Chapter 30, Session Laws of Alaska, 1933), on which there were 62 convictions. Fines totaling \$10,600 were collected, and suspended fines amounted to \$350. Jail sentences were enforced in 58 cases and suspended in 4 cases.

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 June 6, 1939, gives the collections made to that date for the year 1938, 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.

It will be noted that the following schedule includes the amounts collected for clam diggers' and fishermen's licenses, which have previously been omitted from the report.

Fishery license taxes collected by Territory for fiscal year ended Dec. 31, 1938

Schedule	Division No. 1	Division No. 2	Division No. 3	Total
Salmon canneries (pack).....	\$150,765.01	\$22.00	\$512,426.21	\$663,213.22
Clam canneries.....			355.83	355.83
Salteries.....	2,483.42	82.28	1,140.64	3,706.34
Cold-storage plants.....	1,175.00	10.00	50.00	1,235.00
Fish-oil works and fertilizer and fish-meal plants.....	10,729.40		22,383.73	33,113.13
Fish traps.....	53,100.00		32,150.00	85,250.00
Trap catches in excess of 100,000 fish.....	7,499.91		16,182.44	23,682.35
Gill nets.....	675.00	30.00	3,646.40	4,351.40
Selnes.....	3,885.00		2,260.00	6,145.00
Clam diggers:				
Resident.....	5.00		265.00	270.00
Nonresident.....			75.00	75.00
Fishermen:				
Resident.....	2,812.00		2,485.00	5,297.00
Nonresident.....	24,875.00		49,625.00	74,500.00
Total.....	257,704.74	144.28	643,045.25	900,894.27
Salmon canneries (net income), not possible of segregation as to judicial division.....				7,053.02
Total collections.....				907,947.29

KUSKOKWIM RIVER

A patrol of the Kuskokwim River was maintained by Theodore R. Lambert, with the chartered launch *Marie S*, from the first of June until the end of August.

King salmon appeared at the mouth of the river on May 20, or somewhat earlier than usual, and the run continued steady through June, after which a few late stragglers were taken until the end of July. Most of the kings taken by natives, particularly near the mouth

of the river, are for daily use, as they require more time and attention for drying than do other species.

Both chum salmon and reds were unusually abundant this year. A heavy run of chums started on June 19 at the mouth of the river and continued strong until the middle of July, when it dropped off sharply. The bulk of the red-salmon run entered the river between July 1 and July 15. Toward the end of July a few cohos were taken in the vicinity of Bethel, and a good run began on August 1, which continued heavy for only a few days while a southwest wind prevailed. Stormy weather throughout August made it impossible to dry cohos except under cover in the smokehouses. All natives who fished with any regularity had previously caught and cured sufficient fish for their winter use, and many disposed of a surplus to traders. The latter by the end of July had obtained all they could handle during the winter.

Fishing apparatus used by the natives between the mouth of the river and the Narrows consists mainly of set nets, from 9 to 30 fathoms in length. Drift nets are not considered practical for general use in this locality because of the extreme width of the river and the many bars and channels. Much of the time it is too rough offshore for the use of small boats. Between the Narrows and Tuluksak the bulk of the catch is taken by drift nets, from 25 to 50 fathoms in length, although set nets are used to some extent. Upstream above Akiak the current is stronger and the fish wheel is the main gear, with comparatively few drift and set nets in use.

The only commercial fishing operation in the district for the outside market was that of Robert Gierke, who reported an output of 6 tierces of pickled cohos and 12 tierces of pickled kings. Three hundred and eighty natives fished in the river for local food requirements, using 520 gill nets of 13,499 fathoms, 47 wheels, and a number of small boats. They prepared 243 tons of dried chums, 22 tons of dried kings, and 21 tons of dried reds.

YUKON RIVER

Three outfits prepared mild-cured salmon on the Yukon River for the outside market, as follows: Northern Commercial Co., which operated on a barge in Acheron Channel; St. Mary's Mission, at the head of Sunshine Bay in Acropok Slough; and Chris Lauridsen, at Kwiguk Slough. Their total output of mild-cured salmon was 198 tierces of kings. The fish used by the Northern Commercial Co. were taken in gill nets outside the mouth of the Yukon River by native fishermen; while those handled by the other two operators were taken in the river by wheels and gill nets, respectively.

Inspector Calvin F. Townsend and a stream guard patrolled the district aboard the *Coot*, leaving Nenana on May 26 for the mouth of the Yukon and returning to Nenana on September 18. During the trip downstream the water was at low stage, with very little driftwood. At that time there was little activity at the camps, as the inhabitants were out hunting beaver and muskrats. In general, the supply of dried fish from the previous season had not lasted through the winter, but plenty of whitefish had been caught by means of traps through the ice.

The first king salmon were caught at the mouth of the Yukon on June 1, but the main run began on June 5 and continued good until

July 15. Chum salmon came into the river at the same time, and the runs of both species were unusually heavy. Beluga whales were more numerous than for many years and did considerable damage to salmon nets. Several of these whales were taken by the natives to supplement their regular supply of food.

As a result of the excellent runs of king and chum salmon and the good weather for drying fish, natives on the lower river had all the fish they needed for winter. The catches at camps in the upper reaches, however, were not uniformly good. In some places the catches were above average and in others very poor. An explanation for the light catches of kings at certain points was that the fish seemed to follow the main channel up the river and did not strike in close to shore, so they were not taken in the wheels and nets.

There was a marked shortage of salmon on the Tanana River, and the only camp which had any success in fishing was one about 8 miles from Tanana, where fair catches of cohos were obtained from the last week of August until the middle of September. Very few of this species were taken along the Yukon because of high water and heavy driftwood. As a result of storms in August the Tanana River was at flood stage from about the 10th to the end of the month.

Products of the Yukon and Tanana fisheries, including those shipped to the outside market, were as follows: 280 cases of king salmon canned; 198 tierces of mild-cured kings; 17,300 pounds of dry-salted kings; and 213 tons of dried chums. Apparatus consisted of 194 wheels, 88 gill nets of 2,100 fathoms, 3 motor vessels of 43 tons, 1 launch, 9 gill-net boats, 1 scow, and miscellaneous small boats. There were 11 whites and 382 natives engaged in the fishery.

WEIRS FOR COUNTING SALMON ESCAPEMENT

The maintenance of weirs through which the escapement of brood fish may be counted provides information of value in the study of the life history of the salmon and in the regulation of commercial operations to prevent any impairment of the runs through inadequate seeding of the spawning beds.

Eleven weirs were operated in representative streams of Alaska in 1938, and a count of salmon was again made at the Kalgin Island stream without the use of a rack. It was the purpose, also, to re-establish the weir in Chignik River, which had been operated each season since it was first placed there in 1922, but unusually high water for a prolonged period made all attempts to construct it unsuccessful.

Reports of the weir operations and the counts of salmon in 1938 were as follows:

ALITAK BAY

Two weirs were again established on Olga Bay, tributary to Alitak Bay, construction of the cannery station weir being completed on May 26 and the upper station weir on May 29. At each place the counting of red salmon began on the day the weir was ready and was continued until the structure was removed on August 29. The total count for the season at the upper station weir consisted of 616,064 red salmon, 3,371 pinks, and 9,085 cohos. Corresponding figures for the cannery station weir were 97,455 red salmon, 23,701 pinks, and 371 cohos.

In the latter part of July the catch of red salmon in the Alitak Bay district was substantially larger than the escapement. Olga and Moser Bays, therefore, were closed to commercial fishing at 6 p. m. on July 30 and reopened at 6 a. m. on August 13. During that interval approximately 319,000 red salmon were counted through the weirs, the bulk of the escapement being during the second week and reaching its peak on August 13, when 61,541 fish of this species were tallied.

A trout trap operated at the upper station weir took 10,047 Dolly Varden trout during the season, and one at the cannery station took 6,953 of these predatory fish.

Work at the cannery station weir was carried on by Morris Rafn, and at the upper station weir by Lloyd Burns, under the direction of Warden J. Steele Culbertson.

CHIGNIK RIVER

No weir was maintained in the Chignik River in 1938, as it was impossible to establish the structure because of high water. After repeated attempts to construct it were unsuccessful, the work was finally abandoned toward the end of June.

In general, there was a rather light run at Chignik during the season. The commercial catch was 407,605 red salmon, and it was estimated that 550,000 of that species escaped to the spawning grounds. The early escapement was good, owing to the fact that salmon traps were not installed until the latter part of June. Chignik Lagoon and part of Chignik Bay were closed to commercial fishing from 6 a. m. August 15 to 6 a. m. August 19, in addition to the closed periods specified by the regulations.

CHINIK CREEK

From July 6 to July 29, inclusive, 3,804 red salmon were counted through the weir at Chinik Creek, and it was estimated that 200 reds were in the stream below the weir at the time the structure was removed. The peak of the run was on July 25, when 1,008 salmon were tallied. Irwin Metcalf was in charge of operations, under the direction of Capt. R. L. Cole.

ENGLISH BAY

The count of salmon in the stream at the head of English Bay began on June 8 and continued through August 13, during which time the total escapement numbered 16,779 red salmon. The largest count for any one day was 806 on July 26. Weir operations were carried on by Percy G. Maltbie until August 6, and then by Irwin L. Metcalf, under the supervision of Capt. R. L. Cole.

FISH CREEK

Counting operations at the weir in Fish Creek were carried on from July 10 to August 8, inclusive, the total number tallied consisting of 182,463 red salmon and 19,417 cohos. The latter species began to ascend on July 24 and were estimated to be 10 percent of the total

count for the first week and 20 percent thereafter, as it was impossible for the operator to make an exact count of each species. The bulk of the red salmon escapement passed upstream in the period from July 22 to August 1, reaching a peak on July 23, when 23,540 fish were counted. Jack Tansy was assigned by Capt. R. L. Cole to perform the work at this weir.

KALGIN ISLAND CREEK

As in previous years, the stream guard stationed near the salmon stream on the east side of Kalgin Island made a count of the red salmon escapement, although no weir was established in that stream. From June 15 to August 3, inclusive, there were tallied 5,046 red salmon, about one-third of which passed upstream during the last week in July.

KARLUK RIVER

Construction of the weir in Karluk River was begun on April 9 and completed on April 13. Although virtually all ice had gone out of the river, high water made the weir construction rather difficult. Both red and king salmon began to pass upstream on May 19, but the numbers were small until June 8, when a very good run set in. Within the next 3 weeks more than 700,000 red salmon were counted through the weir, the run reaching its peak on June 18, when 83,102 salmon were counted. The large escapement during this period was owing partly to the fact that very little fishing was being carried on, as operations in the district had been delayed on account of the strike of cannery workers.

Pink salmon appeared off the mouth of the river on July 17 and began to pass through the weir two weeks later. A very heavy run of pinks entered the river during August. Owing to the large number of spent fish coming downstream, it was impossible to keep the weir closed after September 3, and the structure was finally removed on September 26.

The total escapement for the season consisted of 1,075,678 red salmon, 1,714,589 pinks, 40,000 cohos, and 5,606 kings. These figures include an estimated escapement of 200,000 reds, 75,000 pinks, and 40,000 cohos during the period from September 4 to September 26, when the weir was left open. Commercial fishing in the Karluk district was closed on September 3 for the remainder of the season, in order to assure a 50-percent escapement. The total commercial catch of red salmon from the Karluk run was 976,904.

In connection with the operation of the Karluk weir, traps were installed for the capture of Dolly Varden trout, and 51,385 of these predatory fish were taken during the season.

Weir operations were in charge of James O'Brien, under the direction of Warden J. Steele Culbertson.

KLAWAK CREEK

Construction of the weir in Klawak Creek was completed on May 24 and counting operations began on the following day, when a few red salmon passed upstream. This run was light but fairly steady throughout the season. On August 10 the first pinks and cohos were

tallied. The run of pink salmon reached its peak on September 16, when 64,119 fish of this species were tallied through the weir. The total escapement numbered 357,751 pinks, 22,209 chums, 15,368 reds, and 4,398 cohos, including an estimate of 15,000 pinks, 4,000 chums, and 1,000 cohos on September 26. Heavy rains the night of September 25 caused the creek to rise about 4 feet, as a result of which the weir was damaged beyond repair for the season. Lloyd M. Johnson was weir foreman, under the direction of Warden Donald S. Haley.

LITTLE PORT WALTER

At the Little Port Walter weir, operated in connection with the biological study of pink salmon in southeast Alaska, there were counted 6,467 pink salmon, 5 chums, and 1 coho in the period from August 29 to September 22, inclusive. It was estimated that 200 salmon were in the bay when the weir was removed.

ORZENOI RIVER

From June 14 to Aug. 7, inclusive, there were counted at the weir in Orzenoi River 8,675 red salmon, 1,764 pinks, 510 chums, and 40 kings. The peak of the run was on July 17, when 1,427 red salmon passed through the weir. During most of July the stream was low, as there was little rainfall. Gordon Ashton carried on the weir work at this place, under the direction of Acting Warden Mark Logan.

RED RIVER

King salmon began to pass upstream through the Red River weir on May 21, and reds on May 25. The run of red salmon was somewhat smaller than in other recent years, the total count for the season numbering 185,851. Other species tallied were pinks, 406,725; kings, 4,465; and cohos, 2,169.

Counting operations were continued until heavy rains caused the river to rise over the top of the weir on August 25. As the structure was badly damaged, its removal was begun on the following day when the high water subsided. There was a fair showing of salmon in the lagoon and some outside the river in the strait at that time. It was estimated, therefore, that the total escapement of reds would be more than 200,000. The Red River district was closed to commercial fishing for salmon after August 13, as the catch was then considerably in excess of the escapement.

Two trout traps operated in connection with the weir caught 54,317 Dolly Varden trout during the season.

The work at this place was in charge of Woodrow Buckley, under the supervision of Warden J. Steele Culbertson.

SITUK RIVER

Construction of the weir in Situk River was completed on June 7, and the first red salmon were counted on June 12. No count was made from June 18 to June 25, inclusive, as the weir was out of commission during a period of high water. As soon as the river fell sufficiently, the weir was dismantled and reestablished about 30 feet above the former site. Counting was resumed at noon on June 26 and con-

tinued through August 2, when the weir was removed because of high water and anticipated floods which threatened a loss of materials. The total count numbered 169,333 red salmon, 28,319 pinks, and 2,668 kings. A. W. Tvetter carried on the weir operations under the direction of Warden William B. Berry.

SALMON TAGGING

A salmon-tagging experiment was conducted in southeast Alaska in 1938 to develop further information concerning the migration routes of pink salmon through lower Chatham Strait. Approximately 2,100 mature pink salmon were tagged from July 7 to Aug. 12, inclusive, the work being done at traps in Tebenkof Bay by employees of the Division of Scientific Inquiry. Of the total number tagged, 637 salmon, or slightly more than 30 percent, were recaptured by the commercial fishery. It is planned to conduct a similar experiment in 1939 to determine any differences in the migration routes of the pink-salmon runs in even- and odd-numbered years.

In the 1938 season, also, a tagging experiment was carried on in the Kodiak area to determine the length of time the fish take to travel from Alitak Bay to weirs in Olga Bay. As commercial fishing is controlled by the weir count, it seemed advisable to determine the lag between catch and counted escapement. Seven hundred red salmon were tagged at the Bun Point trap of Pacific American Fisheries on June 28, and 458 were tagged on July 29 at the Miller Island trap. The work was done by Associate Aquatic Biologist Joseph T. Barnaby and Junior Aquatic Biologist Allan C. DeLacy, assisted by the crew of the *Eider* and Stream Watchman Morris Rafn. A red streamer-type tag, designed by Messrs. Barnaby and DeLacy, was used for the first time in this experiment. The tags were attached to the dorsal part of the body just posterior to the dorsal fin and were readily observed as the fish passed through the weir.

Of the fish tagged in the Kodiak area in June, less than 5 percent were observed subsequently at the weirs, while nearly 50 percent of those tagged in July were counted. A closed period from Aug. 1 to 12 in the commercial fishing season aided in obtaining a larger escapement from the latter tagging.

The fish tagged in June took an average of 7 days to go to the cannery station, and 9 days to the upper station. In the second experiment, however, the fish took an average of 17 days to go to the cannery station, and 11 days to the upper station. No explanation can be given as to the relatively short period taken to reach the upper station, compared with that taken to reach the cannery station. This investigation indicates that the fish arrive at the weirs from 1 to 2 weeks after they pass the fishing gear in Olga Bay.

SALMON LIFE-HISTORY STUDIES

Studies of the life histories and fluctuations in abundance of the Pacific salmon in Alaska were continued in 1938 by the staff of the Fisheries Biological Station at Seattle, Wash. The major investigations of the red salmon at Karluk and the pink salmon at Little Port Walter were carried on as formerly. In July 1938 an appropriation was made available for a comprehensive and extended investigation

of the red-salmon fisheries of Bristol Bay. This investigation consisted of two distinct parts, one dealing with the marine factors influencing the migration of the salmon and their availability to the commercial fishery, and the other dealing with the fresh-water life history and survival of the young in the lakes and streams.

Biological data concerning the red salmon were collected at Chignik and Copper River stations, as in past years. Studies carried on at Karluk River and Little Port Walter gave further insight into the natural factors that influence the abundance and survival of the salmon.

The studies concerning the influence of predatory trout at Karluk River and neighboring streams on Kodiak Island were continued. The tagging of these trout shows that they do not have the high degree of homing characteristics of salmon, but they wander back and forth between the streams on Kodiak Island.

Through the efforts of the C. C. C. workers, as directed by the Forest Service, the station at Little Port Walter was greatly improved by the construction of trails to the headwaters of the stream and of a dock with floating mooring for the accommodation of large boats that visit the field station. The Forest Service also used the stock of acclimated rainbow trout in Sashin Lake, one of the lakes at the head of the stream, for transplantation in many lakes on Baranof Island, and also for a stock sent to Fairbanks.

The collection, compilation, and analysis of the records of daily catches of salmon throughout Alaska by the principal types of fishing apparatus were continued in 1938 and, as in previous years, provided information as to the fluctuations in abundance and time of appearance of the runs in various districts. Considerable effort was made also in securing additional historic material and records on the fisheries of Bristol Bay in connection with the newly developed investigation of the red salmon in this area. The information secured from this work, as in previous years, was used in recommendations for changes in the fishery regulations throughout the Territory for properly conserving salmon populations.

OBSERVATIONS ON THE ESCAPEMENT OF SALMON

The so-called "White Act" of June 6, 1924, established the intention and policy of Congress that not less than 50 percent of the salmon runs in Alaskan waters should be permitted to escape. In certain representative streams counting weirs are operated to accurately fulfill this requirement. Where the operation of weirs is not feasible the development of runs is closely observed so that regulations may be modified during the season if necessary, to secure the most desirable spawning escapement. There follows a general summary of salmon runs and escapement in each of the fishing areas of Alaska.

Southeastern Alaska.—The late appearance of pink salmon runs in southeastern Alaska was characteristic of the even-year cycle of this species in recent years. A prolonged dry season in August, and the consequent low level of streams, retarded the ascent of salmon to spawning areas, but heavy rains after the first of September relieved this condition in all districts. The fall survey of spawning grounds was hampered in many cases by the swollen condition of streams.

In the Ketchikan region, embracing the southern district and that part of the Clarence Strait district south of Ernest Point, the run was of average proportions and considerably better than in 1937. As in past years, the run appeared several days earlier in the southern district than in Clarence Strait, and in both sections it was at its peak as the fishing season closed. Stream inspections indicated a rather spotted seeding, but these districts generally appeared to have obtained adequate escapements. In the southern district the better spawning areas were well seeded, particularly streams in Very Inlet, Boca de Quadra, Smeaton Bay, and Rudyerd Bay. In the western portion of Behm Canal a good escapement of reds and a fair seeding of pinks were observed on the spawning grounds at Loring and Yes Bay. In the Clarence Strait section fair escapements were noted in Tolstoi Bay and Thorn Bay, while streams in Kasaan Bay, Cholmondeley Bay, and Moira Sound were well seeded.

In the Wrangell district, including the waters of Sumner Strait and Clarence Strait, north of Ernest Point, the run fell considerably short of last season and was the smallest that this district has seen in recent years. Indications are that additional protective measures are necessary to restore this run to its former abundance. A survey of streams in this area revealed a rather light escapement, but there appeared to be a fair seeding of the better spawning areas, particularly in Anan Creek, Salmon Bay, Bradfield Canal, and Totem Bay. A good run of reds and cohos occurred in the Stikine River area and the escapement there was believed to be ample for seeding purposes.

There was no heavy sustained run at any time during the season in the South Prince of Wales Island district. Pinks appeared in small numbers about August 13, and after August 27 there was a fair showing of this species off Dall Island, Cordova Bay, and Trocadero Bay. The run of sockeyes, while considerably better than in 1937, was below normal, and chum and coho runs also were disappointing. The total count of each species through the Bureau's weir in Klawak Creek was substantially below the average escapement in recent years. Spawning areas in Tuxekan Passage were well seeded, however, compared with the 1937 season, and Sarkar Lakes, Deweyville, El Capitan Passage, Calder Bay, Sea Otter Sound, and Davidson Inlet all had fair escapements.

On August 1 and 2 a good showing of pinks in Cross Sound proved to be only a spurt which tapered off as the run reached the inner section of Icy Strait and spent itself. The main body of pink salmon entered Icy Strait after fishing operations had been terminated in that district, and moved into the inner waters of Chatham Strait and Frederick Sound about the middle of August. The run was heavy but of short duration and the escapement in the streams of Icy Strait was below normal. In the Western district, streams tributary to Chatham Strait were found to be well seeded with pinks, except in the Hawk Inlet area, where the escapement was poor. The streams inspected in the Eastern district indicated a good escapement for that section also, although the survey there was hampered by heavy rains and high streams. All three sections of the Juneau district experienced average runs of reds and cohos, and the escapement of these species was generally satisfactory. Chums were less abundant than in other years, however, and the seeding of this species was below normal.

The Yakutat area had a better than average run of reds and kings this season, especially in Dry Bay and Situk and Ahrnklin Rivers. Good escapements were reported for all important species in this area.

Prince William Sound and Copper River region.—The run of pinks was unusually late in Prince William Sound but developed rapidly after July 24, reaching large proportions in all sections during the last few days of the season. Pinks were so abundant throughout the area as the close of the commercial fishing season approached, that the Secretary of Commerce approved a supplementary regulation extending the season 2 additional fishing days. A survey of representative salmon streams indicated an excellent seeding of pinks in most spawning areas. Unusually heavy escapements were observed in the northern and eastern sections of the Sound.

A good run of red salmon occurred in the Copper River area, reaching its peak shortly after the first of June. The escapement to the upper river was very satisfactory, owing partly to the stormy weather that hampered fishing operations and reduced the commercial take.

Cook Inlet.—Although the early run of reds in Cook Inlet was light, the main run appeared in good volume after July 19 and continued strong until August 8. This run was good throughout the Inlet, and was especially heavy between the Kenai and Kasilof Rivers, and in the vicinity of Salamato Beach, between East Foreland and Kenai River. The run of kings was lighter than usual, amounting to only about two-thirds of its normal size. A good escapement of reds was observed on the major spawning grounds, especially in Kasilof and Kenai Rivers, but in Chinik Creek, Cottonwood Creek, and the Kalgin Island stream the escapement was almost a failure. The pink-salmon run was considered fair in most sections, and the seeding of this species as a whole was good, especially in streams south of Anchor Point.

Kodiak area.—The run of reds in the Kodiak area varied considerably in the important red producing sections. The Alitak Bay region had an unusually large run and escapement; in Red River the showing of reds was very poor; and in the Karluk region a normal run occurred and the escapement was good. Kodiak Island as a whole had a light run of pinks, as is generally the case in the even years, although the pink run at Karluk was the largest in many years, and Red River, Alitak Bay, and Uganik Bay had good runs of this species. It is believed that the escapement of pinks was adequate for seeding purposes. The run and escapement of chums was very good generally, but the showing of kings and cohos was only fair.

Chignik.—The runs of all species in the Chignik area were very light this season, but the fact that commercial operators were late in installing traps contributed to the escapement of early runs. Only one trap was operated during the month of June and the red run reached its peak during the last week of that month. The run of pinks was the weakest since 1931, and the showing of cohos and chums was also poor. Unusually high water in the Chignik River prevented the installation of the weir this season. Stream observations, however, indicated a good escapement of red salmon, although the seeding of other species was poor.

Alaska Peninsula.—The red run in Peninsula waters this season was unusually heavy, although, for unknown reasons, fishing gear on

the south side of the Peninsula intercepted a smaller portion of the run than in past years. Pinks and chums were late in arriving but were abundant after July 22, with the exception of a slack period from August 7-10. The run was characterized by the unusually small size of pinks, which in some instances were packed 40 or 50 to a standard case of 48 1 pound-cans. Although not as comprehensive as desired, the survey of spawning areas indicated a rather spotted escapement. It is believed that the Peninsula streams generally were not as well seeded as in other recent years.

Bristol Bay.—The best red-salmon run in the history of the area occurred in Bristol Bay this season, reaching its heaviest volume in the Kvichak-Naknek district and in the Nushagak district. In most sections the run started on July 5, and held up well until the 23d, reaching its peak about the middle of the month. Reds appeared in the Ugashik district at least a week later than in other sections, but the run in this section, as well as in the Egegik district, was weak.

Extensive observations were made, by airplane and boat, of the spawning areas accessible to Bristol Bay red salmon. Of the four important watersheds, the Kvichak-Naknek and Nushagak systems received excellent escapements, the Egegik region was rather poorly seeded, and the Ugashik streams were only thinly populated as usual. Taken as a whole, however, the spawning beds of the Bristol Bay area were well seeded.

GENERAL STATISTICS OF THE FISHERIES

The total number of persons engaged in the fisheries of Alaska in 1938 was 28,084, or 2,247 less than in 1937. Fishery products were valued at \$42,869,726, a decrease of \$8,873,494, or 17 percent, from the value in the preceding year. Of the total amount, 91 percent represented the value of salmon products; 5 percent, herring; 2 percent, halibut; and 2 percent, the value of all other fishery products.

Summary of persons engaged and products of the Alaska fisheries in 1938

Item	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Number	Value	Number	Value	Number	Value	Number	Value
PERSONS ENGAGED								
Whites.....	7,312		5,305		4,167		16,784	
Natives.....	3,312		1,712		1,234		6,258	
Chinese.....	71		107		194		372	
Japanese.....	453		153		96		702	
Filipinos.....	1,241		999		1,086		3,326	
Mexicans.....	14		50		329		393	
Puerto Ricans.....			10		77		87	
Kanakas.....	1		14		21		36	
Negroes.....	8		27		49		84	
Miscellaneous.....	3		12		27		42	
Total.....	12,415		8,389		7,280		28,084	
PRODUCTS								
Salmon:								
Canned.....cases	2,713,948	\$11,711,803	2,179,765	\$10,514,492	1,913,285	\$14,410,602	6,806,998	\$36,636,897
Mild cured.....pounds	6,344,000	1,257,247	16,800	1,600	158,400	20,084	6,519,200	1,278,931
Pickled.....do	9,600	900	313,200	31,228	854,885	90,293	1,177,685	122,421
Fresh, for food.....do	3,817,042	291,335					3,817,042	291,335
Frozen, for food.....do	7,183,446	530,891	1,600	60			7,185,046	530,951
Frozen, for bait.....do	720,652	7,241					720,652	7,241
Frozen, for fur farms.....do	61,420	2,500					61,420	2,500
Dry-salted.....do	10,500	1,132	18,000	500	17,300	1,730	45,800	3,362
Dried.....do			4,025	140	998,000	71,200	1,002,025	71,340
Eggs for fish food.....do	7,300	365					7,300	365
Fertilizer.....do	1,832,000	27,480	242,000	3,933			2,074,000	31,413
Oil.....gallons	53,588	10,717	14,400	5,040			67,988	15,757
Herring:								
Fresh, for bait.....pounds	2,826,404	37,865	1,250	13			2,827,654	37,878
Frozen, for bait.....do	3,316,114	23,924					3,316,114	23,924
Pickled, for food:								
Scotch cure.....do			1,634,000	97,927	552,150	32,497	2,186,150	130,424
Norwegian cure.....do					192,800	5,784	192,800	5,784
Roused for food (bloater stock).....do			261,350	6,395	155,550	6,360	416,900	12,755
Meal.....do	7,279,394	132,032	24,911,116	417,582			32,190,510	549,614
Oil.....gallons	900,921	267,021	3,622,192	1,025,684			4,523,113	1,292,705
Halibut:								
Fresh.....pounds	6,794,439	429,448					6,794,439	429,448
Frozen.....do	6,761,916	460,853					6,761,916	460,853
Livers.....do	133,000	66,500					133,000	66,500
Viscera.....do	240,787	24,079					240,787	24,079

Cod:									
Dry-salted.....do.....			135, 119	6, 797	146, 019	8, 421	281, 138	15, 218	
Stockfish.....do.....			6, 126	796	552	82	6, 678	878	
Tongues.....do.....			600	75	125	10	725	85	
Whale:									
Oil.....gallons.....					304, 800	103, 657	304, 800	103, 657	
Sperm oil.....do.....					181, 900	54, 570	181, 900	54, 570	
Meal.....pounds.....					1, 224, 000	21, 414	1, 224, 000	21, 414	
Clam:									
Canned.....cases.....	9, 865	59, 190	30, 945	193, 309	35	175	40, 845	252, 674	
Juice.....do.....	25	100					25	100	
Crab:									
Meat:									
Canned.....do.....	5, 373	48, 267	12, 371	121, 213			17, 744	169, 480	
Cold packed.....pounds.....	2, 765	1, 134					2, 765	1, 134	
In bulk.....do.....			225	90			225	90	
Whole in shell.....dozens.....	572	990	457	944			1, 029	1, 934	
Shrimp:									
Meat:									
Cold packed.....pounds.....	424, 200	164, 000	7, 700	3, 086			431, 900	167, 086	
Frozen.....do.....	3, 211	1, 284					3, 211	1, 284	
Whole in shell.....do.....	690	104					690	104	
Trout:									
Fresh.....do.....	50, 962	4, 534	1, 500	195			52, 462	4, 729	
Frozen.....do.....	17, 295	1, 470	8, 975	692			26, 270	2, 162	
Sablefish:									
Frozen.....do.....	776, 825	23, 499					776, 825	23, 499	
Pickled.....do.....	100, 364	4, 167					100, 364	4, 167	
Livers.....do.....	32, 045	11, 216					32, 045	11, 216	
Rockfish, frozen.....do.....	4, 376	90					4, 376	90	
Flounders:									
Fresh.....do.....	150, 000	3, 750					150, 000	3, 750	
Frozen.....do.....	82, 145	3, 300					82, 145	3, 300	
"Lingcod":									
Fresh.....do.....	610	10					610	10	
Livers.....do.....	1, 544	618					1, 544	618	
Total.....do.....		15, 611, 056		12, 431, 791		14, 826, 879		42, 869, 726	

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 \$12,040,000. Of this amount, \$9,943,000 was the value of the salmon catch. The round weight of the salmon catch landed by the fishermen was approximately 589,706,000 pounds, and the corresponding figure for herring was approximately 179,735,000 pounds. The cod figures given above do not include the offshore catch from waters adjacent to Alaska, which amounted to 3,065,450 pounds of dry-salted cod and 14,325 pounds of tongues, having a total value of \$130,912, landed at ports of the Pacific Coast States.

SALMON

The commercial catch of salmon in Alaska in 1938 was somewhat smaller than that of the preceding year, although well above the general average, being the fourth largest in the history of the industry. The chief decline was in the catch of pink salmon. The number of reds and cohos, on the other hand, showed a substantial increase over 1937, with the result that there was an increase in the total volume of salmon products.

Phenomenal runs of red salmon occurred in the Bristol Bay area, and the catch was the largest ever recorded for that region. This unusual abundance was attributed in part to the fact that, during the migration of the runs from the Pacific, comparatively small catches were made on the south side of the Alaska Peninsula, where unfavorable weather conditions hampered fishing operations, particularly in the early part of the season. Although the total number of red salmon taken in central Alaska was somewhat less than in 1937, there was an increase in the pack of this species, indicating a larger average size of the fish. Among the districts which showed a gain in output of canned red salmon were the Kodiak area, Cook Inlet, and Prince William Sound. There was an increase also in the various districts of south-east Alaska, except the west coast of Prince of Wales Island.

Pink salmon were less abundant than in the 2 preceding years in each of the three major districts of Alaska, although the Prince William Sound and Cook Inlet areas showed substantial gains over the production for 1937. An increase in the catch of cohos was rather generally distributed, except that no fall fishing for this species was carried on in the Copper River and Bering River areas. Fewer chum salmon were taken than in 1937, but the volume of products showed an increase. There was a decline in both the catch and pack of king salmon.

The total catch of salmon decreased about 6 percent from that for 1937. By districts, there was a decrease of about 11 percent in south-east Alaska and 14 percent in central Alaska, while in western Alaska the catch increased 19 percent.

There was a decrease of about 20 percent in the number of fathoms of seines, and an increase of about 11 percent in the number of fathoms of gill nets used in Alaska in 1938, as compared with the previous year.

CATCH AND APPARATUS

The total number of seines used in the salmon industry in 1938 was 801, of which 646 were purse seines and 155 beach seines. The purse seines aggregated 97,310 fathoms of webbing, and the beach seines 14,419 fathoms. The number of gill nets used was 4,711, having a total length of 327,649 fathoms. There were 166 driven and 290 floating traps—a total of 456. This number includes 4 traps in the Chignik district that were installed merely to hold the locations, as well as several traps elsewhere in the Territory, termed "dummy" traps, the catches of which were negligible.

Southeastern Alaska was accredited with 447 seines, or a total of 73,475 fathoms, a decrease of 85 seines and 17,101 fathoms of webbing from the number used in 1937; also with 427 gill nets, aggregating 28,225 fathoms, an increase of 43 nets and 3,265 fathoms of webbing; and with 29 driven and 257 floating traps, a decrease of 3 driven traps

and an increase of 5 floating traps, as compared with the number operated in 1937.

Corresponding figures for central Alaska show 350 seines, or 37,054 fathoms, as compared with 455 seines, or 46,169 fathoms, in 1937; 2,072 gill nets or 128,745 fathoms, as compared with 1,537 gill nets, or 99,570 fathoms, in 1937; and 137 driven and 33 floating traps, as compared with 138 driven and 31 floating traps in 1937.

In western Alaska 4 seines, or 1,200 fathoms of webbing, were used, a decrease of 4 seines and 1,000 fathoms of webbing from the number operated in 1937. There were 2,212 gill nets used, or an aggregate of 170,679 fathoms, an increase of 148 nets but a decrease of 802 fathoms of webbing. No traps were operated in this district.

Seines caught 22 percent of the salmon taken in 1938, gill nets 30 percent, and traps 46 percent, while lines and wheels took the remaining 2 percent.

Salmon traps operated in Alaska in 1938

Licensee	Territorial License No.	Location
Southeast Alaska:		
Independent Salmon Canneries, Inc.....	38-001	Indian Point.
Sebastian Stuart Fish Co.....	38-002	Point Napean.
Ward's Cove Packing Co.....	38-010	Cone Point.
Deep Sea Salmon Co.....	38-011	Union Point.
Do.....	38-013	Bond Bay.
Loveless & Sons.....	38-017	Etolin Island.
Do.....	38-018	Marsh Island.
Ward's Cove Packing Co.....	38-019	Seal Cove.
Brindle Trap Co.....	38-020	Duke Point.
Ward's Cove Packing Co.....	38-021	Gravina Island.
Libby, McNeill & Libby.....	38-031	Cape Fanshaw.
Do.....	38-032	South of Limestone Inlet.
Do.....	38-033	Spasskain Bay.
Do.....	38-034	Do.
Do.....	38-035	Do.
Do.....	38-036	Marble Cove.
Do.....	38-037	False Point Pybus.
Do.....	38-038	Windham Bay.
Do.....	38-039	Northeast of Point Pybus.
Do.....	38-040	Do.
Do.....	38-041	Cape Bendel.
Do.....	38-042	Fanshaw Bay.
Do.....	38-043	Wedge Island.
Do.....	38-044	Cone Island.
Do.....	38-045	Grindall Island.
Do.....	38-046	Niblack Point.
Do.....	38-047	Smugglers Cove.
Do.....	38-048	Thorne Arm.
Do.....	38-049	Sukkwun Island.
Do.....	38-050	Cape Lynch.
Do.....	38-051	Cap Island.
Do.....	38-053	San Christoval Channel.
Do.....	38-054	Suemez Island.
Do.....	38-055	Fern Point.
Do.....	38-056	Arucas Point.
Do.....	38-057	San Christoval Channel.
Do.....	38-060	Cape Bendel.
J. V. Davis.....	38-061	Naked Island.
Do.....	38-062	East Point.
Peril Straits Packing Co.....	38-063	Cosmos Cove.
Do.....	38-064	Marble Bluff.
Alaska Packers Association.....	38-066	Tree Point.
Fidalgo Island Packing Co.....	38-084	South of Kingsmill Point.
Do.....	38-085	Do.
Do.....	38-086	Point Ellis.
Do.....	38-087	South of Kingsmill Point.
Do.....	38-088	Kingsmill Point.
Do.....	38-089	Ship Island.
Do.....	38-090	Point Sykes.
Do.....	38-091	Slate Island.
Do.....	38-092	Onslow Island.
Do.....	38-093	Lucky Cove.
H. Bergman.....	38-094	North of Seal Cove.

Salmon traps operated in Alaska in 1938—Continued

Licensee	Territorial License No.	Location
Southeast Alaska—Continued.		
Laura A. Houston.....	38-095	Point Higgins.
Peril Straits Packing Co.....	38-098	North of Fishery Point.
August Buschmann.....	38-099	Cape Addington.
Olaf A. Johnson.....	38-100	Warburton Island.
Peril Straits Packing Co.....	38-101	Peril Strait.
Do.....	38-102	North of Point Turbot.
Do.....	38-103	Tebenkof Bay.
E. R. Carlson.....	38-105	Sukkwon Island.
Deep Sea Salmon Co.....	38-106	Caamano Point.
Wm. M. Fraser.....	38-107	Steamer Rock.
Astoria & Puget Sound Canning Co.....	38-109	Pleasant Island.
Do.....	38-110	Big Porpoise Island.
Do.....	38-111	Point Adolphus.
Do.....	38-112	Do.
Do.....	38-113	Pleasant Island.
The Nakat Packing Corporation.....	38-114	Kanagunut Island.
Do.....	38-115	Sitklan Island.
Do.....	38-116	Cape Fox Island.
Do.....	38-117	Tree Point South.
Do.....	38-118	Breakwater South.
Do.....	38-119	Breakwater North.
Do.....	38-120	Niblack Point.
Do.....	38-121	Tolstoi Point.
Do.....	38-122	Meyers Chuck.
Do.....	38-123	Ernest Point.
Do.....	38-124	Eaton Point.
Do.....	38-125	Gravina Island.
Do.....	38-126	Point Webster.
Do.....	38-127	Sukkwon Island.
Do.....	38-128	Point Providence.
Do.....	38-129	Tranquil Point.
Do.....	38-130	Branquial Island.
Do.....	38-131	Steamboat Point.
Do.....	38-132	Point Desconocida.
Do.....	38-133	Derrumba Ridge, Heceta Id.
Do.....	38-134	Tree Point.
Arthur Gamble Co.....	38-135	Foggy Point.
Keller Trap Co.....	38-136	Boat Rock.
Gravina Packing Co.....	38-137	Meyers Island.
Dixon Entrance Fisheries Co.....	38-138	Warren Island.
August Buschmann.....	38-139	Cape Ulitka.
The Nakat Packing Corporation.....	38-141	Point Thatcher.
New England Fish Co.....	38-142	Kah Shakes.
Pacific American Fisheries, Inc.....	38-143	Do.
Do.....	38-144	Point Sykes.
Do.....	38-145	Point Alava.
Do.....	38-146	Lucky Cove.
Do.....	38-147	Betton Island.
Do.....	38-148	Escape Point.
Do.....	38-149	South Vallenar Point.
Do.....	38-150	Grindall Peninsula.
Do.....	38-151	Kanagunut Island.
Do.....	38-152	Grindall Point.
Do.....	38-153	False Island.
Do.....	38-154	Polk Island.
Do.....	38-155	Cleveland Peninsula.
Do.....	38-156	West of Point Nunez.
Do.....	38-157	Shipwreck Point.
Do.....	38-158	Kassa Inlet.
Do.....	38-159	Point Colpoys.
Do.....	38-160	East of Point Baker.
Do.....	38-161	Deepwater Point.
Do.....	38-162	Point Hobart.
Do.....	38-163	Point Brightman.
Do.....	38-164	North of Point Amellus.
Do.....	38-165	Totem Bay.
Do.....	38-166	East of Point Baker.
Do.....	38-167	Rocky Point.
Do.....	38-168	Point Gustavus.
Do.....	38-169	Dundas Bay.
Do.....	38-170	Dundas Point.
Do.....	38-171	Lemesurier Island.
Do.....	38-172	Eagle Point.
Do.....	38-173	Mansfield Peninsula.
Do.....	38-174	Gull Cove.
Security Fish Co.....	38-215	Security Cove.
Ira W. Kelly.....	38-219	Caamano Point.
Mrs. Dick Anderson.....	38-220	South of Windy Point.
Frank H. Murphy & Co.....	38-224	Cleveland Peninsula.
Peter A. Miller.....	38-225	Kasaan Bay.

Salmon traps operated in Alaska in 1938—Continued

Licensee	Territorial License No.	Location
Southeast Alaska—Continued.		
Hood Bay Canning Co	38-226	Killsnoo Island.
P. E. Harris & Co	38-238	North of Hawk Inlet.
Do	38-239	Do.
Do	38-240	South of Point Marsden.
Do	38-241	North shore of Icy Strait.
Do	38-242	South of Point Augusta.
Do	38-243	North of Hawk Inlet.
Do	38-244	North of Parker Point.
Do	38-248	Scott Point.
Deep Sea Salmon Co	38-249	Rip Point.
Do	38-250	Hidden Point.
F. & W. Salmon Co	38-252	Island Point.
New England Fish Co	38-257	Carlson Cove.
Do	38-258	South Wilson Cove.
Do	38-259	Cosmos Cove.
Do	38-260	Peninsula Point.
Do	38-261	Blank Point.
Do	38-262	Bronaugh Island.
Do	38-263	Nelson Cove.
Do	38-264	South Kendrick Bay.
Do	38-265	Point Adams.
J. H. Rolle & Co	38-266	South Kendrick Bay.
New England Fish Co	38-267	St. Philip Island.
Do	38-268	Turn Point, Tuxekan Island.
Do	38-269	San Fernando Island.
Do	38-270	Cape Lynch.
Do	38-271	San Christoval Channel.
Do	38-272	St. Ignace Island.
Sebastian Stuart Fish Co	38-273	South of Point Brightman.
Do	38-274	North of Point Windham.
Do	38-275	South of Point Caution.
Do	38-276	South of Point League.
Do	38-277	East of Point Gardner.
Do	38-278	Point Amellus.
Diamond K Packing Co	38-281	Gravina Island.
Ward's Cove Packing Co	38-282	Cube Point.
Nick Bez	38-283	Basket Bay.
L. P. Dawes	38-284	Flag Point.
Brindle Trap Co	38-295	South of Carroll Point.
D. O. Jenkins	38-303	Northwest of Point Augusta Light.
Alaska Pacific Salmon Co	38-304	Point Sophia.
Do	38-305	Northwest of Rocky Island Light.
Do	38-306	West of Three Hill Island.
Do	38-307	Northwest Inian Island.
Do	38-308	Dad Rock, South Inian Pass.
Do	38-309	Northeast Inian Island.
Do	38-310	Pleasant Island.
Do	38-311	South of Point Hepburn.
Do	38-312	Point Hepburn.
Do	38-313	Village Point.
Do	38-314	Mansfield Peninsula.
Do	38-315	South of Funter Bay.
Do	38-316	North of Village Point.
Do	38-317	Northwest of Rocky Island Light.
Do	38-318	False Bay.
Do	38-319	Cube Point.
Do	38-320	Square Cove.
Do	38-321	Hawk Inlet.
Do	38-322	Cape Decision.
Martin Kildall	38-323	Northeast of Cape Decision.
Do	38-324	Southeast of South Vallenar Pt.
Ketchikan Packing Co	38-325	Do.
Do	38-326	Gravina Island.
Gravina Trap Co	38-327	Percy Islands.
Eagle Trap Co	38-328	Clover Passage.
E. Dobszinsky	38-329	Herring Bay.
Alaska Pacific Salmon Co	38-330	Point Barrie.
Do	38-331	Bean Island.
Do	38-334	Island Point.
Lloyd Balcom	38-335	Point Garcla.
R. Lindenberger	38-336	Baker Island.
Do	38-337	North of Bond Bay.
Lynch Bros	38-338	South of Foggy Point.
Beagle Packing Co	38-339	Dall Head.
Do	38-340	Cape Fox.
Do	38-341	Black Island.
Scow Bay Packing Co	38-342	East of Point Baker.
Do	38-343	West of Point Baker.
Do	38-344	North of Halbut Harbor.
Do	38-345	North of Labouchere Bay.

Salmon traps operated in Alaska in 1938—Continued

Licensee	Territorial License No.	Location
Southeast Alaska—Continued.		
Harry Selig	38-346	Dall Head.
Gunderson & Sons	38-304	Screen Islands.
Do	38-395	Etolin Island.
Alaska Pacific Salmon Co	38-396	Deepwater Point.
Do	38-397	Boulder Point.
Do	38-398	Point Hobart.
Do	38-399	Northeast of Point Pybus.
Do	38-400	Canoe Point.
Do	38-401	Point Macartney.
Do	38-402	Point Brightman.
Do	38-403	Cape Fanshaw.
Do	38-404	Cornwallis Point.
Do	38-405	Southeast of Point Webster.
Do	38-406	East of Brownson Bay.
Do	38-407	McLeod Bay.
Do	38-408	Nutkwa Inlet.
Do	38-409	West of Point Nunez.
Do	38-410	Northwest of Kaigan Point.
Do	38-411	Cape Muzon.
Do	38-412	Cordova Bay.
Do	38-413	North of Cape Chacon.
Do	38-414	Ship Island.
Do	38-415	North of Cape Chacon.
Do	38-416	Gravina Island.
Do	38-417	Dall Head.
Do	38-418	Boat Harbor.
Do	38-419	Gravina Island.
Do	38-420	McLean Point.
Do	38-421	Nelson Cove.
Do	38-422	Street Island.
Do	38-423	Island Point.
Otto Blindpage	38-425	Kelp Island.
Superior Packing Co.	38-426	South Passage Point.
Do	38-427	North of Parker Point.
Do	38-428	False Bay.
Do	38-429	Marble Bluff.
Lincoln Fisheries, Inc	38-430	N. W. of North Passage Point.
Do	38-431	Point Alava.
MacKenzie Fish Co	38-432	Lucky Cove.
Otto Anderson	38-433	Caamano Point.
C. D. Payne	38-435	Vallenar Point.
Capp & Taylor Trap Co	38-436	Chasina Point.
James Taylor & Co	38-437	Carroll Point.
Anderson & Peterson Trap Co	38-438	Kendrick Bay.
Hugh Pinkerton	38-439	Tongass Island.
W. S. Balcom	38-444	Bond Bay.
Pyramid Packing Co.	38-445	Cape Chacon.
Do	38-447	South of Point Kakul.
Do	38-448	Bradshaw Cove.
Do	38-449	Distant Point.
G. C. Foster	38-450	South of Point Kakul.
Wrangell Packing Co	38-460	Ratz Point.
Do	38-461	Northwest of Ratz Point.
Hood Bay Canning Co	38-462	Etolin Island.
Do	38-464	Point Caution.
Do	38-465	South of Distant Point.
Diamond K Packing Co.	38-466	South of Basket Bay.
Do	38-467	Northwest of Ratz Point.
Do	38-468	Narrow Point.
Do	38-469	Steamer Point.
Do	38-470	Olson Cove.
Do	38-471	Kingsmill Point.
Herbert Kittilsby	38-472	Northwest of Point Nesbitt.
Lester O. Gore	38-473	Observation Island.
Annette Island Canning Co., 8 traps	38-474	Brownson Bay.
Prince William Sound:		Annette Island Fishery Reserve.
Pacific American Fisheries, Inc.	38-175	Point Freemantle.
Do	38-176	Point Woodcock.
Do	38-177	Graveyard Point.
Do	38-178	Bidarka Point.
Do	38-179	Bligh Island.
Pioneer Canneries, Inc.	38-216	Do.
Do	38-217	North of Point Freemantle.
Do	38-218	Makaka Point.
Pioneer Sea Foods Co.	38-221	Hinchinbrook Island.
Do	38-222	Do.
Do	38-223	Cedar Bay.

Salmon traps operated in Alaska in 1938—Continued

Licensee	Territorial License No.	Location
Prince William Sound—Continued.		
Premier Salmon Co.	38-245	Port Etches.
Do	38-246	Knowles Head.
Do	38-247	Fidalgo Bay.
New England Fish Co	38-253	Johnstone Point.
Do	38-254	Gravinn Point.
Do	38-255	Hawkins Cutoff.
Do	38-256	Gravyard Point.
San Juan Fishing & Packing Co	38-348	Knight Island.
Do	38-349	McLeod Harbor.
Do	38-350	Rocky Point.
Do	38-351	Point Helen.
Do	38-354	Do.
Do	38-355	Chenequa Island.
Do	38-356	Squire Island.
Do	38-357	Port Chalmers.
Shepard Point Packing Co	38-362	Shelter Bay.
Do	38-363	Red Head.
Do	38-364	Port Fidalgo.
Do	38-365	Bainbridge Island.
Do	38-366	Montague Island.
Do	38-367	Do.
Do	38-368	Do.
Do	38-369	Do.
Do	38-370	Knight Island.
Copper River Packing Co	38-372	Chenequa Island.
Do	38-373	Do.
Do	38-374	Do.
Do	38-375	Do.
Do	38-376	Culross Island.
King & Crooker	38-440	Hinchinbrook Island.
B. E. Lee	38-451	Granite Bay.
Cook Inlet:		
Libby, McNeill & Libby	38-022	Corea Bend.
Do	38-023	Ninilehik Point.
Do	38-024	Porcupine.
Do	38-025	Salamato.
Do	38-026	Kalfonski.
Do	38-027	Southwest of Cape Kaslof.
Do	38-028	Moose.
Do	38-029	Kustatan.
Do	38-030	Salamato.
Sig Lindgren	38-058	East shore Cook Inlet.
Anton Johnson and Harold Jonsson	38-059	Salamato Beach.
J. T. Hansen	38-065	Nikishka Bay.
Fidalgo Island Packing Co	38-076	Bluff Point.
Do	38-077	North of Salamato Creek.
Do	38-078	Do.
Do	38-079	Flat Island.
Do	38-080	South of Cape Kaslof.
Do	38-082	Nubble Point.
Do	38-083	Southwest of Point Naskowak.
Pacific American Fisheries, Inc	38-180	East shore Cook Inlet.
Do	38-181	Do.
Do	38-182	South of Salamato.
Do	38-183	North of Kenai.
Ninilehik Packing Co	38-279	Southwest of Anchor Point.
Do	38-280	Southwest of Ninilehik.
Paul A. Shadura	38-285	Kalifonski Beach.
Estate of J. A. Magill	38-287	North of Three Mile Creek.
Do	38-288	South of Three Mile Creek.
Axel Anderson	38-292	East shore Cook Inlet.
Tyonok Native Store Association	38-294	Moquawkie Reservation.
Alaska Year Round Canneries Co	38-296	Kalgin Island.
Do	38-297	Corea Bend.
Do	38-298	Clam Gulch, Kenai Peninsula.
Do	38-299	Kalgin Island.
Myrtle M. Everett	38-332	Trading Bay.
Do	38-333	Do.
E. J. Fribrook	38-377	Chitsik Island.
Do	38-378	East shore Cook Inlet.
Do	38-379	Kalgin Island.
Do	38-380	East shore Cook Inlet.
Snug Harbor Packing Co	38-381	Do.
Do	38-382	Kalgin Island.
Do	38-383	Do.
Do	38-384	Point Harriet.
Cook Inlet Packing Co	38-385	North of Ninilehik River.
Do	38-386	East shore Cook Inlet.
Do	38-387	Do.

Salmon traps operated in Alaska in 1938—Continued

Licensee	Territorial License No.	Location
Cook Inlet—Continued.		
Cook Inlet Packing Co.....	38-388	East shore Cook Inlet.
Do.....	38-389	Do.
Do.....	38-390	Do.
Do.....	38-391	Do.
Kenai River Packing Co.....	38-392	Do.
Do.....	38-393	Do.
Oscar H. Vogel.....	38-424	Point Possession.
Al Jones.....	38-434	West Foreland.
Mrs. Ero Walli.....	38-452	North of Ninilchik River.
W. F. Brown.....	38-454	East shore Cook Inlet.
H. J. Emard.....	38-455	Southwest of Moose Point.
Do.....	38-456	Point Possession.
Do.....	38-457	North of Moose Point.
Do.....	38-458	Moose Point.
Emard Packing Co.....	38-459	McManus Point.
Kodiak Area:		
Alaska Packers Association.....	38-067	Miller Island.
Do.....	38-068	Alitak Bay.
Do.....	38-069	Deadman Bay.
Do.....	38-073	Uyak Bay.
Do.....	38-074	Do.
Do.....	38-075	Do.
Pacific American Fisheries, Inc.....	38-184	Deadman Bay.
Do.....	38-185	Alitak Bay.
Do.....	38-186	Do.
Do.....	38-187	Spiridon Bay.
Do.....	38-188	South of Cape Kultuk.
San Juan Fishing & Packing Co.....	38-208	Malina Bay.
Do.....	38-209	Malina Point.
Kodiak Fisheries Co.....	38-210	Raspberry Island.
Do.....	38-211	Do.
Do.....	38-212	Do.
Do.....	38-213	Viekoda Bay.
Do.....	38-214	Raspberry Island.
Litnik Fish Co.....	38-227	Paramanof Bay.
Uganik Fisheries, Inc.....	38-289	Uganik Island.
Do.....	38-290	Raspberry Island.
Do.....	38-291	Uganik Island.
Bellarmino Corporation.....	38-293	Do.
San Juan Fishing & Packing Co.....	38-352	South of Broken Point.
Do.....	38-353	Uganik Island.
Ottar Hofstad.....	38-359	Cape Uyak.
Do.....	38-360	Cape Ugat.
Chignik Area:		
Columbia River Packers Association.....	38-014	Chignik Bay, near Anchorage Bay.
Do.....	38-015	Aniakchak Bay.
Do.....	38-016	Lake Bay.
Alaska Packers Association.....	38-070	Main Island, Chignik Lagoon.
Do.....	38-071	West end of Chignik Bay.
Do.....	38-072	Cape Kumlik.
Pacific American Fisheries, Inc.....	38-189	Chignik Lagoon, Humes Point.
Do.....	38-190	Hook Bay.
Alaska Peninsula Area:		
Alaska Southern Packing Co.....	38-096	Fox Cape.
Do.....	38-097	Kupreanof Point.
Pacific American Fisheries, Inc.....	38-191	Kelly Rock, Unga Island.
Do.....	38-192	Pinnacle, Unga Island.
Do.....	38-193	Seal Cape.
Do.....	38-195	Ikatan Bay.
Do.....	38-196	Do.
Do.....	38-197	Do.
Do.....	38-198	Do.
Do.....	38-199	Morzhoval Bay.
Do.....	38-200	Vodapoini Point.
Do.....	38-201	Nikolaski, Moss Cape.
Do.....	38-202	Deer Island.
Do.....	38-203	Long John, North of Arch Point.
Do.....	38-204	Swedania Point.
Do.....	38-205	Dolgoi Island.
Do.....	38-206	Cape Tolstol.
D. Hotovitzky.....	38-207	Bold Cape.
P. E. Harris & Co.....	38-230	Cape Horn.
Do.....	38-231	East Anchor Cove.
Do.....	38-232	Ikatan Bay.
Do.....	38-233	Do.
Do.....	38-234	Arch Point.
Do.....	38-235	Pavlof Bay.
Do.....	38-236	Do.
Do.....	38-237	Moss Cape.

Salmon traps operated in Alaska in 1938—Continued

Licensee	Territorial License No.	Location
Alaska Peninsula Area—Continued.		
Korovin Island Fishing & Canning Co.....	38-300	Korovin Island.
Alaska Pacific Salmon Co.....	38-301	Popof Island.
Mrs. Hølene R. Mellick.....	38-302	Do.
Aleutian Fishing & Packing Co.....	38-358	San Diego, west of Guillemot Id.
Blue Fox Fish Co.....	38-440	Popof Island.

Summary of traps operated in Alaska in 1938, by districts

District	Number	District	Number
Southeast Alaska.....	286	Central Alaska—Continued.	
Central Alaska:		Chignik Area.....	8
Prince William Sound.....	42	Alaska Peninsula Area.....	31
Cook Inlet.....	62	Total, Central Alaska.....	170
Kodiak Area.....	27	Grand total.....	456

Percentage of salmon caught in each Alaska district, by principal forms of apparatus

Apparatus	Southeast Alaska		Central Alaska		Western Alaska	
	1937	1938	1937	1938	1937	1938
Beines.....	20	27	39	32	4	3
Gill nets.....	3	2	8	10	95	96
Traps.....	65	67	53	58		
Lines.....	3	4				
Wheels.....					1	1

The total catch of salmon in 1938 was 103,022,897, a decrease of 6,092,026, or about 6 percent, from the number taken in 1937. There was a decrease of 4,852,027 in southeast and 5,755,644 in central Alaska, and an increase of 4,515,645 in the western district. By species, the catch of cohos increased 1,062,707 and reds 4,377,102; while the catch of chums decreased 410,521, pinks 10,977,246, and kings 144,068.

Salmon taken in 1938, by apparatus and species, in each geographic section of Alaska

Apparatus and species	Southeast Alaska	Central Alaska	Western Alaska	Total
Seines:				
Coho, or silver.....	242,402	99,448		341,850
Chum, or keta.....	2,433,122	1,153,296	53,975	3,640,393
Pink, or humpback.....	7,459,317	8,971,618		16,430,935
King, or spring.....	21,439	1,252	5,857	28,548
Red, or sockeye.....	610,486	872,245	837,342	2,320,073
Total.....	10,766,766	11,097,859	897,174	22,761,799
Gill nets:				
Coho, or silver.....	257,742	192,940	6,785	457,467
Chum, or keta.....	26,888	128,868	972,231	1,126,987
Pink, or humpback.....	85,140	771,686	1,936	858,762
King, or spring.....	22,702	50,067	63,545	136,314
Red, or sockeye.....	528,428	2,369,431	25,469,437	28,367,296
Total.....	919,900	3,512,962	26,513,934	30,946,826

Salmon taken in 1938, by apparatus and species, in each geographic section of Alaska— Continued

Apparatus and species	Southeast Alaska	Central Alaska	Western Alaska	Total
Traps:				
Coho, or silver.....	910, 015	530, 395		1, 440, 410
Chum, or keta.....	2, 007, 384	1, 372, 829		3, 470, 213
Pink, or humpback.....	22, 743, 783	15, 164, 598		37, 908, 381
King, or spring.....	7, 124	30, 393		37, 517
Red, or sockeye.....	1, 396, 503	3, 250, 171		4, 646, 674
Total.....	27, 154, 809	20, 348, 386		47, 503, 195
Lines:				
Coho, or silver.....	789, 466	1, 100		790, 566
King, or spring.....	705, 852			705, 852
Total.....	1, 495, 318	1, 100		1, 496, 418
Wheels:				
Chum, or keta.....			292, 400	292, 400
King, or spring.....			19, 459	19, 459
Red, or sockeye.....			2, 800	2, 800
Total.....			314, 659	314, 659
Total:				
Coho, or silver.....	2, 199, 625	823, 883	6, 785	3, 030, 293
Chum, or keta.....	4, 556, 394	2, 654, 993	1, 318, 606	8, 529, 993
Pink, or humpback.....	30, 288, 240	24, 907, 902	1, 936	55, 198, 078
King, or spring.....	757, 117	81, 712	88, 861	927, 690
Red, or sockeye.....	2, 535, 417	6, 491, 847	26, 309, 579	35, 336, 843
Grand total.....	40, 336, 793	34, 960, 337	27, 725, 767	103, 022, 897

CANNING

CHANGES IN CANNERIES

Few changes in business organization and operations were reported for 1938 in the Alaska salmon-canning industry. In southeast Alaska the plant of the Demmert Packing Co. at Klawak, which had been idle in the previous year, was taken over and operated by a new concern, the Spencer Packing Corp. The plant of the Nakat Packing Corp. at Hidden Inlet was again in operation, having been rebuilt since its destruction by fire in the spring of 1937.

In central Alaska the San Juan Fishing & Packing Co. purchased the Drier Bay cannery from the Alaska Pacific Salmon Co. and dismantled it during the season. The cannery of Herbert T. Domenici at Uyak, which was idle in 1937, was taken over and operated by a new organization, the Great Northern Packing Co., Inc. The Shepard Point Packing Co. used its plant at Port Ashton both for salmon canning and for herring operations, but did not operate the cannery at Shepard Point. The Kodiak Fisheries Co. completed construction of its new modern cannery at Port Bailey, about 40 miles northwest of Kodiak, in time for operation in the 1938 season. This plant was built to replace the company's cannery at Kodiak. The Anchor Line Packing Co., formerly operating a floating plant at Seldovia, established and operated a small shore cannery on Kenai River.

At the beginning of the year the Bristol Bay Packing Co. was merged into the Alaska Salmon Co., which operated only the Kvichak River plant during the season. The company's Wood River cannery was used as a saltery, and the second Kvichak River plant, to replace buildings of the Bristol Bay Packing Co. destroyed by fire in 1936,



FIGURE 1.—Typical Alaska salmon cannery.



FIGURE 2.—Completing the cleaning operation, Alaska salmon cannery.

was not completed until after the close of the fishing season. The floating plant *La Merced*, of the Alaska Southern Packing Co., operated at Uyak Bay, Kodiak Island, during part of the season, but most of its pack was prepared in the Bristol Bay district, operations being carried on at Ships Anchorage in Kvichak Bay.

NEW CANNERIES

Aside from the replacement of certain canneries by new establishments, as mentioned above, there was only one new salmon cannery in Alaska during the season. This was a floating plant operated by Lars Sagen on a small scow at Crescent River, Tuxedna Harbor. Scotty's Packing Co., at Mummy Island, which had previously engaged in the packing of clams and crabs, added canned salmon to its production this season and is included for the first time in the list of salmon canneries.

The Salt Sea Fisheries put up a small pack of salmon, as well as crab meat, at its hand cannery at Tenakee, but this is not included in the list of salmon canneries.

CANNERIES NOT OPERATED

Largely as a result of prolonged labor negotiations in the spring, which resulted in undue delay in preparation for the season's activities, several canneries did not open, and the total number operated was the smallest for any year since 1933.

Of the canneries in southeast Alaska that were operated in the previous year, the following stood idle in 1938: Berg Packing Co., Ketchikan; Deep Sea Salmon Co., Skowl Arm; Hood Bay Canning Co., Hood Bay; Hydaburg Fisheries, Inc., Hydaburg; New England Fish Co., Chatham; Pyramid Packing Co., Inc., Sitka; and Red Salmon Packers Association, Yakutat. The plant of the Kayler-Otness Co., which was burned down in the fall of 1937, was rebuilt but did not pack salmon in 1938, its operations being confined to crabs and shrimp. The Pacific American Fisheries, Inc., used its plant at Kasaan solely for canning clams that were obtained from the beaches at Massett, B. C.

In central Alaska, plants that were closed for the 1938 season were the King Cove cannery of the Pacific American Fisheries, Inc., the company's catch in this region being put up by P. E. Harris & Co. at False Pass under a joint operating agreement; the Shepard Point cannery of Shepard Point Packing Co.; the Phillips Canning Corporation at Valdez; the Zachar Bay cannery of Shelikof Packing Co., which had been leased to the Kodiak Fisheries Co. in 1937; and the Shearwater Bay plant of Kodiak Fisheries Co., all canning operations of this concern being carried on at its new plant at Port Bailey, which replaces the company's plant at Kodiak. The Kodiak cannery has been discontinued, and all the machinery has been removed. The cannery of A. N. Nilson at Portlock was destroyed by fire during the winter of 1937-38 and was not rebuilt.

The Nushagak and Ugashik plants of the Alaska Packers Association and the Wood River plant of Alaska Salmon Co. were engaged only in the production of pickled salmon in 1938. Other canneries in the western district that had operated in the previous year but were closed in 1938 were the Nushagak and Port Moller plants of Pacific

American Fisheries, Inc., and the floating plant of Western Pacific Packing Co., Egegik River.

The following plants have been dropped from the list of inactive canneries, as they have been dismantled or abandoned and are not likely to be reopened: Alaska Packers Association, Loring, Wrangell, and Kasilof; Alaska Sanitary Packing Co., Cape Fanshaw; Anderson Mercantile Co., Inc., Deep Creek; W. G. Culver, Point McManus; General Fish Co., Ocean Dock, Anchorage; Gustan & Vogel, Point Possession; Libby, McNeill & Libby, Klawak; the Nakat Packing Corporation, Ketchikan; North Coast Packing Co., Ninilchik; Pacific American Fisheries, Inc., Excursion Inlet, Ketchikan, Port Walter, Santa Ana, Chignik, and Uniakwik Inlet; Point Possession Fish Co., Point Possession; Redoubt Bay Packing Co., Redoubt Bay; Harvey J. Smith, West Foreland; Spur Fish Corporation, Nikishka Bay; Sunset Packing Co., Otter Creek; John Wik, Kenai; Jake Young, Port Chatham; E. Sandvik, Swansons Creek; and San Juan Fishing & Packing Co., Drier Bay (formerly owned by Alaska Pacific Salmon Co.). The plant of E. Sandvik at Swansons Creek is now being used for pickling salmon.

The following canneries were closed during the year but may be reopened:

Southeast Alaska:

Alaska Pacific Salmon Co.....	{ Boca de Quadra. Choinly. Funter Bay. Pybus Bay. Ketchikan.
Berg Packing Co.....	Ketchikan.
Deep Sea Salmon Co.....	Skowl Arm.
Hood Bay Canning Co.....	Hood Bay.
Hydaburg Fisheries, Inc.....	Hydaburg.
Lane Bros.....	Moirra Sound.
New England Fish Co.....	Chatham.
Pyramid Packing Co.....	Sitka.
Red Salmon Packers Association.....	Yakutat (floating).
Seaport Salmon Co.....	Ketchikan.
Karl Thiele.....	Lake Bay.

Central Alaska:

Alaska Packers Association.....	Chignik.
Aleutian Fishing & Packing Co.....	Sand Point.
Glacier Sea Foods Co.....	Cordova.
Kadiak Fisheries Co.....	Shearwater Bay.
Ninilchik Packing Co.....	Ninilchik.
Pacific American Fisheries, Inc.....	{ Kenai. King Cove.
Phillips Canning Corporation.....	Valdez.
Premier Salmon Co.....	Stevens Creek.
Shelikof Packing Co.....	Zachar Bay.
Shepard Point Packing Co.....	Shepard Point.

Western Alaska:

Alaska Packers Association.....	{ Naknek River. Nushagak Bay. Ugashik River.
Alaska Salmon Co.....	Wood River.
Herendeen Bay Consolidated Canneries.....	Herendeen Bay.
Libby, McNeill & Libby.....	{ Lockanok. Nushagak.
Pacific American Fisheries, Inc.....	{ Nushagak River (2). Port Moller.
Red Salmon Canning Co.....	Naknek River.
Western Pacific Packing Co.....	Egegik River (floating).

TOTAL CANNERIES OPERATED

Ninety-eight canneries were operated in Alaska in 1938-39 in southeastern, 41 in central, and 18 in western Alaska—which is a decrease from the previous year of 7 for the southeastern, 3 for the central, and 5 for the western district. The floating canneries *International*, of the International Packing Co., *Memnon*, of the Columbia River Packers Association, Inc., and *La Merced*, of the Alaska Southern Packing Co., Inc., were operated in both central and western Alaska, but each is credited to only one district, the *International* to central and the other two to western Alaska.

Companies that operated traps only, the catches of which were sold or packed by other companies under joint operating arrangements, have been omitted from the following list, although for a number of years they have been included.

*Companies that canned salmon in Alaska, number and location of canneries operated, and number of traps owned by each, 1938*¹

[New canneries indicated by asterisk (*)]

Company	Canneries		Traps		
	Number	Location	Driven	Floating	Total
Southeast Alaska:					
A'aska 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			
Beagle Packing Co.	1	do	2	4	6
Burnett Inlet Salmon Co.	1	Burnett Inlet			
Consolidated Fisheries	1	Excursion Inlet	3	10	13
Diamond K Packing Co.	1	Wrangell	2	6	8
Douglas Fisheries Co., Inc.	1	Douglas			
Fidalgo Island Packing Co.	2	Bay of Pillars	5		5
		Ketchikan	2	3	5
Haines Packing Co.	1	Letnikof Cove			
P. E. Harris & Co.	1	Hawk Inlet		7	7
Icy Straits Salmon Co.	1	Hoonah			
Independent Salmon Canners, Inc.	1	Ketchikan		1	1
Ketchikan Packing Co.	1	do		2	2
		Craig		8	8
		George Inlet		7	7
Libby, McNeill & Libby	4	Taku Harbor	5	10	15
		Yakutat			
Lindenberger Packing Co.	1	Craig			
		Hidden Inlet		6	6
Nakat Packing Corp., The	3	Union Bay		5	5
		Waterfall		9	9
		Ketchikan		5	5
New England Fish Co.	2	Noyes Island		6	6
Northern Fisheries, Inc.	1	Ketchikan			
Ocean Packing Co.	1	Klawak			
Pacific American Fisheries, Inc.	1	Petersburg	3	4	7
Peril Straits Packing Co.	1	Todd		7	7
Scow Bay Packing Co.	1	Scow Bay		4	4
Sebastian Stuart Fish Co.	1	Tyee		6	6
Spencer Packing Corp.	1	Klawak			
Superior Packing Co.	1	Tenakee		5	5
Ward's Cove Packing Co.	1	Ward Cove		3	3
Wrangell Packing Co.	1	Wrangell		2	2
Central Alaska:					
Alaska Native Consolidated Canning Co.	1	Sand Point			
Alaska Pacific Salmon Co.	1	do	3		3
Alaska Packers Association	2	Chignik	3		3
		Larsen Bay	3		3
Alaska Red Salmon Packers, Inc.	1	Hallbut Bay (Carmel)			
Alaska Southern Packing Co.	1	Uyak Bay (floating)			
Alaska Year-Round Canners Co.	1	Seldovia	4		4

See footnotes at end of table.

Companies that canned salmon in Alaska, number and location of canneries operated, and number of traps owned by each, 1938—Continued

Company	Canneries		Traps		
	Number	Location	Driven	Floating	Total
Central Alaska—Continued.					
Anchor Line Packing Co.	1	Kenai River			
Chignik Packing Co.	1	Chignik			
Columbia River Packers Association, Inc.	1	Ikatan Bay (floating)			
Cook Inlet Packing Co.	1	Seldovia	7		7
Copper River Packing Co.	1	McClure Bay		5	5
Edvard Packing Co.	1	Anchorage	5		5
Fidalgo Island Packing Co.	1	Port Graham	7		7
General Fish Co., Inc.	1	Anchorage	3		3
W. R. Gilbert Co., Inc.	1	Point Whittshed			
Great Northern Packing Co., Inc.	1	Uyak Bay			
Grimes Packing Co.	1	Uzink			
Gulf Packing Co.	1	Cordova ¹			
Hazen & Co.	1	Seward			
P. E. Harris & Co.	1	False Pass	8		8
International Packing Co.					
	1	Ikatan, Ivanof, and Volcano Bays (floating)			
Kodiak Fisheries Co.	1	Port Bailey	5	1	6
Libby, McNeill & Libby	1	Kenai	10		10
Frank McConaghy Co., Inc.	1	Kodiak (floating)			
New England Fish Co.	1	Cordova	4		4
North Pacific Sea Foods Co.	1	Swanport			
Pacific American Fisheries, Inc.	2	Allak	6		6
		Squaw Harbor	4		4
Pioneer Canneries, Inc.	1	Cordova	2	1	3
Pioneer Sea Foods Co., The	1	Orca		3	3
Puget and Alaska Canning Co.	1	Seldovia			
Lars Sagen	1	Crescent River (floating) ²			
Sandvik Hand Cannery	1	Uganik Village			
San Juan Fishing & Packing Co.	2	Port San Juan	2	6	8
		Uganik Bay	4		4
Scotty's Packing Co.	1	Mummy Island ²			
Shepard Point Packing Co.	1	Port Ashton		9	9
Snug Harbor Packing Co.	1	Snug Harbor	8		8
Suryan's, Inc.	1	Moser Bay (floating)			
Uganik Fisheries, Inc.	1	Uganik	3		3
L. Utness	1	Mountain Slough			
Washington Fish & Oyster Co., Inc.	1	Port Williams			
Western Alaska:					
Alaska Packers' Association	5	Egegik River			
		Kvichak Bay (2)			
		Naknek River (2)			
Alaska Salmon Co.	1	Kvichak River			
Alaska Southern Packing Co., Inc.	1	Naknek (floating)			
Columbia River Packers' Association, Inc.	2	Nushagak			
		Port Moller (floating)			
International Packing Co.	1	Port Moller (floating)			
		Egegik River			
Libby, McNeill & Libby	4	Ekuk			
		Koguching			
		Libbyville			
Nakat Packing Corporation, The	1	Nakeen			
Pacific American Fisheries, Inc.	2	Naknek River			
Red Salmon Canning Co.	2	Naknek River			
		Ugashik River			

¹ A list of all traps operated in Alaska in 1938 appears on pp. 115 to 121 of this report.

² Primarily a clam cannery.

LOSSES AND DISASTERS

Property losses reported for the Alaska fisheries in 1938 amounted to \$110,235, of which \$45,338 represented the value of some 5,000 cases of canned red salmon lost with a lighter of the Alaska Packers Association in Kvichak Bay, and \$21,000 was the value of a shipment of empty cans lost while being conveyed to the floating cannery of Suryan's, Inc. The remainder consisted chiefly of small boats and

fishing apparatus. The total reported losses in southeast Alaska amounted to \$22,985; those in the central district, \$34,058; and in western Alaska, \$53,192.

Other losses are known to have occurred, of which records are incomplete. One small cannery, that of A. N. Nilson, at Portlock, was destroyed by fire in the winter of 1937-38, but no information is available as to its value.

The most serious disaster was the loss of the purse-seine boat *Eidsvold*, with the entire crew, somewhere in the vicinity of Dall Island.

Thirty-one lives were lost during the year—14 in southeast, 10 in central, and 7 in western Alaska. In the southeastern district 7 fishermen were drowned, 3 shoresmen and 1 transporter met death in accidents, and 2 shoresmen and 1 transporter died of disease. Two fishermen, 3 shoresmen, and 1 transporter were drowned in central Alaska, 1 fisherman and 2 shoresmen died of disease, and 1 shoresman committed suicide. In western Alaska 2 fishermen were drowned and 1 fisherman, 3 shoresmen and 1 transporter died of disease.

STATISTICS

Ninety-eight canneries were operated in Alaska in 1938, or 15 less than in the previous year. Employment was given to 22,280 persons, as compared with 24,865 in 1937, a decrease of 2,585. White employees decreased 806, natives 536, Chinese 179, Japanese 254, Filipinos 548, Mexicans 243, Puerto Ricans 3, and miscellaneous 44; while Kanakas increased 20 and Negroes 8.

The total pack of canned salmon was 6,806,998 cases, valued at \$36,636,897. This is an increase of 2 percent in quantity but a decrease of about 18 percent in value from the production in 1937, when the pack amounted to 6,669,665 cases, valued at \$44,547,769. Average prices of all species were considerably lower in 1938 than in the previous year.

The output of canned salmon in southeast Alaska decreased from 2,933,896 cases in 1937 to 2,713,948 cases in 1938, or 7 percent; in central Alaska the decline was from 2,216,359 cases to 2,179,765 cases, or about 2 percent; while in western Alaska the output increased from 1,519,410 cases to 1,913,285 cases, or about 26 percent. By species, in Alaska as a whole, the pack of cohos increased from 137,317 cases in 1937 to 222,321 cases in 1938, or about 62 percent; chums, from 730,832 cases to 786,753 cases, or about 8 percent; and reds from 2,106,669 cases to 2,521,233 cases, or about 20 percent; while the pack of pinks decreased from 3,625,379 cases to 3,232,878 cases, or about 11 percent; and kings from 69,468 cases to 43,813 cases, or about 37 percent.

Details are included in the following tables to show comparison of the 1938 pack with the average for the 5 preceding years, 1933 to 1937, by cases of each species and by districts. Cohos and reds show gains of 17 percent and 23 percent, respectively, over the 5-year average, while chums declined about 4 percent, pinks 7 percent, and kings 13 percent. By districts, the pack in 1938 increased approximately 2 percent over the 5-year average in central Alaska and about 41 percent in the western district, while in southeast Alaska there was a decrease of 12 percent, making a net increase of 3 percent over the 5-year average for all of Alaska.

Persons engaged, wages paid, and operating units of Alaska salmon canning industry, 1938

Item	Southeast Alaska	Central Alaska	Western Alaska	Total
PERSONS ENGAGED				
Fishermen:				
Whites.....	1,471	1,513	1,801	4,875
Natives.....	1,235	805	235	2,275
Japanese.....		1		1
Filipinos.....	6	3		9
Mexicans.....	2		1	3
Kanakas.....		2		2
Negroes.....	2			2
Miscellaneous ¹	2			2
Total.....	2,718	2,324	2,127	7,169
Shoresmen:				
Whites.....	2,275	1,834	1,618	5,825
Natives.....	1,615	783	104	2,482
Chinese.....	70	103	194	367
Japanese.....	437	151	96	684
Filipinos.....	1,213	971	1,082	3,266
Mexicans.....	6	50	324	380
Puerto Ricans.....		10	77	87
Kanakas.....	1	5	21	27
Negroes.....	6	26	46	78
Miscellaneous ¹	1	11	27	39
Total.....	5,624	4,024	3,587	13,235
Transporters:				
Whites.....	807	574	419	1,800
Natives.....	10	43		53
Chinese.....	1	4		5
Filipinos.....	1		1	2
Mexicans.....			4	4
Kanakas.....		7		7
Negroes.....		1	3	4
Miscellaneous ¹		1		1
Total.....	819	630	427	1,876
Total:				
Whites.....	4,553	4,021	3,926	12,500
Natives.....	2,860	1,611	339	4,810
Chinese.....	71	107	194	372
Japanese.....	437	152	96	685
Filipinos.....	1,220	974	1,083	3,277
Mexicans.....	8	50	329	387
Puerto Ricans.....		10	77	87
Kanakas.....	1	14	21	36
Negroes.....	8	27	49	84
Miscellaneous ¹	3	12	27	42
Grand total.....	9,161	6,978	6,141	22,280
Wages paid shoresmen.....	\$1,629,510	\$1,488,601	\$1,729,144	\$4,847,255
Wages paid transporters.....	\$434,873	\$367,664	\$289,455	\$1,091,992
OPERATING UNITS				
Plants:				
Shore canneries.....	39	37	16	92
Floating canneries—				
Power vessels.....		2	2	4
Net tonnage.....		2,366	4,092	6,458
Scows.....		2		2
Total plants operated.....	39	41	18	98
Vessels:				
Power, over 5 tons.....	495	183	73	751
Net tonnage.....	9,310	4,903	21,278	35,491
Launches.....	115	244	18	377
Power dories.....	31	118	32	181
Gill-net boats.....	103	332	943	1,378
Seine skiffs.....	273	279	4	556
Other rowboats and skiffs.....	586	593	149	1,328
Lighters and scows.....	196	201	121	518
Houseboats.....	23	2	23	48
Pile drivers.....	24	33	11	68
Pile pullers.....	3	8		11
Rigging scows.....	32	10		42

¹ Koreans, Chileans, Peruvians, etc.

Persons engaged, wages paid, and operating units of Alaska salmon canning industry, 1938—Continued

Item	Southeast Alaska	Central Alaska	Western Alaska	Total
Apparatus:				
Purse seines.....	421	221	4	646
Fathoms.....	71,595	24,515	1,200	97,310
Beach seines.....	28	109		135
Fathoms.....	1,880	11,012		12,892
Gill nets.....	422	2,031	1,523	3,976
Fathoms.....	28,075	126,930	150,435	305,440
Traps, driven.....	29	137		166
Traps, floating.....	257	33		290

Output and value of canned salmon in Alaska in 1938¹

Product	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Cases	Value	Cases	Value	Cases	Value	Cases	Value
Coho, or silver:								
½-pound flat.....	8,930	\$84,746	3,092	\$27,921			12,022	\$112,667
1-pound flat.....	2,688	18,816	157	1,072			2,845	19,888
1-pound tall.....	132,147	807,301	69,839	428,613	345	\$1,937	202,331	1,237,851
4-pound flat.....			5,123	28,905			5,123	28,905
Total.....	143,755	910,863	78,211	486,511	345	1,937	222,321	1,399,311
Chum, or keta:								
½-pound flat.....	5,147	28,969	376	2,105			5,523	31,074
1-pound flat.....	469,306	1,681,816	250,046	907,034	59,614	216,171	778,966	2,805,021
4-pound flat.....			2,264	7,328			2,264	7,328
Total.....	474,453	1,710,785	252,686	916,467	59,614	216,171	786,753	2,843,423
Pink, or humpback:								
½-pound flat.....	41,691	250,497	9,091	57,515			50,782	308,012
1-pound flat.....			4,105	18,317			4,105	18,317
1-pound tall.....	1,845,078	7,094,557	1,318,415	5,006,070			3,163,493	12,100,627
4-pound flat.....			14,498	54,767			14,498	54,767
Total.....	1,886,769	7,345,054	1,346,109	5,136,669			3,232,878	12,481,723
King, or spring:								
½-pound flat.....	1,279	13,325	1,075	17,390			2,354	30,715
1-pound flat.....	1,450	11,890	4,381	40,887	280	2,580	6,111	55,357
1-pound tall.....	13,641	93,458	15,488	103,975	6,219	45,138	35,348	242,571
Total.....	16,370	118,673	20,944	162,252	6,499	47,718	43,813	328,643
Red, or sockeye:								
½-pound flat.....	53,802	598,554	50,618	578,628	18,222	216,029	122,642	1,393,211
1-pound flat.....	13,247	116,386	38,361	318,542			51,608	434,928
1-pound tall.....	125,542	911,488	384,267	2,850,896	1,828,605	13,928,747	2,338,414	17,691,131
4-pound flat.....			8,569	64,527			8,569	64,527
Total.....	192,591	1,626,428	481,815	3,812,593	1,846,827	14,144,776	2,521,233	19,583,797
Grand total.....	2,713,948	11,711,803	2,179,765	10,514,492	1,913,285	14,410,602	6,806,998	36,636,897

¹ For the purpose of affording fair comparison, all cases are put upon the common basis of 48 1-pound cans per case.

*Output of canned salmon in Alaska, in cases, 1933 to 1938*¹
BY SPECIES

Product	1933	1934	1935	1936	1937	Average for 5-year period, 1933-37	1938	Percentage increase or decrease in 1938, as compared with 5-year average
Coho, or silver:								
½-pound flat	3,367	5,785	6,822	7,309	9,625	6,582	12,022	+82.65
1-pound flat	4,657	8,283	2,833	1,335	1,204	3,662	2,845	-22.31
1-pound tall	164,544	222,049	180,522	213,656	123,610	178,876	202,331	+13.11
4-pound flat					2,878	5,123	5,123	+789.41
Total	162,568	236,117	190,177	222,300	137,317	189,696	222,321	+17.20
Chum, or keta:								
½-pound flat	658	2,298	1,647	1,600	5,883	2,397	5,523	+130.41
1-pound flat					39	8		-100.00
1-pound tall	658,131	738,343	851,281	1,099,583	723,815	814,231	778,960	-4.33
4-pound flat					1,096	219	2,264	+933.79
Total	658,789	740,641	852,928	1,101,083	730,832	816,855	786,753	-3.89
Pink, or humpback:								
½-pound flat	14,857	28,793	44,560	37,406	33,338	31,791	50,782	+59.74
1-pound flat		1,668	687		438	558	4,105	+635.66
1-pound tall	2,167,694	3,793,732	3,198,819	4,522,388	3,586,005	3,453,908	3,163,493	-8.41
4-pound flat					4,698	939	14,498	+1,443.98
Total	2,182,551	3,824,193	3,244,066	4,559,794	3,625,379	3,487,196	3,232,878	-7.29
King, or spring:								
½-pound flat	9,955	9,983	13,462	10,388	15,495	11,857	2,354	-80.15
1-pound flat	10,021	10,214	6,520	5,722	6,213	7,738	6,111	-21.03
1-pound tall	21,437	32,666	10,423	35,774	47,760	30,812	35,348	+14.72
Total	41,413	52,863	36,405	51,884	69,468	50,407	43,813	-13.08
Red, or sockeye:								
½-pound flat	53,638	88,051	87,498	137,219	149,424	103,166	122,642	+18.88
1-pound flat	60,052	73,430	57,093	118,090	87,654	79,384	51,608	-34.99
1-pound tall	2,066,593	2,466,535	664,355	2,247,233	1,866,176	1,862,178	2,338,414	+25.57
4-pound flat					3,415	683	8,569	+1,154.61
Total	2,180,283	2,628,016	809,846	2,502,542	2,106,669	2,045,411	2,521,233	+23.26
Grand total	5,225,604	7,481,830	5,133,122	8,437,603	6,669,665	6,589,665	6,806,993	+3.30

BY DISTRICTS AND SPECIES

Southeast Alaska:								
Coho, or silver	95,805	158,527	142,493	134,722	88,625	124,014	143,765	+15.93
Chum, or keta	424,861	394,212	540,948	778,339	603,760	528,425	474,453	-10.21
Pink, or humpback	1,478,013	2,622,362	2,200,060	2,025,144	2,143,168	2,273,750	1,886,769	-17.02
King, or spring	8,146	15,594	11,108	20,505	30,693	17,209	16,370	-4.88
Red, or sockeye	81,126	104,398	159,429	218,007	167,744	146,141	192,501	+31.78
Total	2,087,951	3,295,093	3,054,038	4,076,717	2,933,896	3,089,539	2,713,948	-12.16
Central Alaska:								
Coho, or silver	65,307	76,371	47,461	86,007	48,654	64,760	78,211	+20.77
Chum, or keta	207,879	313,233	302,123	296,188	191,610	262,207	252,686	-3.63
Pink, or humpback	794,538	1,199,872	1,044,002	1,603,584	1,482,210	1,206,841	1,346,109	+11.54
King, or spring	23,786	28,472	24,462	27,073	31,641	27,087	20,944	-22.68
Red, or sockeye	484,484	709,470	384,183	856,829	462,241	579,442	481,815	-16.85
Total	1,485,994	2,327,418	1,802,231	2,869,681	2,216,359	2,140,337	2,179,765	+1.84
Western Alaska:								
Coho, or silver	1,456	1,219	223	1,571	138	921	345	-62.54
Chum, or keta	26,049	33,196	9,857	26,550	35,450	25,223	59,614	+127.33
Pink, or humpback		1,959	4	31,066	1	6,606		-100.00
King, or spring	9,481	8,797	835	4,306	7,131	6,110	6,490	+6.37
Red, or sockeye	1,614,673	1,814,148	265,934	1,427,706	1,476,684	1,319,829	1,846,827	+39.93
Total	1,651,659	1,859,319	276,853	1,491,205	1,519,410	1,359,689	1,913,285	+40.71
Grand total	5,225,604	7,481,830	5,133,122	8,437,603	6,669,665	6,589,665	6,806,993	+3.30

¹ The number of cases has been put upon the common basis of 48 1-pound cans per case.

Relative importance of each species of canned salmon within each district in 1938

District	Coho	Chum	Pink	King	Red	Total, all species
	Percent	Percent	Percent	Percent	Percent	Percent
Southeast Alaska.....	5.3	17.5	69.5	0.6	7.1	100.0
Central Alaska.....	3.6	11.6	61.7	1.0	22.1	100.0
Western Alaska.....	.0	3.1	0	.4	96.5	100.0
All Alaska.....	3.3	11.6	47.5	.6	37.0	100.0

Relative importance of each district in the production of each species of salmon canned in 1938

District	Coho	Chum	Pink	King	Red	Total, all species
	Percent	Percent	Percent	Percent	Percent	Percent
Southeast Alaska.....	64.7	60.3	58.4	37.4	7.6	59.9
Central Alaska.....	35.2	32.1	41.6	47.8	19.1	32.0
Western Alaska.....	.1	7.6	.0	14.8	73.3	28.1
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, 1928 to 1938

Product	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938
Coho, or silver.....	\$7.12	\$7.59	\$8.26	\$6.51	\$4.12	\$5.20	\$5.23	\$6.40	\$6.51	\$8.14	\$6.29
Chum, or keta.....	6.06	5.35	3.60	3.19	2.79	4.12	3.65	3.83	3.58	4.62	3.61
Pink, or humpback.....	6.56	6.06	4.17	3.46	3.14	4.52	4.10	4.14	3.94	4.95	3.86
King, or spring.....	11.13	11.92	13.32	9.40	5.46	7.51	6.85	8.70	7.95	9.94	7.50
Red, or sockeye.....	9.41	10.71	12.57	9.20	5.61	6.71	6.72	9.32	8.38	10.12	7.77

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 1937. 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 packing 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.—Mainland shore from Castle Cape to Cape Kunmik.

Kodiak-Afognak Islands.—Kodiak, Spruce, and Raspberry Islands.

Cook Inlet.—The shores of Cook Inlet.

Prince William Sound.—Resurrection Bay to Point Whittshed.

Copper and Bering Rivers.—Point Whittshed 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 shores along 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 1938, by districts ¹

District	Coho	Chum	Pink	King	Red	Total	Percentage increase or decrease from 1937
	<i>Cases</i>	<i>Cases</i>	<i>Cases</i>	<i>Cases</i>	<i>Cases</i>	<i>Cases</i>	
Bristol Bay	346	64,551		5,446	1,772,885	1,833,227	+25.76
Port Moller and Herendeen Bay		5,063		1,053	73,942	80,058	+29.71
Ikatan-Shumagin Islands	21,650	128,574	367,827	1,655	57,439	577,145	-13.86
Chignik	2,234	6,792	12,071	148	35,147	56,412	-53.98
Kodiak-Afognak Islands	14,716	69,792	450,098	316	142,112	677,034	-27.48
Cook Inlet	32,745	16,290	54,894	16,060	170,725	290,694	+59.14
Prince William Sound	6,846	31,218	461,114	251	10,615	510,044	+131.65
Copper and Bering Rivers		50	105	2,514	65,777	68,446	-21.84
Yakutat and Dry Bay	26,854	397	7,417	1,450	27,211	63,329	+63.57
Icy Strait-Lynn Canal	18,363	87,263	245,556	3,917	70,078	425,177	-8.35
Chatham Strait-Frederick Sound	19,063	93,879	373,982	1,348	13,346	501,638	-30.31
Sumner Strait-Dixon Entrance	48,169	212,578	912,747	585	60,956	1,235,035	+5.75
West Coast, Prince of Wales Island	31,296	80,336	347,067	9,070	21,000	488,769	-10.09
Total	222,321	786,753	3,232,878	43,813	2,521,233	6,806,998	+2.06

¹ Pack reduced to the basis of forty-eight 1-pound cans per case.

Canneries operated in Alaska in 1938, by districts

District	Canneries located in district	Canneries handling salmon taken in district
	<i>Number</i>	<i>Number</i>
Bristol Bay	17	17
Port Moller and Herendeen Bay	2	2
Ikatan-Shumagin Islands	6	7
Chignik	2	2
Kodiak-Afognak Islands	13	14
Cook Inlet	10	11
Prince William Sound	11	7
Copper and Bering Rivers	1	7
Yakutat and Dry Bay	1	1
Icy Strait-Lynn Canal	7	12
Chatham Strait-Frederick Sound	5	15
Sumner Strait-Dixon Entrance	19	22
West Coast, Prince of Wales Island	7	16
Total (without duplication)	98	

¹ Number includes 1 floating plant that was operated in more than 1 district.

² Number includes 2 floating plants that were operated in more than 1 district.

MILD CURING

Notwithstanding a considerable decrease in the number of troll-caught king salmon in southeast Alaska, the production of mild-cured salmon showed a marked increase over that of the preceding year. The increase was both for kings and for cohos, but chiefly the latter, which made up a larger portion of the pack than for any other year since 1929. The total output was the second largest in the history of the industry, having been exceeded only by the pack in 1927. As usual, the bulk of the product was from southeast Alaska, with a limited supply also from the western and central districts.

No enumeration of trolling boats was made by the Bureau in 1938, as no patrol vessel was available for this work at the beginning of the season. In respect to the number of fishermen, boats, and lines in southeast Alaska, therefore, the same figures are used as for the preceding year. In order to enable the securing of more accurate data regarding trolling operations in the future, it is the purpose to embody in the Alaska fishery regulations a requirement that before the commencement of commercial fishing each season the name and number of each trolling boat shall be furnished to the Bureau's local representative.

Twenty-one plants were operated in 1938 and 1,753 persons were employed, as compared with 17 plants and 1,605 persons in the previous year. There was also some production of mild-cured salmon incidental to canning and other operations.

The total output of mild-cured salmon was 6,519,200 pounds, valued at \$1,278,931, an increase of 797,600 pounds in quantity and \$214,587 in value over the production in 1937.

Persons engaged, wages paid, and operating units, Alaska salmon mild-curing industry, 1938

Item	Southeast Alaska	Central Alaska	Western Alaska	Total
PERSONS ENGAGED				
Fishermen:				
Whites.....	1,078	1	2	1,081
Natives.....	239	2	23	264
Total.....	1,317	3	25	1,345
Shoresmen:				
Whites.....	338			338
Natives.....	27		27	54
Total.....	365		27	392
Transporters:				
Whites.....	14			14
Natives.....			2	2
Total.....	14		2	16
Grand total.....	1,696	3	54	1,753
Wages paid shoresmen.....	\$170,146		\$3,473	\$173,619
Wages paid transporters.....	\$10,812		\$300	\$10,812
OPERATING UNITS				
Plants:				
Shore.....	15	1	2	18
Floating:				
Barges.....	2			2
Net tonnage.....	300			300
Scow.....			1	1
Total plants operated.....	17	1	3	21

Persons engaged, wages paid, and operating units, Alaska salmon mild-curing industry, 1938—Continued

Item	Southeast Alaska	Central Alaska	Western Alaska	Total
Vessels:				
Power, over 5 tons.....	259	1	3	263
Net tonnage.....	2,241	14	43	2,298
Launches.....	651		1	652
Power dory.....			1	1
Gill-net boats.....			9	9
Rowboats and skiffs.....	150		5	153
Lighters and scows.....	2		1	3
Houseboat.....	1			1
Apparatus:				
Gill nets.....		1	21	22
Fathoms.....		100	1,053	1,153
Lines.....	3,718	4		3,722
Wheels.....			3	3

Products of Alaska salmon mild-curing industry in 1938

Products	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Coho, or silver.....	1,793,600	\$103,218	16,800	\$1,600			1,810,400	\$104,818
King, or spring.....	5,550,400	1,154,029			158,400	\$20,084	5,708,800	1,174,113
Total.....	6,344,000	1,257,247	16,800	1,600	158,400	20,084	6,519,200	1,278,931

1 992 tierces. 2 21 tierces. 3 1,013 tierces. 4 6,938 tierces. 5 198 tierces. 6 7,136 tierces.

PICKLING

The output of pickled salmon in Alaska showed a marked increase over that for 1937, reaching the highest level for any year since 1926. This increase may be attributed primarily to the excellent runs of red salmon in the Bristol Bay district and to the fact that certain plants there did not engage in canning operations, owing to the undue delay in preparation for the season's activities by reason of unsettled labor conditions. Canneries that were used solely for pickling salmon were the Alaska Salmon Co.'s plant at Wood River, and the Nushagak and Ugashik plants of the Alaska Packers Association. A number of small outfits also engaged in the industry, and some pickled salmon was packed in connection with salmon canning and other branches of the fisheries.

Of the total output, 72 percent was prepared in western Alaska, about 27 percent in the central district, and somewhat less than 1 percent in the southeastern district.

There were 217 persons employed, an increase of 96 over the number reported for 1937. The total output was 1,177,685 pounds, valued at \$122,421, as compared with 765,396 pounds, valued at \$100,550, in the previous year.

Persons engaged, wages paid, and operating units, Alaska salmon-pickling industry, 1938

Item	Central Alaska	Western Alaska	Total
PERSONS ENGAGED			
Fishermen:			
Whites.....	31	40	71
Natives.....	8	58	66
Total.....	39	98	137
Shoresmen:			
Whites.....	1	36	37
Natives.....	2	38	40
Filipinos.....		3	3
Total.....	3	77	80
Grand total.....	42	175	217
Wages paid shoresmen.....	\$718	\$13,496	\$14,214
OPERATING UNITS			
Plants:			
Shore.....	26	8	34
Floating—scows.....	2		2
Total plants operated.....	28	8	36
Vessels:			
Power, over 5 tons.....	1	8	9
Net tonnage.....	5	1,314	1,319
Launches.....	7	1	8
Power dories.....	12		12
Gill-net boats.....	3	63	66
Selne skiffs.....	1	1	2
Other rowboats and skiffs.....	29	63	92
Lighters and scows.....	2	12	14
Houseboats.....		3	3
Pile drivers.....		3	3
Apparatus:			
Beach seines.....	19		19
Fathoms.....	1,452		1,452
Gill nets.....	39	81	120
Fathoms.....	1,665	4,645	6,310

Products of Alaska salmon-pickling industry in 1938

Products	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Coho, or silver.....	3,000	\$240	100,900	\$8,870	1,570	\$236	114,470	\$9,346
Chum, or keta.....			600	30	27,700	1,734	28,300	1,764
Pink, or humpback.....			1,600	110	4,100	264	5,700	374
King, or spring.....			8,600	1,222	23,300	2,448	31,900	3,670
Red, or sockeye.....	6,600	660	192,500	20,996	798,215	85,611	907,315	107,267
Total.....	9,600	900	313,200	31,228	854,885	90,293	1,177,685	122,421

FRESH SALMON

As in the previous year, the fresh-salmon business was confined to southeast Alaska, where it was largely incidental to other branches of the fisheries. Three dealers whose chief output was fresh salmon gave employment to 10 white shoresmen. The total products amounted to 3,817,042 pounds, valued at \$291,335, as compared with 3,421,129 pounds, valued at \$292,316, in 1937—an increase of about 12 percent in quantity, but a decrease of about a third of 1 percent in value. The foregoing output includes approximately 35,600 chum salmon, or 308,200 pounds, that were taken in Cholmondeley Sound during the fall season and shipped to a salmon cannery at Anacortes, Wash.

Products of Alaska fresh-salmon industry in 1938

Species	Pounds	Value
Coho, or silver.....	1,322,327	\$95,427
Chum, or keta.....	635,719	12,366
Pink, or humpback.....	12,925	355
King, or spring.....	1,648,326	166,412
Red, or sockeye.....	197,745	16,775
Total.....	3,817,042	291,335

FREEZING

The production of frozen salmon in Alaska, most of which was incidental to mild curing and other branches of the fisheries, was substantially larger in 1938 than in the preceding year. Ninety-nine white shosmen, not elsewhere recorded, were identified with this industry, receiving wages amounting to \$49,926. Except for a small output incidental to trout operations at Seward, in the central district, the entire production was from southeast Alaska. The total output was 7,185,046 pounds valued at \$530,951, as compared with 5,344,666 pounds valued at \$431,614 in 1937—an increase of 34 percent in quantity and 23 percent in value.

Frozen salmon used as bait in the halibut fishery or as animal feed on fur farms are not included in the above figures but are shown under miscellaneous salmon products.

Products of Alaska frozen-salmon industry in 1938

Species	Pounds	Value
Coho, or silver.....	4,910,565	\$357,875
Chum, or keta.....	636,444	20,553
Pink, or humpback.....	61,020	2,441
King, or spring.....	1,573,089	149,621
Red, or sockeye.....	3,928	461
Total.....	7,185,046	530,951

DRY-SALTED, DRIED, AND OTHER MISCELLANEOUS SALMON PRODUCTS

An outfit in southeast Alaska and one in the central district reported the dry-salting of salmon. Employment was given to 2 whites and 4 natives, respectively, and the output of dry-salted salmon amounted to 10,500 pounds, valued at \$1,132, in southeast Alaska, and 18,000 pounds, valued at \$500, in central Alaska. Other miscellaneous products in southeast Alaska consisted of 720,652 pounds of frozen salmon for bait, valued at \$7,241; 61,420 pounds of frozen salmon for use as animal feed on fur farms, valued at \$2,500; and 7,300 pounds of salmon eggs, valued at \$365, which were shipped in brine to Seattle for use in specially prepared fish food. An output of 4,025 pounds of dried salmon, valued at \$140, was reported for central Alaska.

Miscellaneous fishery products of the Yukon, Tanana, and Kuskokwim Rivers were 17,300 pounds of dry-salted salmon, valued at \$1,730, and 998,000 pounds of dried salmon, valued at \$71,200. Nine whites and 710 natives engaged in the fishery, and the apparatus used consisted of 238 wheels, 587 gill nets of 14,546 fathoms, 2 dories, and 50 rowboats and skiffs.

Production of dry-salted, dried, and other miscellaneous salmon products in Alaska in 1938

Products	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Dry-salted:								
Coho, or silver.....	680	\$51	18,000	\$500			18,680	\$551
King, or spring.....					17,300	\$1,730	17,300	1,730
Red, or sockeye.....	9,870	1,081					9,870	1,081
Total.....	10,500	1,132	18,000	500	17,300	1,730	45,800	3,362
Dried:								
Chum, or keta.....			1,025	50	912,000	66,900	913,025	66,950
Pink, or humpback.....			3,000	90			3,000	90
King, or spring.....					44,000	2,200	44,000	2,200
Red, or sockeye.....					42,000	2,100	42,000	2,100
Total.....			4,025	140	998,000	71,200	1,002,025	71,340
Frozen for bait:								
Coho, or silver.....	9,273	128					9,273	128
Chum, or keta.....	630,146	6,301					630,146	6,301
Pink, or humpback.....	79,028	790					79,028	790
Red, or sockeye.....	2,205	22					2,205	22
Total.....	720,652	7,241					720,652	7,241
Frozen for feed on fur farms:								
Pink, or humpback.....	61,420	2,500					61,420	2,500
Salmon eggs for fish food.....	7,300	365					7,300	365
Grand total.....	799,872	11,238	22,025	640	1,016,300	72,930	1,837,197	84,808

BYPRODUCTS

Salmon meal and oil were prepared at a byproducts plant in southeast Alaska, and at a salmon cannery on Larsen Bay, in the central district, in connection with its canning operations. The average number of employees at the former plant was 24 white shosmen, although approximately three times that number of persons were identified with the industry for varying periods, due to changes in the crews supplied through union hiring halls at different times during the season.

The total production in 1938 was 2,074,000 pounds of fertilizer, valued at \$31,413, and 67,988 gallons of oil, valued at \$15,757, as compared with 1,972,000 pounds of fertilizer, valued at \$29,151, and 78,100 gallons of oil, valued at \$23,956, in 1937—an increase of 5 percent in the output of fertilizer, and a decrease of about 13 percent in the output of oil.

HERRING

As in the previous year, little attention was given to the production of Scotch-cured herring in Alaska in 1938, primarily because of unfavorable market conditions. No pickled herring whatever was reported for southeastern Alaska and the pack in the central district was somewhat curtailed, while in the western district there was a considerable increase, with the result that the total output of Scotch-cured herring in the Territory was slightly larger than that for 1937. Of this output, 552,150 pounds, or 25 percent, came from the western district, while Prince William Sound produced 784,500 pounds and the Kodiak area 849,500 pounds, or 36 percent and 39 percent of the total, respectively.

Herring for bait showed a slight increase, although a shortage during the winter months made it necessary to import a supply of frozen herring from Prince Rupert.

A sharp curtailment in the production of herring meal and oil in southeast Alaska was partly offset by increases in the Prince William Sound area, but the total output of these products was considerably less than that of the preceding year. There were 17,720,922 pounds of meal and 2,406,822 gallons of oil produced in the Prince William Sound area, or about 55 percent and 53 percent, respectively, of the entire output of meal and oil in Alaska. The Kodiak area accounted for 7,190,194 pounds of meal and 1,215,370 gallons of oil, or 22 percent and 27 percent of the total, respectively, while southeast Alaska produced the remaining 7,279,394 pounds of meal and 900,921 gallons of oil, representing 23 percent and 20 percent of the total of these respective products. As in the preceding year, the figures indicate a relatively high oil content for the herring in the Kodiak area.

It was reported that the herring in the Kodiak area in 1938 arrived later than in the previous year, but finally appeared in large quantities. Most of the fishing in that district was again carried on in the vicinity of Cape Ugat and Uyak Bay.

Nineteen concerns handled herring in southeast Alaska, including 6 cold-storage plants that froze herring for bait and 8 outfits engaged solely in the production of bait herring. Five reduction plants, or 3 less than in the preceding year, were operated in the district, as follows:

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 nine plants manufactured herring oil and meal, a decrease of one from the number operated in the preceding year. Four of these plants also packed Scotch-cured herring and two produced some bloater stock. In addition, a small quantity of the Scotch-cured product was prepared in connection with salmon pickling in the Kodiak area. W. J. Imlach succeeded the Evans Bay Packing Co. as operator of the plant at Port Benny. The principal herring operators in central Alaska were as follows:

Saltery and reduction plants:

Apex Fish Co.....	Port Wakefield.
Chatham Strait Fish Co.....	Crab Bay.
Oceanic Fisheries Co., Inc.....	Port Oceanic and Port Vita.
San Juan Fishing & Packing Co.....	Port San Juan.

Reduction plants:

W. J. Imlach.....	Port Benny.
Perfection Fisheries, Inc.....	Thumb Bay.
Shepard Point Packing Co.....	Port Ashton.
Southwestern Herring, Inc.....	Iron Creek.

Production of pickled herring was reported by four plants in western Alaska, one of which was engaged primarily in the cod

fishery. The following were the principal operators in the western district:

Alaska Commercial Co.....	Unalaska.
Golovin Bay Packing Co.....	Golovin.
Hovland & Nesskaug.....	Dutch Harbor.

Studies of the life history and fluctuations in the abundance of the herring populations in Alaska were continued by Edwin H. Dahlgren and two assistants, the work being carried on in southeast Alaska and in the Prince William Sound and Kodiak areas of central Alaska.

STATISTICAL SUMMARY

There were 940 persons engaged in the herring industry in 1938, as compared with 988 in 1937. The number of plants decreased from 20 to 17. Products of the fishery were valued at \$2,053,084, a decrease of \$838,770, or 29 percent from 1937, when the total value was \$2,891,854. Scotch-cured herring increased from 2,098,040 pounds, valued at \$107,968, to 2,186,150 pounds, valued at \$130,424, or about 4 percent in quantity and about 21 percent in value. Herring for bait increased from 5,238,172 pounds, valued at \$48,816, to 6,143,768 pounds, valued at \$61,802, or 17 percent in quantity and about 27 percent in value. Meal decreased 14 percent in quantity and about 13 percent in value, and oil decreased about 19 percent in quantity and 39 percent in value.

Persons engaged, wages paid, and operating units, Alaska herring industry, 1938

Item	Southeast Alaska	Central Alaska	Western Alaska	Total
PERSONS ENGAGED				
Fishermen:				
Whites.....	247	284	3	534
Natives.....	13		3	16
Total.....	260	284	6	550
Shoremen:				
Whites.....	99	253	10	362
Natives.....		7	21	28
Total.....	99	260	31	390
Grand total.....	359	544	37	940
Wages paid shoremen.....	\$71,877	\$164,607	\$6,195	\$242,679
OPERATING UNITS				
Plants, shore.....	5	9	3	17
Vessels:				
Power, over 5 tons.....	87	86		73
Net tonnage.....	1,242	1,636		2,878
Launches.....	2		1	5
Gill net boats.....		2	4	4
Power dory.....			1	1
Seine skiffs.....	32	35		67
Other rowboats and skiffs.....	9	4		13
Apparatus:				
Purse seines.....	37	36	3	76
Fathoms.....	6,157	6,240	300	12,697
Gill nets.....			6	6
Fathoms.....			510	510
Pound seines.....	6			6
Pounds.....	9			9

Products of Alaska herring industry in 1938

Item	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Fresh, for bait.....	2,826,404	\$37,865	1,250	\$13	-----	-----	2,827,654	\$37,878
Frozen, for bait.....	3,318,114	23,924	-----	-----	-----	-----	3,318,114	23,924
Pickled, for food:	-----	-----	-----	-----	-----	-----	-----	-----
Scotch cure.....	-----	-----	1,634,000	97,927	552,150	\$32,497	2,186,150	130,424
Norwegian cure.....	-----	-----	-----	-----	192,800	5,784	192,800	5,784
Roused for food (bloater stock).....	-----	-----	281,350	6,395	155,550	6,360	416,900	12,755
Meal.....	7,279,394	132,032	24,911,116	417,582	-----	-----	32,190,510	549,614
Oil.....	16,758,908	267,021	27,166,440	1,025,684	-----	-----	43,925,348	1,292,705
Total.....	20,178,820	460,842	53,974,156	1,547,601	900,500	44,641	75,053,476	2,053,084

1 900,921 gallons.

1 3,622,192 gallons.

1 4,523,113 gallons.

HALIBUT

The voluntary control of production by the halibut fleet was continued in 1938, with some modifications from the previous program, in an effort to make it more effective in spreading the season's landings and maintaining favorable prices. This system was not entirely successful, and a concentration of landings in the spring was reflected in low price levels.

Regulations of the International Fisheries Commission increased the quotas for areas 2 and 3 by 1,000,000 pounds each. Fishing was discontinued more promptly than in the previous year, however, after the quota was reached. The season opened on April 1, and in areas 1 and 2 it closed at midnight July 29. The final date of clearance for halibut fishing in area 3 was September 29, and fishing in this area and in area 4 closed on October 29.

In addition to the sale of halibut and other fish livers for pharmaceutical purposes, the fishermen in 1938 had a market for halibut and sablefish viscera at 10 cents per pound, this material being used in experiments to determine the feasibility of extracting oils of a high vitamin content. It is understood that the yield of medicinal oil therefrom did not justify the expenditures, however, and that no further contract would be entered into for the purchase of viscera in 1939.

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 in the Gulf of Alaska in the 1937-38 season.

STATISTICAL SUMMARY

Seven hundred and twenty-five persons were employed in the Alaska halibut fishery in 1938—an increase of 28 over the number reported for the preceding year; and products, exclusive of livers and viscera, amounted to 13,556,355 pounds, valued at \$890,301. 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 and viscera, in Alaska totaled 8,296,907 pounds, valued at \$499,472, which include 26,000 pounds valued at \$2,000 landed by Canadian vessels. In 1937 the landings of the Alaska

fleet were 13,281,681 pounds, valued at \$931,629, and landings in Alaska amounted to 8,705,204 pounds, valued at \$557,911. Fares of the Alaska fleet in 1938, therefore, increased 2 percent in quantity but decreased 4 percent in value from 1937. The landings in Alaska ports in 1938 decreased about 5 percent in quantity and 10 percent in value from 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 866,000 pounds of halibut, sablefish, "lingcod," and rockfish livers, valued at about \$405,000, landed at Alaska and Pacific coast ports during 1938 by American vessels, as compared with 953,000 pounds, valued at \$449,000, landed by American vessels in 1937. The estimated amount of halibut livers landed in Alaska was 133,000 pounds, valued at \$66,500.

Halibut and sablefish viscera landed by the American fleet amounted to about 983,000 pounds, valued at \$98,000. The estimated amount landed in Alaska was 240,787 pounds, valued at \$24,079. No segregation was made according to species, but as the bulk of the product was halibut viscera, the entire amount is being included in the halibut statistics.

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, 1938

Item	Total	Item	Total
PERSONS ENGAGED		OPERATING UNITS	
Fishermen, whites	577	Vessels:	
Shoresmen:		Power, over 5 tons	110
Whites	137	Net tonnage	1,570
Natives	11	Launches	28
Total	148	Skates of lines	3,422
Grand total	725		
Wages paid shoresmen	\$22,046		

Products of the Alaska halibut fishery in 1938

Products	Pounds	Value
Fresh (including local)	6,794,439	\$429,448
Frozen	6,761,916	460,853
Livers ¹	133,000	66,500
Viscera ²	240,787	24,079
Total	13,930,142	980,880

¹ The amount of livers landed by the Alaska fleet was not segregated; the quantity shown herein is the estimated amount landed in Alaska.

² The total includes some sablefish viscera, the amount and value of which it was impossible to segregate.

COD

Operations in the cod industry were on about the same scale as in other recent years in the Shumagin Islands region and in the vicinity of Unalaska. Twenty-six whites and two natives were reported engaged in the fishery from shore stations, including men aboard the

motor vessels *Gloria West* (59 tons) and *Sitka* (50 tons), each of which made an expedition to the westward, the latter for the purpose of experimenting with an otter trawl for the taking of cod. Products amounted to 281,138 pounds of dry-salted cod, valued at \$15,218; 6,678 pounds of stockfish, valued at \$878; and 725 pounds of tongues, valued at \$85—a total of 288,541 pounds, valued at \$16,181, as compared with 203,327 pounds, valued at \$10,338, in 1937.

Three sailing vessels comprised 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. Of these vessels, the *Wawona* (413 tons) was operated by the Robinson Fisheries Co., and the *Sophie Christenson* (570 tons) and *Charles R. Wilson* (328 tons) were operated by the Pacific Coast Codfish Co. The Union Fish Co. did not send any boats north this year.

Products of the offshore fishery were 3,065,450 pounds of dry-salted cod, valued at \$129,572, and 14,325 pounds of tongues, valued at \$1,340—a total of 3,079,775 pounds, valued at \$130,912, as compared with 3,795,923 pounds, valued at \$188,611 in 1937. The offshore fishery employed 104 persons, or 61 less than in the previous year.

WHALES

The American Pacific Whaling Co. operated only its Akutan station in Alaska during 1938, its other station at Port Hobron, Kodiak Island, standing idle. Of the 136 persons employed during the season, 125 were whites and 11 natives.

There were 5 steam whalers operated, or 1 less than the combined number for the two plants in the preceding year, and 173 whales were taken, consisting of 65 finback, 12 humpback, 33 sulphur bottom, and 63 sperm whales.

Operations in this industry continued to be controlled by the International Whaling Act and regulations issued thereunder. The regulations of October 9, 1936, were superseded by revised joint regulations of the Secretary of the Treasury and the Secretary of Commerce approved by the President on May 18, 1938. These regulations were again modified in December 1938, giving effect to a supplementary agreement drafted on June 8, 1937, at the International Whaling Conference in London. An important provision of the new agreement was the raising of the minimum-length limit of certain species that may be lawfully taken.

An officer of the Coast Guard was assigned to duty at the Akutan station during the season to enforce the provisions of the Whaling Treaty Act and the regulations. Statistical and biological data were collected by the Bureau and forwarded through the State Department to the International Bureau for Whaling Statistics, Oslo, Norway.

Whale products in 1938 amounted to 304,800 gallons of body oil, valued at \$103,657; 181,900 gallons of sperm oil, valued at \$54,570; 396 tons of meal from meat, valued at \$15,796; and 216 tons of bone meal, valued at \$5,618—a total value of \$179,641, as compared with \$479,121 in 1937.

CLAMS

The canning of clams in Alaska in 1938 was centered, as before, in Cordova and vicinity. Notwithstanding the fact that the clam fishery regulations had been modified to permit the taking of an additional 160,000 pounds of razor clams, or a total of 1,200,000 pounds including shells, in the Prince William Sound, Copper River, and Bering River areas during the first 6 months of the year, this limit was reached earlier than in 1937 and the spring season closed on April 23. No change was made in the fall quota of 280,000 pounds, but only limited operations were conducted after activities were resumed on August 16, and the quota was not reached. The total output from this district, therefore, was somewhat less than that of the previous year.

An analysis of the catch in the above-mentioned district indicated that at least 98 percent of the clams were mature, the majority running from 7-9 years of age, with 8-year-olds predominating. The Bureau's conservation policy has played an important part in restoring the clam beds to a good condition, and it now appears that the area can provide a larger annual pack if digging is extended to outlying grounds. Modified regulations for the ensuing year, therefore, will place a limitation on the output of certain well-known beds and will increase the limitation on the pack for the district as a whole.

Eleven operators, as follows, engaged in the canning of clams in Cordova and vicinity, this activity in some cases being incidental to the canning of salmon or of crab meat: Arctic Sanitary Packing Co., Blue Sea Packing Co., Buck Canning Co., W. R. Gilbert Co., Inc., Gulf Packing Co., E. A. Haltness, Hawkins Island Packing Co., Pioneer Canneries, Inc., Scotty's Packing Co., Sheep Bay Packing Co., and S. E. Smith Packing Co. Other operators in central Alaska were the Enterprise Sea Food Co., at Ninilchik, and the Sandvik Hand Cannery, at Uganik. The Sheep Bay Packing Co. and the Sandvik Hand Cannery packed butter clams; all other production reported for central Alaska consisted of razor clams.

In southeast Alaska the plant of the Nickey Packing Co., in Tongass Narrows, prepared a limited pack of butter clams, and the Pacific American Fisheries, Inc., diverted its salmon cannery at Kasaan to clam-packing operations, the raw product for this purpose being imported from the razor clam beds at Massett, B. C.

A small production of razor clams was prepared also at Izembeck Bay, on the north shore of the Alaska Peninsula, by the Pacific Fisheries & Trading Co., in conjunction with its crab-canning activities.

There were 584 persons employed, of whom 477 were whites, 95 natives, 11 Filipinos, and 1 Japanese. The total production amounted to 40,870 cases containing 1,029,588 pounds (1,015,332 pounds of razor clams and 14,256 pounds of butter clams), valued at \$252,774. This is an increase of 26 percent in quantity and 5 percent in value over the output for 1937, when clam products amounted to 816,942 pounds valued at \$240,392.

Products of Alaska clam industry in 1938

Item	Cases	Pounds	Value
RAZOR CLAMS			
Minced:			
½-pound cans (48 to case).....	1 34, 592	830, 208	\$204, 830
10-ounce cans (48 to case).....	4, 457	133, 710	32, 491
1-pound cans (48 to case).....	119	5, 712	1, 189
Whole:			
10-ounce cans (48 to case).....	1, 126	33, 780	9, 765
1-pound cans (48 to case).....	234	11, 232	2, 556
20-ounce cans (24 to case).....	23	690	161
Total, razor clams.....	40, 551	1, 015, 332	250, 992
BUTTER CLAMS			
Minced:			
½-pound cans (48 to case).....	12	288	72
Whole:			
½-pound cans (48 to case).....	32	768	110
1-pound cans (48 to case).....	250	12, 000	1, 500
Juice:			
1-pound cans (48 to case).....	25	1, 200	100
Total, butter clams.....	319	14, 256	1, 782
Grand total.....	40, 870	1, 029, 588	252, 774

¹ Of this number, 9,615 cases, valued at \$57,690, were packed from clams obtained from Massett, B. C.

SHRIMP

Two plants in southeast Alaska were engaged primarily in the shrimp business: Alaskan Glacier Sea Food Co., at Petersburg, and Reliance Shrimp Co., at Wrangell. Cold-packed shrimp were also produced at the crab cannery of Dean C. Kayler, at Petersburg, which cannery was erected during the winter to replace that of Kayler-Otness, Inc., destroyed by fire in November 1937. A small production of shrimp was reported also by the Alaskan Glacier Sea Food Co., at Cordova, in conjunction with its crab-canning operations.

There were 141 persons engaged in the industry, of whom 27 were whites, 84 natives, 16 Japanese, 9 Filipinos, and 5 Mexicans. Products consisted of 431,900 pounds of cold-packed shrimp meat, valued at \$167,086; 3,211 pounds of frozen shrimp meat, valued at \$1,284; and 690 pounds of fresh shrimp in shell, valued at \$104—a total of 435,801 pounds, valued at \$168,474. Comparable figures for 1937 show a production of 463,385 pounds, valued at \$164,933.

CRABS

During the year 1938, four plants in southeast Alaska and seven in the central district were engaged in the crab fishery. The A R B Packing Co. continued to operate as a separate unit its crab plant at Wrangell, which had formerly belonged to the Boardway Canning Co. Other plants in southeast Alaska were those of Dean C. Kayler, at Petersburg, and the Salt Sea Fisheries, at Tenakee, each of which was built to replace one destroyed by fire in the fall of 1937, and the plant of Oscar H. Wood, at Hoonah.

In addition to the operations carried on at its Cordova plant, the Alaskan Glacier Sea Food Co. packed crab meat at a newly equipped branch plant on Bering River. Engaged in the crab industry in the Cordova region also were the Gulf Packing Co., which packed both clams and salmon; the S. E. Smith Packing Co., primarily a clam cannery; and the Sheep Bay Packing Co.

The canning of king crabs was again carried on by the King Crab Co., at Seldovia. A limited pack of this species was prepared also by the Pacific Fisheries & Trading Co. aboard its floating plant *Tondeleyo*, which prospected for crabs in the Kodiak area and to the westward along the Alaska Peninsula.

The bulk of the season's output was canned, less than 10 percent of the total volume of crab products being made up of cold-packed meat and whole crabs in the shell.

There were 420 persons engaged in the industry, of whom 332 were whites, 61 natives, 26 Filipinos, and 1 Mexican. Products consisted of 448,761 pounds of canned crab meat (3,866 cases of 6½-ounce cans, 12,092 cases of ½-pound cans, 296 cases of 13-ounce cans, and 749 cases of 1-pound cans, 48 to the case; 224 cases of 1-pound cans, 90 to the case; and 517 cases of 20-ounce cans, 24 to the case), valued at \$169,480; 2,765 pounds of cold-packed meat, valued at \$1,134; 225 pounds of crab meat in bulk, sold locally, valued at \$90; and 1,029 dozen whole crabs in the shell, valued at \$1,934. Except for 24,312 pounds of king crab (1,013 cases of ½-pound cans), valued at \$9,747, the entire production was of Dungeness crab. The total output of crab products in 1938 was 483,276 pounds, valued at \$172,638, as compared with 711,318 pounds valued at \$276,099 in 1937, a decrease of 32 percent in quantity and 37 percent in value.

Products of the Alaska crab industry in 1938

Product	Southeast Alaska			Central Alaska			Total		
	Number	Pounds	Value	Number	Pounds	Value	Number	Pounds	Value
DUNGENESS CRABS									
Canned:				3,866	75,387	\$34,794	3,866	75,387	\$34,794
6½-ounce cans (48 to case) cases				5,766	138,384	47,314	11,079	265,896	95,131
½-pound cans (48 to case) cases	5,313	127,512	\$47,817	296	11,544	5,337	296	11,544	5,337
13-ounce cans (48 to case) cases				749	35,982	12,030	749	35,952	12,030
1-pound cans (48 to case) cases				224	20,160	8,047	224	20,160	8,047
1-pound cans (24 to case) cases				517	15,510	4,394	517	15,510	4,394
20-ounce cans (24 to case) cases	553	2,765	1,134				553	2,765	1,134
Cold-packed meat: 5-pound cans				225	225	90	225	225	90
Crab meat in bulk				457	15,660	944	1,029	31,525	1,934
Whole in shell									
Total, Dungeness crabs		146,142	49,941		312,822	112,950		458,964	162,891
KING CRABS									
Canned: ½-pound cans (48 to case) cases	60	1,440	450	953	22,872	9,297	1,013	24,312	9,747
Grand total		147,582	50,391		335,694	122,247		483,276	172,638

TROUT

The commercial production of Dolly Varden and steelhead trout in the Territory is small and, for the most part, incidental to other branches of the fisheries in southeast Alaska. During the 1938 season, however, 2 white fishermen in the central district were engaged in the industry. The total products were as follows: Dolly Vardens, 52,128 pounds fresh, valued at \$4,712, and 20,395 pounds frozen, valued at \$1,926; steelheads, 334 pounds fresh, valued at \$17, and 5,875 pounds frozen, valued at \$236.

MISCELLANEOUS FISHERY PRODUCTS

Fish of minor commercial importance are taken in limited 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 1938 were as follows: Sablefish, 776,825 pounds frozen, valued at \$23,499; 100,364 pounds pickled, valued at \$4,167, and 32,045 pounds of livers, valued at \$11,216; rockfish, 4,376 pounds frozen, valued at \$90, flounders, 150,000 pounds fresh, valued at \$3,750, and 82,145 pounds frozen, valued at \$3,300; "lingcod", 610 pounds fresh, valued at \$10; and "lingcod" and rockfish livers, 1,544 pounds, valued at \$618.

FUR-SEAL INDUSTRY**PRIBILOF ISLANDS****GENERAL ADMINISTRATIVE WORK**

In 1938, 58,364 fur-seal skins were taken at the Pribilof Islands, an increase of 3,184 over the numbers taken in the preceding year. Of the skins obtained on St. Paul Island, 43,867 were removed from the animals by the stripping process and blubbered before curing. The remaining 2,215 skins from that island and the entire take of 12,282 skins from St. George Island were removed by the skinning process.

Delivery was made at Seattle to a representative of the Canadian Government of 8,755 sealskins, representing 15 percent of the season's take selected proportionately from the different sizes and grades, in accordance with provisions of the treaty of July 7, 1911. The remaining 49,609 skins were forwarded to the Fouke Fur Co. at St. Louis, Mo., for processing and sale at public auction. From the proceeds of sale of these skins, payment will be made to Japan of its share of 15 percent of the season's take, due under the fur-seal treaty.

The byproducts plant at St. Paul Island produced 30,587 gallons of oil and 178½ tons of meal from fur-seal carcasses and blubber. Except for small quantities retained at the Pribilof Islands for use as fox feed, these products were shipped to Seattle, where the oil was sold by competitive bidding and the meal was transferred to the Division of Fish Culture for feeding fish in hatcheries throughout the country.

In the 1938-39 season there were taken on the Pribilof Islands 1,029 fox pelts, consisting of 219 blue and 5 white pelts from St. Paul Island and 799 blue and 6 white pelts from St. George Island.

Sealing and foxing operations were carried on by Pribilof natives under the direction of the Bureau's staff. Approximately 80 additional natives from the mainland and Aleutian Islands were employed to assist with fur-seal activities during the summer.

On St. George Island three new cottages and a warehouse were built and concrete foundations were laid for a bunkhouse and for a small shed. Construction of a new machine shop was started on St. Paul Island. Sections of road on both islands were repaired or resurfaced, and improved roads were extended on St. George Island. Additional buildings, including a powerhouse and four overnight



FIGURE 3.—St. Paul Village, St. Paul Island, Alaska.



FIGURE 4.—Bidarrah unloading supplies from the Bureau of Fisheries vessel *Penguin* at St. George Island, Alaska.

cabins, were erected at the substation for sea-otter patrol in the western Aleutians.

During the northward migration of the fur seals and while the animals remained in Bering Sea waters, a patrol was maintained by Coast Guard vessels, which also rendered other assistance in the Bureau's work. The Navy Department detailed the U. S. S. *Vega* to carry the annual shipment of supplies from Seattle to the Pribilof Islands and to bring out the season's take of sealskins.

TRANSPORTATION OF SUPPLIES

The U. S. S. *Vega*, of the Navy, sailed from Seattle on July 29 with the annual shipment of supplies for the Pribilof Islands, which aggregated 1,290 tons of general freight, 252,181 board feet of lumber and 540 bundles of shingles for St. Paul Island and 784 tons of freight, 115,427 board feet of lumber and 500 bundles of shingles for St. George Island, a total of 2,074 tons of freight, 367,608 board feet of lumber, and 1,040 bundles of shingles. The vessel arrived at the Islands on August 6.

On the return trip to Seattle, covering the period from August 17 to August 25, the vessel brought out 58,364 sealskins, 168 tons of seal meal, 40 barrels of blubber, 217 empty steel drums, and miscellaneous freight.

Additional supplies for the Pribilof Islands were shipped during the year on the *Penguin*.

POWER VESSEL "PENGUIN"

Five round trips between Seattle and the Pribilof Islands were made by the *Penguin* in 1938, carrying passengers and supplies. In addition, the vessel performed interisland service and made trips to settlements along the Alaska Peninsula and the Aleutian Islands to transport native laborers hired for fur-seal work at the Pribilofs during the summer. Two trips were made to the western Aleutians—one in July and one in September—in connection with the sea-otter patrol. The July trip covered a period of approximately 3 weeks, during part of which time the ship's crew assisted with the construction of a powerhouse and the installation of a power plant and other equipment at the station on Amchitka Island. On the September trip to the westward, freight for the Navy Aerological Station at Kanaga was delivered en route.

A full cargo of freight, chiefly perishable foodstuffs, was carried on each trip from Seattle, and outgoing shipments from the islands included the 1937-38 take of foxskins, transported to Seattle in March, and the fur-seal oil produced at the byproducts plant on St. Paul Island, which was brought out in September and November.

The northbound voyages of the *Penguin* were as follows: Feb. 19-Mar. 11; May 2-14; June 11-24; Aug. 23-Sept. 5; and Oct. 15-30. Southbound voyages covered the following periods: Mar. 16-29; May 22-June 1; Aug. 3-14; Sept. 23-Oct. 5; and Nov. 2-14. On these voyages transportation was furnished to 76 passengers for the Bureau, including 23 employees of the Fouke Fur Co. who assisted with the season's sealing activities at the islands, and 3 persons connected with the Bureau's salmon patrol and investigations in Alaska. The vessel also transported 21 passengers for the Navy,

5 for the Office of Indian Affairs, 2 for the Coast Guard, 1 for the Bureau of Lighthouses, and 20 unofficial travelers.

The *Penguin* cruised 29,608 nautical miles during the year.

ROADS

St. Paul Island.—No new road work was undertaken on St. Paul Island during the year. About 1½ miles of the Northeast Point plank road around Big Lake was torn up and replaced with a fill of scoria. The Zapadni road was widened for a distance of approximately 800 feet. All other roads were dragged, and where necessary, resurfaced.

St. George Island.—The Staraya Artil road was extended approximately 2,000 feet, to the lake at the foot of the rookery. The Zapadni road was extended about 3,500 feet to a suitable killing ground near the rookery. About 4,000 feet of the Zapadni plank road was torn up and replaced with scoria.

BUILDINGS

St. Paul Island.—Construction of a new machine shop was started on St. Paul Island. When fully completed, this building will house all machinery and tools required in a first-class repair shop. There will also be a room for painting, another for overhauling cars, and another for stores. No other major construction work was undertaken on this island.

St. George Island.—Three additional 3-room frame cottages for natives were constructed this season. A warehouse, 20 by 50 feet, was built at Zapadni. This will permit unloading the *Penguin* during the fall and winter months, when prevailing winds often make the village landing unfavorable for long periods. Concrete foundations were poured for a new bunkhouse for Aleutian workmen and for a small shed to house the hoist used for unloading cargo at the village dock. Considerable repair work on native houses, including reshingling, was undertaken throughout the year.

BYPRODUCTS PLANT

The byproducts plant on St. Paul Island was in operation from June 20 to August 3, rendering oil and meal from 31,805 seal carcasses and 7,085 cubic feet, or about 368,420 pounds, of blubber. Total production for the season amounted to 471 barrels, or 24,252 gallons, of No. 1 oil; 115½ barrels, or 6,335 gallons, of No. 2 oil; and 357,222 pounds of meal. The foregoing quantities in gallons represent averages of 51.49 gallons per barrel of No. 1 oil and 54.85 gallons per barrel of No. 2 oil, as determined from the products sold by weight upon the basis of 7½ pounds to the gallon.

In August the supply vessel *Vega* brought to Seattle 336,612 pounds of meal, which was turned over to the Division of Fish Culture for use in fish hatcheries throughout the country. The season's output of seal oil was shipped to Seattle on the *Penguin*—400 barrels on the September voyage, and the remaining 173 barrels in November. As in the past, small quantities of oil and meal were retained at the Pribilof Islands for use as fox feed.

In November, 23,944 gallons of No. 1 fur-seal oil and 5,869.33 gallons of No. 2 oil were sold at Seattle by competitive bidding for \$4,149.19. The No. 1 oil brought 15 cents a gallon and the No. 2 oil 9½ cents a gallon, or decreases of 25 percent and 37 percent, respectively, from the prices obtained for similar grades of oil in 1937. One additional barrel of No. 1 oil, containing 51.49 gallons, was sold to a New York firm at the rate of 15 cents a gallon, for use in experimental processing of sealskins. The total gross receipts for fur-seal oil produced in 1938, therefore, were \$4,156.91.

NATIVES

CENSUS

On December 31, 1938, the total native population of St. Paul Island was 265, including 12 persons who were temporarily absent from the island. There were seven births and one death during the year. Three natives left the island and settled in Unalaska and one native became a permanent resident on St. George Island.

The census on St. George Island on December 31, 1938, showed a population of 169 natives, including one who moved there from St. Paul Island. There were six births and one death during the year.

The total native population of both islands at the end of 1938 was 434; an increase of eight over the census of the previous year.

MEDICAL SERVICE

The customary medical services and facilities were available to Government employees and the natives. One physician was stationed at St. Paul Island and another at St. George Island throughout the year. The general health of the natives was good, and sanitary conditions in the villages were satisfactory.

For the first time in several years a dentist was employed at the islands. He arrived at St. Paul Island on March 12, and during the remainder of the year a great deal of dental work was accomplished there and on St. George Island. Much remained to be done, however, as the teeth of the natives were in very poor condition, and the services of the dentist were continued for an indefinite period.

SCHOOLS

Schools for the native children are maintained by the Bureau on St. Paul and St. George Islands, and all children between the ages of 6 and 16 years are required to attend. Two teachers are employed on each island. Instruction is confined to elementary branches, including some manual training and home economics.

The 1937-38 school year began on September 20, 1937, on St. Paul Island and closed on May 6, 1938. School opened on September 13, 1937, on St. George Island and closed on May 13, 1938.

On St. Paul Island there were 12 girls and 26 boys enrolled in the junior school, and 18 girls and 14 boys in the senior school, a total enrollment of 70. On St. George Island 11 girls and 8 boys were in the junior school and 11 girls and 9 boys in the senior school, a total of 39 pupils.

SAVINGS ACCOUNTS

A number of the Pribilof Islands natives have savings accounts in the bank of the Washington Loan & Trust Co., Washington, D. C., on which they receive interest compounded semiannually at the rate of 2 percent. The Commissioner of Fisheries, as trustee, had custody during the year of these funds. There follows a summary of the trust account for the year 1938:

On hand Jan. 1, 1938.....	\$4,202.04
Interest earned from Jan. 1 to Dec. 31, 1938.....	79.49
Total.....	4,281.53
Withdrawn by natives.....	430.97
On hand Dec. 31, 1938.....	3,850.56

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, December 31, 1938

Kochutin, Alexandra.....	\$1,391.09	Mercurief, Elizabeth.....	\$74.84
Kozloff, Marina.....	139.85	Mercurief, Erena.....	527.51
Lekanof, Tatiana (Mercurief).....	461.45	Mercurief, George.....	114.07
Lestenkof, Michael.....	442.86	Pankoff, Agrippina.....	214.53
Mercurief, Alexandra.....	50.05		
Mercurief, Daniel.....	434.31	Total.....	3,850.56

PAYMENTS FOR TAKING FUR-SEAL SKINS

Natives of the Pribilof Islands are paid for their work in taking sealskins at specified rates per skin. The sealers on each island are divided into classes according to their skill and ability, and the collective earnings are apportioned among them, each worker in a given class receiving an equal share. Small bonuses are paid for special services.

On St. Paul Island the payments to natives in 1938 were at the rate of 60 cents per skin for the 46,082 sealskins taken, or a total of \$27,649.20, and in addition \$180 was paid to 2 foremen and 4 mess attendants.

Natives on St. George Island were paid at the rate of 75 cents per skin, the total in 1938 amounting to \$9,211.50 for the 12,282 sealskins taken, and an additional \$100 was paid to two native foremen.

Details of these payments are shown in the following table:

Payments to Pribilof Islands natives for taking fur-seal skins, calendar year 1938

Classification	St. Paul Island			St. George Island		
	Number of men	Share of each	Total	Number of men	Share of each	Total
First class.....	35	\$500.40	\$17,514.00	33	\$213.75	\$7,053.75
Second class.....	11	400.80	4,408.80	8	155.25	1,242.00
Third class.....	11	270.00	2,970.00	5	105.75	528.75
Fourth class.....	11	207.60	2,283.60	3	80.25	240.75
Fifth class.....	5	74.40	372.00	2	57.00	114.00
Boys' class.....	3	33.60	100.80	1	32.25	32.25
Foreman (additional compensation).....			60.00			55.00
Do.....			40.00			45.00
Mess attendants, 4.....			80.00			
Total.....	76		27,829.20	52		9,311.60

PAYMENTS FOR TAKING FOX SKINS

For taking fox skins on the Pribilof Islands in the 1937-38 season the natives were paid at the rate of \$5 per skin. The payments amounted to \$1,230 for the 246 fox skins taken on St. Paul Island and \$3,085 for the 617 skins taken on St. George Island, a total of \$4,315.

FUR SEALS

KILLINGS

In 1938, 58,364 fur seals were killed, of which 46,082 were taken on St. Paul Island and 12,282 on St. George Island. Details in regard to the killings are shown in the following tabulations:

Seal killings on Pribilof Islands in 1938

ST. PAUL ISLAND

Date	Serial number of drive	Hauling ground	Skins secured
June 6	1	Reef.....	82
13	2	do.....	275
19	3	Zapadni.....	127
20	4	Reef and Gorbatch.....	631
21	5	Polovina and Half Way.....	109
22	6	Vostochni and Morjovi.....	521
23	7	Zapadni.....	104
24	8	Tolstoi, Lukanin, and Kitovi.....	349
25	9	Reef and Gorbatch.....	897
26	10	Polovina and Half Way.....	78
27	11	Vostochni and Morjovi.....	949
28	12	Zapadni.....	642
29	13	Tolstoi, Lukanin, and Kitovi.....	324
30	14	Reef and Gorbatch.....	1,370
July 1	15	Polovina and Half Way.....	284
2	16	Vostochni and Morjovi.....	1,510
3	17	Zapadni.....	762
4	18	Tolstoi, Lukanin, and Kitovi.....	905
5	19	Reef and Gorbatch.....	1,833
6	20	Polovina and Half Way.....	341
7	21	Vostochni and Morjovi.....	1,871
8	22	Zapadni.....	2,019
9	23	Tolstoi, Lukanin, and Kitovi.....	682
10	24	Reef and Gorbatch.....	1,923
11	25	Polovina and Half Way.....	971
12	26	Vostochni and Morjovi.....	2,533
13	27	Zapadni.....	2,213
14	28	Tolstoi, Lukanin, and Kitovi.....	566
15	29	Reef and Gorbatch.....	1,852
16	30	Polovina and Half Way.....	882
17	31	Vostochni and Morjovi.....	2,342
18	32	Zapadni.....	974
19	33	Tolstoi, Lukanin, and Kitovi.....	732
20	34	Reef and Gorbatch.....	2,242
21	35	Polovina and Half Way.....	722
22	36	Vostochni and Morjovi.....	2,030
23	37	Zapadni.....	1,203
24	38	Tolstoi, Lukanin, and Kitovi.....	799
25	39	Reef and Gorbatch.....	1,625
26	40	Polovina and Half Way.....	649
27	41	Vostochni and Morjovi.....	1,478
28	42	Zapadni.....	788
29	43	Tolstoi, Lukanin, and Kitovi.....	687
30	44	Reef and Gorbatch.....	821
31	45	Polovina and Half Way.....	896
Aug. 1	46	Vostochni and Morjovi.....	829
		Total.....	46,082

Seal killings on Pribilof Islands in 1938—Continued

ST. GEORGE ISLAND

Date	Serial number of drive	Hauling ground	Skins secured
June 11	1	North.....	52
14	2	Zapadni.....	49
16	3	North and East.....	133
20	4	Zapadni.....	38
21	5	North and Staraya Artil.....	74
23	6	East.....	124
24	7	Zapadni.....	74
25	8	North and Staraya Artil.....	249
27	9	East.....	179
28	10	Zapadni and South.....	210
29	11	North and Staraya Artil.....	307
July 1	12	East.....	246
2	13	Zapadni.....	278
3	14	North and Staraya Artil.....	479
5	15	East.....	410
6	16	Zapadni.....	137
7	17	North and Staraya Artil.....	476
9	18	East.....	458
10	19	Zapadni.....	148
11	20	North and Staraya Artil.....	908
13	21	East.....	688
14	22	Zapadni.....	235
15	23	North and Staraya Artil.....	805
17	24	East.....	620
18	25	Zapadni.....	378
19	26	North and Staraya Artil.....	783
21	27	East.....	544
22	28	Zapadni.....	171
23	29	North and Staraya Artil.....	669
25	30	East.....	567
26	31	Zapadni.....	101
27	32	North and Staraya Artil.....	521
28	33	East.....	320
29	34	Zapadni.....	44
30	35	East and Staraya Artil.....	807
		Total.....	12,282

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	Age	Length
Yearlings.....	<i>Inches</i> Up to 36.75	4-year-olds.....	<i>Inches</i> 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 1938

(On basis of classification shown in preceding table)

Age	St. Paul Island	St. George Island	Total
Yearling males.....	13		13
2-year-old males.....	1,431	225	1,656
3-year-old males.....	42,884	11,276	54,140
4-year-old males.....	1,642	712	2,354
5-year-old males.....	2		2
Cows ¹	130	69	199
Total.....	46,082	12,282	58,364

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 1938 were confined to 3-year-old males.

COMPUTATION OF FUR-SEAL HERD

The computation of the fur-seal herd in 1938 was made by Supt. H. J. Christoffers. As of August 10 the total of all classes was 1,872,438—a numerical increase of 33,319 over the figures for the preceding year. The detailed report will be found on pages 161 to 168 of this document. The following is a comparative statement of the numerical strength of the various elements of the fur-seal herd in the years 1927 to 1938, inclusive.

General comparison of computations of the seal herd on the Pribilof Islands, 1927 to 1938

Classes	1927	1928	1929	1930	1931	1932
Harem bulls.....	4,643	6,050	7,187	8,312	9,233	10,088
Breeding cows.....	263,566	284,725	307,491	332,084	358,642	387,320
Surplus bulls.....	4,827	5,285	5,207	3,983	3,201	2,893
Idle bulls.....	972	1,449	1,633	1,809	1,888	2,349
6-year-old males.....	13,450	12,857	10,399	5,012	6,553	8,154
5-year-old males.....	16,073	13,001	7,016	11,327	12,966	11,351
4-year-old males.....	14,448	7,798	9,102	14,871	13,198	17,849
3-year-old males.....	9,730	11,133	13,639	60,674	74,828	81,101
2-year-old males.....	41,252	49,087	64,354	92,232	99,612	107,592
Yearling males.....	61,026	65,861	85,381	72,605	78,410	84,682
2-year-old cows.....	48,186	57,061	67,210	92,247	99,626	107,593
Yearling cows.....	67,131	72,481	85,417	332,084	358,642	387,320
Pups.....	263,566	284,725	307,491			
Total.....	808,870	871,513	971,527	1,045,101	1,127,082	1,219,961

Classes	1933	1934	1935	1936	1937	1938
Harem bulls.....	10,213	10,770	11,547	12,321	13,100	13,160
Breeding cows.....	418,299	451,751	487,883	526,848	568,982	614,499
Surplus bulls.....	4,700	6,494	6,130	7,994	9,140	7,277
Idle bulls.....	2,341	2,282	2,535	2,733	3,031	2,125
6-year-old males.....	9,335	8,173	11,117	11,421	15,188	17,269
5-year-old males.....	10,216	13,897	14,276	18,985	21,586	18,201
4-year-old males.....	15,441	15,862	21,096	23,991	33,815	24,275
3-year-old males.....	18,216	24,770	28,165	40,170	45,891	32,278
2-year-old males.....	87,662	94,920	102,555	110,505	118,889	107,003
Yearling males.....	116,195	125,490	135,525	146,365	158,051	142,232
2-year-old cows.....	91,454	98,768	106,066	115,197	124,410	123,150
Yearling cows.....	116,197	125,490	135,526	146,365	158,054	156,470
Pups.....	418,299	451,751	487,883	526,848	568,992	614,499
Total.....	1,318,568	1,430,418	1,550,913	1,689,743	1,839,119	1,872,438

FOXES

Herds of blue foxes are maintained on St. Paul and St. George Islands which yield several hundred pelts annually. The foxes require very little care, roaming the islands at large and obtaining their food during most of the year from birds, birds' eggs, and marine life along the beaches. In the winter, when the natural supply of food is inadequate, the foxes are fed prepared rations, consisting chiefly of cereals, salted seal meat, and seal oil. During December and January the animals are trapped for their pelts or for marking and releasing as a breeding reserve.

TRAPPING SEASON OF 1938-39

In the 1938-39 season there were 1,029 fox pelts taken, of which 1,018 were blue and 11 white. Two hundred and nineteen blue and 5 white pelts were taken on St. Paul Island and 799 blue and 6 white pelts on St. George Island.

There were trapped, marked, and released for breeding stock, 53 male and 44 female foxes on St. Paul Island and 38 males and 49 females on St. George Island. The breeding reserve includes also a considerable number of animals that were not captured during the season.

REINDEER

St. Paul Island.—The estimated number of reindeer in the herd on St. Paul Island on September 30, 1938, was 1,943, of which it was estimated that 430 were the young of the season. During the year 103 animals were killed for food. Of this number, 24 were used at the Bureau mess, 50 at the Aleutian mess, 25 by St. Paul Island natives, 6 were transferred to St. George Island, and 4 were not fit for food. The herd was apparently in good condition.

St. George Island.—A count of the reindeer in the herd on St. George Island on September 30, 1938, showed 38 animals, of which 8 were fawns. No reindeer on this island were killed for food during the year.

FUR-SEAL SKINS

SHIPMENTS

Seven hundred and seventy barrels containing 58,364 fur-seal skins taken on the Pribilof Islands in 1938 were shipped on the U. S. S. *Vega* and arrived at Seattle on August 25. Forty barrels of blubber, having a gross weight of 19,838 pounds, also were brought out on the *Vega* and delivered to the Fouke Fur Co., f. o. b. Seattle, for use in the tanning of sealskins.

Delivery of 8,755 sealskins, packed in 114 barrels, was made to a representative of the Canadian Government at Seattle on August 26, in accordance with provisions of the fur-seal treaty. The remaining 49,609 skins were forwarded by freight to the Fouke Fur Co. at St. Louis, Mo., and arrived there on September 3.

SALES

Two public-auction sales of fur-seal skins taken on the Pribilof Islands were held in St. Louis in 1938—on May 2 and October 10, respectively—at which there were sold a total of 44,239 skins for a gross sum of \$941,916. During the year, also, 992 sealskins taken on the Pribilof Islands were disposed of at private sales, under special authorization of the Secretary of Commerce, for a total of \$22,241.68. 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.

May 2, 1938.—On May 2, 1938, 19,949 Pribilof Islands fur-seal skins, dressed, dyed, and machined, were sold for \$432,622.25. These skins consisted of 7,100 dyed black and 12,849 dyed safari brown.

October 10, 1938.—At the sale on October 10, 24,290 Pribilof Islands fur-seal skins were sold for \$509,293.75. Of these, 24,244 dressed, dyed, and machined, brought \$509,242.75, and 46 raw and partly processed skins brought \$51. In addition, 3 confiscated fur-seal skins were sold raw for \$1.50, making a total of \$509,295.25 for fur-seal skins at this sale.

Special sales.—During the year, 992 Pribilof Islands fur-seal skins were sold under special authorization by the Department for advertising and promotional purposes, the gross sales amounting to \$22,241.68. Of these skins, 563 dyed safari brown brought \$11,617.88; 426 dyed black, \$10,598.29; and 3 raw and partly processed skins, \$25.51.

Further details in regard to the sales of sealskins by the Department of Commerce for the account of the Government in 1938 are given in the following tables:

Comparative values by sizes and grades, with percentages of each size, of Pribilof sealskins sold at public auction in 1938

Classes and sales	Grade	Number	High	Low	Average	Total	Total number	Average price	Total amount	Percentage
DYED BLACK										
Extra large:										
May 2.....	I and II.....	160	\$32.25	\$30.50	\$31.26	\$5,001.25	346	\$26.51	\$9,173.25	4.87
	Scarred, faulty, etc.....	186	24.00	22.00	22.43	4,172.00				
Oct. 10.....	I and II.....	146	29.00	26.50	28.16	4,112.00	304	25.54	7,765.00	3.12
	Scarred, faulty, etc.....	153	23.50	21.00	23.12	3,653.00				
Large:										
May 2.....	I and II.....	1,435	32.00	29.00	30.32	43,505.00	2,833	25.65	72,674.50	39.90
	Scarred, faulty, etc.....	1,398	23.50	19.00	20.87	29,169.50				
Oct. 10.....	I and II.....	1,812	26.75	24.50	25.61	46,227.25	3,394	23.79	80,737.75	34.80
	Scarred, faulty, etc.....	1,563	22.75	20.00	21.97	34,345.50				
	III.....	19	9.00	8.00	8.68	165.00				
Medium:										
May 2.....	I and II.....	1,840	24.00	20.00	22.41	41,240.00	3,683	20.24	74,555.50	51.88
	Scarred, faulty, etc.....	1,843	19.00	17.00	18.08	33,315.50				
Oct. 10.....	I and II.....	2,757	24.00	20.00	22.18	61,157.00	5,605	20.28	113,679.75	57.46
	Scarred, faulty, etc.....	2,780	20.25	17.00	18.69	51,944.75				
	III.....	68	9.00	8.00	8.50	578.00				
Small medium:										
May 2.....	I and II.....	135	18.00	17.50	17.74	2,395.00	238	16.47	3,920.50	3.35
	Scarred, faulty, etc.....	103	15.00	14.50	14.81	1,525.50				
Oct. 10.....	I and II.....	213	19.25	16.50	18.51	3,942.00	451	16.49	7,436.00	4.62
	Scarred, faulty, etc.....	227	15.50	14.00	14.99	3,403.00				
	III.....	11	9.00	8.00	8.27	91.00				
All classes:										
May 2.....							7,100	22.68	160,323.75	100.00
Oct. 10.....							9,754	21.49	209,618.50	100.00
DYED SAFARI BROWN										
Extra extra large:										
Oct. 10.....	I and II.....	6	28.50	28.50	28.50	171.00	12	25.50	306.00	.08
	Scarred, faulty, etc.....	6	22.50	22.50	22.50	135.00				
Extra large:										
May 2.....	I and II.....	280	29.50	27.50	28.36	7,940.00	640	24.36	15,590.00	4.98
	Scarred, faulty, etc.....	360	22.00	20.00	21.25	7,650.00				
Oct. 10.....	I and II.....	179	28.50	25.00	28.04	5,020.00	432	24.13	10,424.50	2.98
	Scarred, faulty, etc.....	250	23.25	20.00	21.54	5,385.00				
	III.....	3	6.50	6.50	6.50	19.50				
Large:										
May 2.....	I and II.....	2,485	30.00	24.00	27.40	68,101.25	4,795	23.93	114,721.25	37.32
	Scarred, faulty, etc.....	2,310	22.50	18.50	20.18	46,620.00				

Oct. 10.....	I and II.....	2,534	28.50	24.00	25.57	64,790.00	}	5,051	22.83	115,300.00	34.86
	Scarred, faulty, etc.....	2,453	22.50	18.50	20.42	50,094.00					
	III.....	64	6.50	6.50	6.50	416.00					
Medium:											
May 2.....	I and II.....	3,440	23.50	20.00	21.61	73,980.00	}	6,560	19.51	128,000.00	51.05
	Scarred, faulty, etc.....	3,120	18.50	16.50	17.31	54,020.00					
	I and II.....	3,795	23.00	20.50	21.63	82,096.50					
Oct. 10.....	Scarred, faulty, etc.....	4,245	19.50	16.75	18.15	77,060.25	}	8,138	19.63	159,774.25	56.16
	III.....	98	6.50	6.25	6.30	617.50					
Small medium:											
May 2.....	I and II.....	359	19.25	17.00	17.65	6,337.25	}	854	16.38	13,987.25	6.6
	Scarred, faulty, etc.....	495	16.00	15.00	15.45	7,650.00					
	I and II.....	444	18.00	16.50	17.39	7,721.00					
Oct. 10.....	Scarred, faulty, etc.....	391	15.50	15.00	15.25	5,961.00	}	857	16.13	13,819.50	5.9
	III.....	22	6.25	6.25	6.25	137.50					
All classes:											
May 2.....								12,849	21.19	272,298.50	100.00
Oct. 10.....								14,490	20.68	299,624.25	100.00
	MISCELLANEOUS										
Oct 10.....	Unhaired and dressed.....	28	1.50	1.50	1.50	42.00	}	46	1.11	51.00	100.00
	Partly unhaired.....	13	.50	.50	.50	6.50					
	Raw.....	6	.50	.50	.50	2.50					

Special sales of Pribilof Islands fur-seal skins in 1938

Date	Number of skins	Description	Price per skin	Total
Jan. 31	70	Dyed black, large.....	\$31.42	\$2,199.40
Feb. 28	2	Raw salted.....	6.66	13.32
Mar. 31	80	Dyed black, medium.....	24.45	1,956.00
	80	Dyed Safari brown, medium.....	20.93	1,674.40
May 16	80	do.....	21.51	1,720.80
	40	Dyed black, medium.....	22.41	896.40
June 30	12	Dyed Safari brown, large.....	27.40	328.80
	22	Dyed Safari brown, medium.....	21.51	473.22
	40	Dyed black, medium.....	22.41	896.40
	23	Dyed Safari brown, large.....	27.40	630.20
	18	Dyed Safari brown, medium.....	21.51	387.18
July 25	35	Dyed black, large.....	30.32	1,061.20
July 26	1	do.....	21.69	21.69
	1	Dyed Safari brown, large.....	21.69	21.69
	1	Partly processed.....	12.19	12.19
Aug. 30	80	Dyed black, medium.....	22.41	1,792.80
Sept. 30	110	Dyed Safari brown, medium, scarred and faulty.....	17.31	1,904.10
	40	Dyed Safari brown, medium.....	21.51	860.40
Oct. 30	80	Dyed Safari brown, medium, scarred and faulty.....	18.15	1,452.00
	40	Dyed Safari brown, medium.....	21.63	865.20
Nov. 30	80	Dyed black, medium.....	22.18	1,774.40
	17	Dyed Safari brown, large.....	25.57	434.69
Dec. 14	20	Dyed Safari brown, medium.....	21.63	432.60
	20	do.....	21.63	432.60
	992			22,241.68

DISPOSITION OF FUR-SEAL SKINS TAKEN ON PRIBILOF ISLANDS

On January 1, 1938, there were on hand 68,498 fur-seal skins taken on the Pribilof Islands. Of these, 68,480 were at St. Louis, Mo., and 18 at Washington. In 1938, 58,364 fur-seal skins were taken on the Pribilof Islands, of which 8,755 were allotted to the Government of the Dominion of Canada as its share of the season's take and the remaining 49,609 were shipped to St. Louis. Of the skins on hand at the beginning of the year, 45,231 were disposed of, leaving 23,267 unsold, which, with the 49,609 from the 1938 take, make a total of 72,876 on hand on December 31, 1938. 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 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 1938

Source	On hand Jan. 1	Receipts in 1938	Sales in 1938	On hand Dec. 31
Taken on Pribilof Islands:				
Calendar year 1935.....	3		3	
Calendar year 1936.....	21,574		21,569	5
Calendar year 1937.....	46,903		23,659	23,244
Calendar year 1938.....		49,609		49,609
United States' share of Japanese fur-seal skins: Season of 1937.....		210		210
Total.....	68,480	49,819	45,231	73,068

Summary of all Government-owned fur-seal skins under control of Department of Commerce, calendar year 1938

Source	On hand Jan. 1			Re- ceipts in 1938	Disposed of in 1938		On hand Dec. 31		
	Fouke Fur Co.	Wash- ington office	Total		Sales	Deliv- ered to Canada	Fouke Fur Co.	Wash- ington 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 1935.....	3		3		3				
Calendar year 1936.....	21,574		21,574		21,569		5		5
Calendar year 1937.....	46,903		46,903		23,639		23,244		23,244
Calendar year 1938.....				58,364		8,755	49,609		49,609
Miscellaneous skins held for reference purposes.....		4	4					4	4
United States' share of Jap- anese sealskins: Season of 1937.....				210			210		210
Total.....	68,480	22	68,502	58,574	45,231	8,755	73,068	22	73,090

SHIPMENT AND SALE OF FOX SKINS

The 231 blue and 15 white fox skins taken on St. Paul Island and the 616 blue and 1 white fox skins taken on St. George Island in the season of 1937-38 were shipped from the islands on the *Penguin*, sailing on March 15. The vessel reached Seattle on March 29, and the fox skins were forwarded by express to the Department's selling agents at St. Louis, Mo.

At the public auction sale in St. Louis on May 2, 1938, 501 blue and 1 white fox skins of the 1936-37 season's take were sold. The blue pelts brought \$12,423.00, including \$40 for one dressed skin, and the average selling price of the raw blue pelts was \$24.77. The single white pelt was sold dressed for \$15. One fine silvery pelt brought \$85, which was the maximum price obtained for a single pelt.

On October 10, 1938, there were sold at public auction at St. Louis 423 blue and 16 white fox skins taken on the Pribilof Islands in the 1937-38 season. The blue pelts brought \$10,295.00, an average of \$24.34 per skin; and the white pelts sold for \$216.00, or \$13.50 each. The maximum price obtained was \$72, for a single skin.

FUR-SEAL PATROL

UNITED STATES COAST GUARD

Vessels of the Coast Guard were again assigned by the Treasury Department to patrol waters along the route of the Alaska fur seals during their northward migration to the Pribilof Islands. Twelve outters and patrol vessels were instrumental in enforcing the laws and regulations for the protection of fur seals and sea otters in the North Pacific and Bering Sea.

On March 15 the cutter *Onondaga* began the regular patrol of the Washington coast between the Columbia River entrance and the Strait of Juan de Fuca. Several preliminary cruises were made by

this vessel prior to March 15, and as early as February 15 50 seals were sighted off Willapa Bay. The seal patrol activities of the *Onondaga* were continued until March 26, and were supplemented by frequent cruises of the patrol boat *Atalanta* in the Strait of Juan de Fuca and along the coast of Vancouver Island from March 14 to 31.

On April 1 the cutter *Redwing* relieved the *Onondaga* and continued the patrol northward from Vancouver Island to Dixon Entrance and Clarence Strait. The *Redwing* was relieved on April 20 by the cutter *Haida*, which patrolled the waters from southeast Alaska to Kodiak until May 5.

Vessels of the Coast Guard which participated in the seal patrol in the North Pacific west of Kodiak, and in Bering Sea, were the patrol boats *Alert* and *Ariadne* from April 20 to July 1 and July 10, respectively; the cutter *Haida* from May 31 to June 29; the cutter *Spencer* from April 20 to July 31; the cutter *Shoshone* from June 15 to August 15; the patrol boat *Reliance* from July 1 to September 10; the cutter *Redwing* from August 2 to September 10; the patrol boat *Cyane* from July 5 to September 20; and the cutter *Hamilton* from July 15 to November 1. The cutter *Northland* made its regular annual cruise to the Arctic Ocean, patrolling in Bering Sea and adjacent waters from May 20 to September 20.

BUREAU OF FISHERIES

The Bureau of Fisheries vessel *Scoter* was assigned to patrol the waters off the coast of Washington, principally in the vicinity of Neah Bay, during the period of sealing operations by the native Indians. The *Scoter* maintained a patrol in this area from March 16 to April 12.

Morris Rafn and William B. Newcomb were detailed to Lapush, Wash., during the sealing season, as special agents of the Bureau to authenticate sealskins and to secure compliance with the treaty provisions which prohibit the use of firearms or motorboats in the taking of fur seals by the aborigines.

SEALING PRIVILEGES ACCORDED ABORIGINES

The North Pacific Sealing Convention of July 7, 1911, permits Indians and other aborigines dwelling on the coasts of North America to hunt for seals by primitive methods. In 1938 there were taken and duly authenticated, by officials of the respective Governments, 1,551 fur-seal skins, of which 184 were taken by Indians under the jurisdiction of the United States and 1,367 by Indians of Canada. The details are as follows:

Washington.—A total of 92 sealskins were taken at Lapush and Neah Bay by the Indians of Washington State. Four of these skins were taken from male seals and 88 from females, during the months, of March, April, and May. The skins were authenticated by A. M. Rafn and W. B. Newcomb, special agents of the Bureau, and by Mr. Guy C. Coy, Collector of Customs at Neah Bay, acting as special agent of the Bureau of Fisheries.

Alaska.—Ninety-two sealskins were taken by the natives of Sitka during April and May, and were authenticated by Bureau employees. Of these skins, 2 were from male and 90 from female seals.

British Columbia.—Indians along the British Columbia coast took 1,367 fur-seal skins in 1938, according to an official report.



FIGURE 5.—Fur-seal harems on Polovina Rookery, St. Paul Island, Alaska.

JAPANESE SEALSKINS DELIVERED TO THE UNITED STATES

Under the provisions of the fur-seal treaty of 1911, there were allotted to the United States 210 Japanese fur-seal skins, or 10 percent of the number taken by Japan on Robben Island in 1938. These skins were received by the Department's selling agents at St. Louis, Mo., on May 9, 1939.

SUBSTATION FOR SEA-OTTER PATROL

The Bureau's work for the furtherance of sea-otter investigations and patrol was continued. At the substation established on Amchitka Island in 1937, 4 additional overnight cabins, 8 by 10 feet, were built on the south side of the island at 8-mile intervals. At the camp site in Constantine Harbor a 10 by 16-foot powerhouse was constructed, and a 5-horsepower diesel engine was installed for use as a power plant. Two radio masts were erected on concrete bases, and radio antennae were strung leading to a receiving set and a transmitter. Buildings that had been erected in the previous year were given a coat of paint.

The number of sea otters counted in the vicinity of Amchitka Island in 1938 was considerably less than the estimate for the previous year. Whether the difference was due to an error in the count or to a change in the habits and distribution of the animals was not known. It is anticipated that further light will be thrown upon this problem by investigations in succeeding years.

COMPUTATION OF FUR SEALS, PRIBILOF ISLANDS, 1938

By HARRY J. CHRISTOFFERS

As indicated by the commercial killings, there was a satisfactory increase over the previous year in the number of 3-year-old male fur seals arriving at the Pribilof Islands in the 1938 season. A total of 54,140 3-year-olds were killed, compared with 50,800 in 1937 and 54,890 in 1935. The killings for the past several years, however, do not show a gain commensurate with an average increase of 8 percent in the size of the herd. It is evident, therefore, that during recent years the herd has not been increasing as fast as expected, in view of the increases apparent for the period from 1929 to 1931. This condition is probably due in part to insufficient additions to the breeding reserve as a result of continuing sealing operations for several days after July 23. It cannot be the entire cause, however. Unknown factors during the life of the seals at sea must have been partly the cause of the large increases from 1929 to 1931, and other unknown factors must have caused a greater loss of life at sea during more recent years. Disease or natural enemies would hardly be expected to increase directly in proportion to the growth of the herd. It would not be surprising, therefore, if there should be in any year an abnormally large increase in the number of 3-year-old males available for killing.

The St. George Island killings this year show a remarkable increase over those for the past 2 years, although only slightly more than the number killed in 1935.

During the last week of the season at St. Paul Island the 3-year-olds continued to come in increasing numbers. The number killed at that time, however, does not show the number which were available; as the rookeries were badly broken up, no seals were driven from the portions of rookeries having a considerable number of cows.

The experience this year, when a great many 3-year-olds arrived after the rookeries were broken up near the end of the season, indicates the advantage of killing 4-year-olds instead of 3-year-olds. A more definite portion of killable seals could be secured by killing from the 4-year-old class, as these animals arrive much earlier in the season. This would also result in driving a smaller number of cows, a very important point to be considered. Cows do not withstand driving to the same extent as young males. A great many of the cows driven probably die as a result of extreme exhaustion. As previously recommended, therefore, the killing of 4-year-olds still appears advisable, if it should be considered desirable from a commercial standpoint.

Through the courtesy of the Commander of the Bering Sea Patrol and the commanding officer of the Coast Guard cutter *Spencer*, an airplane made a trip from the village landing to Northeast Point and return. The plane passed over the Polovina rookeries en route and made several trips over the Northeast Point rookeries, for the purpose of ascertaining if it would be practicable to make a pup count by taking pictures from a plane. Motion pictures and still pictures were taken by the Coast Guard, but it appears that the value of such pictures in connection with a census of the fur seals is limited. The black rocks, on which most of the seals are found, are so dark that there is practically no contrast between them and the black pups. In addition, the pups are so small that they cannot be seen from a plane. The seals were not bothered in the least from the noise of the plane.

Adult sea lions, because of their light color, were easily distinguished from the plane, but all of them made a dash for the water when they heard the plane overhead.

BULLS

Insofar as possible, a count was made of all harem and idle bulls. During the counting period at St. Paul Island, harems were increasing and cows were being held in place by the active harem bulls. A couple of days of warm weather, however, caused a break-up of the St. George harems before counts could be made. It was necessary, therefore, to apply to St. George the information obtained at St. Paul, after observing the actual harem areas occupied.

On certain St. Paul rookeries harem areas were greatly extended, while on others considerably less area was covered than in the previous year. Female seals prefer to crowd together as closely as possible. Therefore, the crowded areas grow faster and contain many more seals per square foot than other portions of the rookery which would appear to be more favorable for their requirements. A cow prefers to enter a large harem rather than to go to a bull with only a few cows or none at all. The favored harems finally become so large that the cows must enter another bull's domain. Then the unfavored one soon accumulates a much larger number.

This year, it will be noted, there was practically no increase in the number of harem bulls and there was a marked reduction in the num-

ber of idle bulls on rookeries. The reduced number of idle bulls was very noticeable from the beginning of the season. Very few surplus bulls took up idle-bull positions, and no trouble was experienced in making an accurate count of the idle bulls. The number recorded for St. Paul Island, therefore, is quite accurate. There appeared to be the usual number of full-grown, strong, and active surplus bulls on the hauling grounds, but they were not interested in taking up idle-bull positions. Though the shortage of idle bulls was very noticeable, it is not necessarily a matter of great importance, as there is no difference between an idle and a surplus bull except in the position he occupies. They may change places continually throughout the season. Usually, however, as soon as the idle bulls secure harems, surplus bulls move over from the hauling grounds to become idle bulls, so that there are always about the same number of idle bulls in the rear of the rookeries.

It is interesting to note that 3 bulls branded in 1923 were observed—1 on Polovina Cliffs rookery and 2 on Reef rookery. All were husky animals and held large harems in the center of the rookeries.

The decrease in the expected number of harem and idle bulls might possibly be due to the final dying off of the extra males reserved from 1923 to 1932. If so, there is a possibility of a shortage of bulls within the next few years. If the number of harem and idle bulls continues to decrease, it would be advisable each year to make an additional reserve of males.

Estimated number of harem and idle bulls, approximate ratio of idle bulls to harem bulls, and average harem, 1938

Rookery	Date	Harem bulls	Idle bulls	Total	Approximate ratio of idle bulls to harem bulls	Average harem
St. Paul Island:						
Kitovi.....	July 19	414	51	465	1:8	49.11
Lukanin.....	do.....	183	32	215	1:6	53.71
Gorbach.....	July 20	1,050	211	1,261	1:5	49.16
Ardiguen.....	do.....	96	17	113	1:6	50.86
Reef.....	do.....	2,100	308	2,408	1:7	49.38
Sivutch.....	do.....	475	60	535	1:8	66.80
Lagoon.....	do.....	2	2	2	---	26.50
Toistol.....	July 19	1,200	163	1,363	1:7	50.86
Zapadni.....	July 18	1,000	178	1,178	1:6	58.66
Little Zapadni.....	do.....	576	103	679	1:6	51.91
Zapadni Reef.....	do.....	69	17	86	1:4	15.03
Polovina.....	July 17	464	112	576	1:4	45.44
Polovina Cliffs.....	do.....	369	88	457	1:4	31.28
Little Polovina.....	do.....	120	29	149	1:4	35.03
Morjovi.....	do.....	302	54	356	1:6	25.02
Vostochni.....	do.....	2,300	364	2,664	1:6	36.57
Total.....		10,720	1,787	12,507	1:6	46.76
St. George Island:						
North.....	July 23	800	73	873	1:11	51.13
Staraya Artil.....	do.....	650	100	750	1:7	47.42
Zapadni.....	do.....	230	50	280	1:5	18.91
South.....	do.....	150	10	160	1:15	6.81
East Reef.....	do.....	185	35	220	1:5	50.66
East Cliffs.....	do.....	425	70	495	1:6	62.97
Total.....		2,440	338	2,778	1:7	46.41
Total (both islands).....		13,160	2,125	15,285	1:6	46.69

A shortage of bulls will cause a reduction in the yearly rate of increase of pups. A larger number of surplus bulls can do no harm, except to make it a little more difficult to drive. If previous experience in reserving should be repeated, the increases of killable seals secured through making extra reserves would more than pay for itself within the next 5 years.

The albino bull, first observed in 1935, frequented the idle-bull area back of Reef rookery the greater part of the season. At no time was he observed with any cows.

AVERAGE HAREM

The average harem is computed from the estimated number of cows and harem bulls. This year's figures indicate an increase in the average harem from 43.43 in 1937 to 46.69 in 1938. This increase should not cause any great concern, although a lower average harem would be preferable, as it would show that there were more than sufficient bulls.

It is felt that the more bulls there are on hand the faster the herd will increase. An extra large number of bulls does not now necessarily create a much smaller average harem. It would mean that as the season advances and the harem bulls become exhausted, or at least weaker, their places would be taken by stronger bulls not worn out from harem duties. The present system does not provide for any considerable replacement of harem bulls during the active breeding season.

Computation of breeding cows, based on annual increase of 8 percent, and of average harem, in 1938

Rookery	Breeding cows		Harem bulls, 1938	Average harem		Increase (+) or decrease (-) in 1938 from 1937
	1937	1938		1938	1937	
St. Paul Island:						
Kitovi	18,824	20,330	414	49.11	40.05	+9.06
Lukanin	9,101	9,829	183	53.71	41.94	+11.77
Gorbatch	47,796	51,620	1,050	49.16	47.80	+1.36
Ardiguen	4,521	4,883	96	50.86	42.25	+8.61
Reef	96,007	103,688	2,100	49.38	50.53	-1.15
Sivutch	29,379	31,729	475	66.80	65.29	+1.51
Lagoon (actual count pups)	51	53	2	26.50	25.50	+1.00
Tolstoi	56,516	61,037	1,200	50.86	47.09	+3.77
Zapadni	54,314	58,659	1,000	58.66	47.23	+11.43
Little Zapadni	27,686	29,901	576	51.91	46.14	+5.77
Zapadni Reef	960	1,037	69	15.03	15.24	-
Polovina	19,520	21,082	464	45.44	44.87	+1.57
Polovina Cliffs	10,688	11,543	369	31.28	30.54	+1.74
Little Polovina	3,892	4,203	120	35.03	32.43	+2.60
Morjovi	6,996	7,556	302	25.02	21.53	+3.49
Vostochni	77,883	84,114	2,300	36.57	33.86	+2.71
Total	464,134	501,264	10,720	46.76	43.42	+3.34
St. George Island:						
North	37,877	40,907	800	51.13	46.19	+4.94
Staraya Artil	28,539	30,822	650	47.42	43.91	+3.51
Zapadni	4,027	4,349	230	18.91	20.13	-1.22
South	945	1,021	150	6.81	6.43	+1.38
East Reef	8,679	9,373	185	50.66	49.88	+1.78
East Cliffs	24,781	26,763	425	62.97	59.00	+3.97
Total	104,848	113,235	2,440	46.41	43.49	+2.92
Total (both islands)	568,982	614,499	13,160	46.69	43.43	+3.26

When man did not interfere and all males grew to maturity, a harem bull would be replaced after a short period of service by a stronger bull. This resulted in a stronger and better race and undoubtedly caused every cow to be properly served, with a resulting higher birth rate and possibly a smaller mortality rate.

On newly inhabited areas most of the harems were quite large. Below Hutchinsons Hill a single harem, covering a large area, contained at one time over a hundred cows. There were numerous strong, husky bulls without cows a short distance from the harem, but none of them seemed interested in securing any of the cows from this particular harem.

PUPS AND COWS

The number of pups and cows was determined by applying the average rate of increase secured through actual pup counts made from 1917 to 1922. It is difficult to say whether there was an actual increase of approximately 8 percent, but observations would indicate that this estimate is somewhat high. The harems now cover such large areas that a normal increase in cows would not necessarily be readily observed from year to year, but should be easily discernible over a period of years. From year to year one area may show a large increase or a considerable decrease, as movements are not constant in any particular place.

Distribution of pups on the Pribilof Islands, Aug. 10, 1938, and comparison with distribution in 1937

Rookery	1938				Total pups, 1937	Increase, 1938
	Living pups	Dead pups	Total pups	Percent dead pups		
St. Paul Island:						
Kitovi.....	20,031	290	20,330	1.47	18,824	1,506
Lukanin.....	9,616	213	9,829	2.17	9,101	728
Gorbach.....	51,176	444	51,620	.86	47,796	3,824
Ardiguen.....	4,766	117	4,883	2.39	4,521	362
Reef.....	102,174	1,514	103,688	1.46	96,007	7,681
Sivutch.....	30,955	774	31,729	2.44	29,379	2,350
Lagoon.....	53		53		51	2
Tolstol.....	60,189	848	61,037	1.39	56,516	4,521
Zapadni.....	57,650	1,009	58,659	1.72	54,314	4,345
Little Zapadni.....	29,153	748	29,901	2.50	27,686	2,215
Zapadni Reef.....	1,029	8	1,037	.80	960	77
Polovina.....	20,759	323	21,082	1.53	19,520	1,562
Polovina Cliffs.....	11,320	214	11,543	1.85	10,688	855
Little Polovina.....	4,098	105	4,203	2.51	3,892	311
Morjovi.....	7,403	153	7,556	2.02	6,996	560
Vostochni.....	82,364	1,750	84,114	2.08	77,883	6,231
Total.....	492,745	8,519	501,264	1.70	464,134	37,130
St. George Island:						
North.....	40,334	573	40,907	1.40	37,877	3,030
Staraya Artil.....	30,027	795	30,822	2.58	28,539	2,283
Zapadni.....	4,300	49	4,349	1.12	4,027	322
South.....	1,003	18	1,021	1.72	945	76
East Reef.....	9,231	142	9,373	1.51	8,679	694
East Cliffs.....	26,364	399	26,763	1.49	24,781	1,982
Total.....	111,259	1,976	113,235	1.74	104,848	8,387
Total (both Islands).....	604,004	10,495	614,499	1.71	568,982	45,517

The number of dead pups did not appear to be proportionately any greater this year than in the past, but the evidence available is not conclusive. To anyone observing the great activity on closely crowded harem areas it would seem highly probable that the death rate of pups is somewhat greater than indicated. The pups in the front portions of the rookeries have in many places a long way to travel to reach the rear of the areas occupied by active harem bulls.

It was quite surprising to note the number of old cows in heat at the end of the season. Many of them had pups recently born. Theoretically the older cows should be bred the first part of the season. If not bred at the proper time they would no doubt come in heat a second time. This would result in the pup being born the following year at a later date than would be normal for the age of the cow.

MORTALITY OF SEALS AT SEA

Considering the number of killable seals at the Pribilof Islands in the last few years, as well as general observations regarding the number of older bachelors and surplus bulls on the hauling grounds, it is advisable to increase the mortality rates of pups at sea. Accordingly, there have again been applied the mortality rates for pups which were used in 1925 and which were continued until 1929, when, as a result of additional reserves made in 1923 and 1924, the number of 3-year-old seals returning to the islands was so great that it was necessary to reduce these mortality rates. If present conditions do not improve, it will be necessary to increase mortality rates for several other ages of male seals and to reduce the percentage increase of pups and cows. There is a strong possibility that the mortality rates increase with the growth of the herd. However, past experience would indicate that the decrease in the rate of growth of the herd is more likely to be directly comparable to the percentage of animals killed. Observations indicated it was advisable to apply the larger mortality rate for pups to all ages up to and including the 5-year-old male class.

Mortality rates for female pups were increased from 40 percent to 45 percent and for males from 40 percent to 50 percent. Experience has shown that for all animals there is a greater death rate among young males than young females. It will be necessary to change mortality rates as new information regarding the life-history of seals is secured.

COMPLETE COMPUTATION

The following summary shows the methods used in computing the number of animals in the Pribilof Islands seal herd in 1938. It will be noted that the mortality rate for female pups was increased from 40 percent to 45 percent and for male pups from 40 percent to 50 percent. In addition, figures carried over from 1937 for yearling females and for all males up to 6 years of age were altered to provide for the newly applied mortality rates from the year the animals were born.

Complete computation of fur seals, Pribilof Islands, as of August 10, 1938

Class	St. Paul Island	St. George Island	Total
Pups, estimated	501, 264	113, 235	614, 499
Breeding cows, 3 years old and over, by inference	501, 264	113, 235	614, 499
Harem bulls, estimated	10, 720	2, 440	13, 160
Idle bulls, estimated	1, 787	338	2, 125
Yearlings, male and female, estimated:			
Females born in 1937	232, 067	52, 424	284, 491
Natural mortality, 45 percent	104, 430	23, 591	128, 021
Yearling females, Aug. 10, 1938	127, 637	28, 833	156, 470
Males born in 1937	232, 067	52, 424	284, 491
Natural mortality, 50 percent	116, 034	26, 212	142, 246
Yearling males beginning 1938	116, 033	26, 212	142, 245
Yearling males killed in 1938	13		13
Yearling males, Aug. 10, 1938	116, 020	26, 212	142, 232
2-year-olds, male and female, estimated:			
Yearling females, Aug. 10, 1937 ¹	118, 186	26, 697	144, 883
Natural mortality, 15 percent	17, 728	4, 005	21, 733
2-year-old females, Aug. 10, 1938	100, 458	22, 692	123, 150
Yearling males, Aug. 10, 1937 ¹	107, 437	24, 270	131, 707
Natural mortality, 17.5 percent	18, 801	4, 247	23, 048
2-year-old males beginning 1938	88, 636	20, 023	108, 659
2-year-old males killed in 1938	1, 431	225	1, 656
2-year-old males, Aug. 10, 1938	87, 205	19, 798	107, 003
3-year-old males, estimated:			
2-year-old males, Aug. 10, 1937 ¹	80, 653	18, 111	98, 764
Natural mortality, 12.5 percent	10, 082	2, 264	12, 346
3-year-old males beginning 1938	70, 571	15, 847	86, 418
3-year-old males killed in 1938	42, 864	11, 276	54, 140
3-year-old males, Aug. 10, 1938	27, 707	4, 571	32, 278
4-year-old males, estimated:			
3-year-old males, Aug. 10, 1937 ¹	24, 754	4, 833	29, 587
Natural mortality, 10 percent	2, 475	483	2, 958
4-year-old males beginning 1938	22, 279	4, 350	26, 629
4-year-old males killed in 1938	1, 642	712	2, 354
4-year-old males, Aug. 10, 1938	20, 637	3, 638	24, 275
5-year-old males, estimated:			
4-year-old males, Aug. 10, 1937 ¹	15, 910	4, 316	20, 226
Natural mortality, 10 percent	1, 591	432	2, 023
5-year-old males beginning 1938	14, 319	3, 884	18, 203
5-year-old males killed in 1938	2		2
5-year-old males, Aug. 10, 1938	14, 317	3, 884	18, 201
6-year-old males, estimated:			
5-year-old males, Aug. 10, 1937 ¹	18, 567	3, 019	21, 586
Natural mortality, 20 percent	3, 713	604	4, 317
6-year-old males, Aug. 10, 1938	14, 854	2, 415	17, 269

¹ It was found necessary to apply mortality rates of 45 percent for female pups and 50 percent for male pups, instead of 40 percent in each case, as formerly. Adjustments were made in the figures for 1937, therefore, to take care of these increased mortality rates for female pups and yearlings, and for males up to and including 5 years of age.

Complete computation of fur seals, Pribilof Islands, as of August 10, 1938—Con.

Class	St. Paul Island	St. George Island	Total
Surplus bulls, 7 years old and over, estimated:			
6-year-old males, Aug. 10, 1937.....	12,670	2,518	15,188
Natural mortality, 20 percent.....	2,534	504	3,038
7-year-old males, Aug. 10, 1938.....	10,136	2,014	12,150
Surplus bulls, Aug. 10, 1937.....	(?)	(?)	9,140
Natural mortality, 30 percent.....			2,742
Remaining surplus for 1938.....			6,398
Breeding bulls of 1937.....	13,205	2,926	16,131
Natural mortality, 30 percent.....	3,962	878	4,840
1937 bulls remaining in 1938.....	9,243	2,048	11,291
Breeding bulls of 1938.....	12,507	2,778	15,285
1937 bulls remaining, deducted.....	9,243	2,048	11,291
Increment of new bulls in 1938.....	3,264	730	3,994
7-year-old males computed for 1938.....	10,136	2,014	12,150
Surplus bulls computed for 1938.....			6,398
Total theoretical bull stock for 1938.....			18,548
New increment of breeding bulls deducted.....			3,994
Surplus bulls in 1938.....			14,554
50 percent deducted for losses due to natural causes and errors in loss percentages in previous years.....			7,277
Surplus bulls, Aug. 10, 1938.....			7,277

† Estimates have been worked out, insofar as possible, to show approximately the number of seals of each class which should be credited to each island. The seals, however, do not haul out in accordance with figures given. Seals born on either island frequent the other island. They travel promiscuously between the two islands and haul out on either one. The total for both islands, however, is approximately correct.

Recapitulation

Class	Total	Class	Total
Pups.....	614,499	5-year-old males.....	18,201
Cows.....	614,499	6-year-old males.....	17,269
Harem bulls.....	13,160	Surplus bulls.....	7,277
Idle bulls.....	2,125		
Yearling females.....	156,470	Total, 1938.....	1,872,438
Yearling males.....	142,232	Total, 1937.....	1,839,119
2-year-old females.....	123,150		
2-year-old males.....	107,003	Numerical increase, 1938.....	33,319
3-year-old males.....	32,278	Percent increase, 1938.....	1.81
4-year-old males.....	24,275		



U. S. DEPARTMENT OF COMMERCE

HARRY L. HOPKINS, *Secretary*

BUREAU OF FISHERIES

CHARLES E. JACKSON, *Acting Commissioner*

Administrative Report No. 37

**FISHERY INDUSTRIES
OF THE UNITED STATES**

1938

By R. H. FIEDLER

APPENDIX III TO REPORT OF COMMISSIONER OF FISHERIES
FOR THE FISCAL YEAR 1939



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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.

FISHERY INDUSTRIES OF THE UNITED STATES, 1938 ¹

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

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¹ Administrative Report No. 37, Appendix III to the Report of the Commissioner of Fisheries, 1939. Approved for publication, June 12, 1939.

FOREWORD

This report constitutes a summary of the activities of the Division of Fishery Industries, as well as a review of the fishery statistics collected by the Division during the past year. As its name indicates, this Division of the Bureau is concerned with the activities and welfare of the commercial fisheries and fishery industries and the fishermen and shoresmen engaged therein; the fish canning and preserving industries; and the trade in fishery products. Its functions include the conduct of studies or activities: (1) To determine the extent and magnitude of our aquatic resources and the commercial importance of our fishery industries; (2) to learn the economic condition of fishermen and shoresmen engaged in the fishery industry, their place in the national economy, and what measures can be taken to improve their well-being; (3) to determine the character, utility, and effectiveness of different forms of fishing apparatus and vessels, suggest improvements therein, and discourage the use of those forms which are unnecessarily destructive or unprofitable; (4) to learn the effect of fishing on the supply of fish and suggest measures to promote orderly and sustained production; (5) to study and develop fisheries for hitherto unutilized fishes; (6) to investigate the preservation of fishery products, suggest improved methods, and discourage wasteful practices in this field; (7) to ascertain what use can be made of aquatic products not now utilized to economic advantage; (8) to inquire into the nutritive value of aquatic foods for man and his domestic animals, and promote the consumption of these foods; (9) to ascertain the means and methods of transporting fishery products on land and sea and recommend economical practices; (10) to inquire into the condition and extent of the wholesale and retail trade in fishery products and promote the more orderly marketing of our fishery harvest; (11) to introduce useful foreign methods or processes of capture, preservation, utilization, or marketing fishery products; (12) to handle matters relative to the administration of the act which authorizes cooperative associations of producers of aquatic products; and (13) to conduct the fishery market news service authorized by act of Congress in 1937.

Results of the various technological, economic, and marketing investigations carried on by the Division are published in separate documents as each project is completed, and a brief résumé of each current project is contained in this report. 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 issuance of the previous report² together with such summarized statements and interpretations of the statistics as are deemed significant and useful.

Part 1. OPERATIONS OF THE DIVISION

COOPERATION WITH OTHER FEDERAL AGENCIES

It has been the established policy of the Bureau of Fisheries and of this Division to cooperate with other Federal agencies wherever the activities are such that mutual information can be exchanged with advantage or where, by working cooperatively, the results of such

² Fishery Industries of the United States, 1937, by R. H. Fiedler: Appendix III to the Report of the U. S. Commissioner of Fisheries for 1938, pp. 151-460.

mutual work may be furthered or its ends made more effective and valuable.

Thus, the technologists of this Division gave courses in canning fishery products to State Extension Service workers at the request of and with the cooperation of the Extension Service of the United States Department of Agriculture. Demonstrations and practical instruction on other related subjects, pertaining to the preservation of fishery products and a better utilization of the excellent food value of fish, were given to State Extension Service workers through and with the cooperation of the Extension Service of the United States Department of Agriculture. In some cases, students or State Extension Service workers were detailed to the Bureau's laboratories in Washington, D. C., for instruction, and in other cases one of our technologists visited some of the States for this purpose.

Cooperation was also given by members of our technological staff to chemists and bacteriologists of the Food and Drug Administration, United States Department of Agriculture, at various times in connection with the development and application of tests or methods of determining the quality and constituents of various fishery products.

On several occasions members of the Division's economic and marketing staff cooperated with the Department of Labor in holding conferences with fishermen's unions and associations to settle disputes. The Department of Labor, through its Employment Service, also gave considerable aid to the Division in selecting personnel for the conduct of the Division's survey of retail fish markets.

The Division also has worked with various Federal agencies in obtaining statistical data on our fisheries. In a cooperative arrangement, the Bureau of Agricultural Economics, Department of Agriculture, furnished statistics on the volume of cold-storage holdings of fish and quantities frozen, and the health authorities in Washington, D. C., assisted in obtaining data on the volume of fish handled at the Municipal Fish Wharf and Market in this city. Cooperation was accorded the Bureau of the Census in obtaining for that Bureau figures on the volume of the quarterly production and holdings of fish oils in the United States.

In addition to the specifically enumerated instances of cooperation with other Federal agencies cited above, which are on a continuing basis or were of a more detailed nature, it should be stated that a very close relationship exists between this Division and many of those Federal agencies whose duties require an interest in fish in particular, foodstuffs or feedstuffs in general, or in various marine activities. The staff of the Division is in almost daily contact with some one or more of these Federal agencies in the exchange of information of inestimable value to the scientific work of the Federal establishment.

COOPERATION WITH STATE AGENCIES

The Division has continued to encourage cooperative relations with State institutions and agencies in the conduct of researches and investigations of mutual interest. This policy has resulted in expanded programs and decreased costs. During 1938 the following cooperative investigations with various States were conducted:

At Washington State College, Pullman, Wash., the Seattle technological laboratory staff of this Division worked with Dr. J. S. Carver

in connection with tests on the feeding of fish oils and fish meals to poultry. Our Seattle technological laboratory staff also continued its close cooperative relation with members of the faculty and staff of the University of Washington, Seattle, Wash., as in past years.

The University of Maryland and the Maryland State Agricultural Experiment Station, College Park Md., continued their excellent cooperative relations with our College Park technological laboratory staff. Additional free space for the Bureau's laboratories was provided by the University of Maryland for the expanded technological work of the Bureau at that place. For example the use of another room was donated to the Division for the establishment of a new bacteriological laboratory in the Horticultural Building of the University. The various departments of animal husbandry of the Maryland State Agricultural Experiment Station continued their cooperation in the conduct of feeding tests of fishery byproducts in the rations of farm animals. The members of the staffs of these two institutions who have worked closely with our College Park technological staff are Dr. L. B. Broughton, Head of the Chemistry Department; Dr. W. C. Supplee and Mr. L. E. Bopst of the Chemistry Department; Dr. L. H. James, Head of the Department of Bacteriology; and Prof. M. H. Berry of the Dairy Department. These various cooperative studies are described in greater detail elsewhere in this report.

As discussed in the 1937 report, the Bureau's technologists continued their cooperation with the Virginia State Division of Markets in extending and improving State marketing grades for fishery products sold in that State.

The Bureau's economists and marketing specialists are working in close cooperation with the Division of Markets of the Virginia State Department of Agriculture and Immigration in connection with the survey of retail fish markets which is discussed elsewhere in this report. The Division of Markets furnished the services of a man who surveyed the retail fish markets in Harrisonburg, Staunton, Lexington, Roanoke, Lynchburg, and Charlottesville. These markets could not otherwise have been covered.

In the conduct of its statistical research work the Bureau obtains unusual cooperation from various States. The statistical surveys of the fisheries in the States bordering on the Great Lakes, in the Pacific Coast States, and in New York, Maryland, and Virginia have been greatly facilitated by the cooperation obtained from the fishery agencies in these States. With this aid it is now necessary for the Bureau to conduct only partial surveys in these States to supplement the data available from the fishery agencies. A comprehensive system for the collection of fishery statistics in the State of Maine is now being developed by the State of Maine in cooperation with members of the Bureau's staff.

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

COOPERATION WITH FISHERY ADVISORY COMMITTEE

The Division of Fishery Industries offered its fullest assistance during the year to the Fishery Advisory Committee for the Department of Commerce. Facts and figures upon the scope and conditions of the fisheries are not readily apparent except through the data collected and compiled by the Bureau of Fisheries and for this reason the success of the meetings of this Committee is partially reliant upon cooperative assistance of the Bureau's staff.

During the fiscal year the Fishery Advisory Committee held two official meetings. The first of these occurred on October 5, 1938, in Boston. This meeting was held in conjunction with the National Fishery Convention which was held in Boston during the first week of October. The division contributed to the deliberations of this meeting, furnishing summaries of activities and problems as well as assisting in the program of the meeting and in its publicity.

Assistance was also furnished the Committee in its second meeting, which was held on January 30 and 31, 1939, in the Department of Commerce Building in Washington. The full technical personnel of the Washington area was made available for consultation at this meeting. An outline of fishery problems and the Bureau's activities in relation thereto provided the foundation of the Committee's program.

The meetings resulted in the passage of resolutions, concerning the operations of the Division of Fishery Industries, which endorsed the enlargement of the Market News Service; recommended a thorough study of retail fish marketing; and urged the establishment of an extension service and the making of quality and consumption studies by the Bureau.

COOPERATIVE PAN-AMERICAN FISHERY RESEARCH

At the request of Dr. Ernest Gruening, Director of the Division of Territories and Island Possessions of the Department of the Interior, the writer was detailed as adviser on fishery matters to accompany the President's Educational Commission to Puerto Rico. The commission conducted a study of the University of Puerto Rico with the view of developing this university into a Pan-American institution. This project was recommended to President Roosevelt by his Committee on Cooperation with Latin America, and was approved by him. The commission was headed by President Isaiah Bowman of The Johns Hopkins University.

Our neighbors to the south are constantly asking us for assistance in the field of fisheries. In view of this, it appeared desirable to explore the place and need for a school of fisheries or fishery research laboratory at the proposed Pan-American institution in Puerto Rico which could serve as a focal point for fishery education to students from the Americas and the West Indies.

The development of a fishery school or research laboratory also would round out a program of scientific cooperation with Latin America which already has had its beginnings in a School of Tropical Medicine. This school is conducted under the joint auspices of the University of Puerto Rico and Columbia University. Plans are also under way for the development of graduate schools of tropical forestry and tropical agriculture.

The commission left New York City for Puerto Rico on April 6 and returned April 24, 1939. Its findings and recommendations have been reported to the President.

EXHIBITS AT EXPOSITIONS

During 1938 the Division of Fishery Industries finished arrangements for a Bureau of Fisheries display for the Pan-American Exposition at Tampa, Fla., and planned the participation of the Bureau in the "theme" exhibits for the New York World's Fair, 1939. The display at Tampa consisted of a diorama of the sponge-fishing industry. At the New York Fair the Bureau was represented in the following dioramas: Conservation, Food, Industry, Recreation, and Territories. Displays also were shipped to San Francisco for the use of Fair authorities at that city in the Golden Gate International Exposition. These consisted of illuminated panels depicting the migration of the Alaska salmon in the Pacific Ocean and the American and European eels in the Atlantic Ocean. The Bureau also was represented in the Conservation theme at this Fair.

The publicity attendant upon the public showing of displays depicting the Bureau's activities and operations in the fishery industries is recognized as an important factor in the public relations of the Bureau of Fisheries.

ECONOMIC AND MARKETING INVESTIGATIONS

There is a constant demand upon the Division of Fishery Industries to conduct economic studies of the commercial fisheries, including investigations having application to the various functions of marketing fishery commodities. It has been possible to undertake only a limited program of long-time or continuing studies of this kind with available personnel and funds during recent years. However, as is customary each year, many short-time economic and marketing studies were made in order to satisfy the urgent demands placed upon the Division. Some of these studies are conducted preliminary to or closely associated with administrative activities of the Bureau and, consequently, they are frequently not published. Some of the economic and marketing studies which were made during the past year are discussed briefly in the following paragraphs.

SURPLUS-FISH SITUATION

As a result of the legislation incorporated in Public Act 542, which was approved on May 25, 1938, the Federal Surplus Commodities Corporation, during the latter part of the fiscal year 1938, purchased 3,595,000 pounds of fish and fish products at a commodity cost of about \$265,000. These purchases consisted largely of pollock, haddock, cod, mackerel, blue runner, hake, and squeteagues or "sea trout." It will be recalled that 12,059,000 pounds of fishery products were purchased, at a commodity cost of \$597,000, during the latter part of the fiscal year 1937 under similar authority. These costs do not include handling and transportation.

Fishery commodities purchased by the Federal Surplus Commodities Corporation were diverted from the normal channels of trade and

commerce by their distribution through Federal, State, and private relief agencies.

A study of the situation with respect to surplus fish was made by the staff of the Division during April and May 1939. The findings of this study were presented by the writer on May 31, 1939, before the Committee on Merchant Marine and Fisheries of the House of Representatives in connection with the deliberations of that Committee on H. R. 5025 and 5681.

The former of these bills had for its purpose the provision of temporary measures for the further purchase of fishery products for distribution to relief clients, while H. R. 5681 was designed to furnish permanent provision for the removal of surplus fishery commodities from the normal channels of trade and commerce.

The study made in the Division developed the following information:

Frozen and cured fish.—The holdings of frozen fishery products in cold-storage warehouses in the United States on April 15, 1939, amounted to 29,744,000 pounds, compared with 37,367,000 pounds on the same date the previous year. This is 882,000 pounds in excess of the normal or 5-year average of the holdings as of April 15, which amounted to 28,862,000 pounds.

The excess holdings as of April 15, 1939, over the 5-year average for this date consisted principally of shellfish, largely shrimp originating from the South Atlantic and Gulf coast; shad from the Atlantic coast; sablefish from the Pacific coast; and various fresh-water fish from the Great Lakes.

On April 15, 1939 the cold-storage holdings of cured herring amounted to 15,670,000 pounds, compared with 15,082,000 pounds on the same date in 1938 and the 5-year average of 12,229,000 pounds as of April 15.

Cold-storage holdings of mild-cured salmon on April 15, 1939, amounted to 3,529,000 pounds, compared with 2,719,000 pounds on the same date a year ago and the 5-year average of 3,116,000 pounds as of April 15.

Canned fish.—Holdings of canned salmon in the hands of packers, according to a report of the Association of Pacific Fisheries, Seattle, Wash., amounted to 2,032,591 standard cases of 48 1-pound cans per case on February 28, 1939. This is a decrease of 1,396,000 cases, or 67,000,000 pounds, as compared with the holdings on the same date the previous year.

Data obtained by telegram from members of the industry showed that holdings of canned tuna on March 15, 1939, amounted to 9,600,000 pounds, or approximately 6,000,000 pounds less than a year ago, while those of California sardines aggregated 7,900,000 pounds, or 3,100,000 pounds more than on the same date the previous year. Current holdings of canned shrimp amounted to 4,500,000 pounds which were almost identical with the holdings a year ago, and those of canned oysters were 2,600,000 pounds, or 800,000 pounds greater than in the preceding year. It is reported that there were no stocks of Maine sardines in packers hands on March 15 this year, but last year holdings of this product totaled about 8,000,000 pounds.

Summary.—The holdings in the spring of 1939 of all of the types of edible fishery products outlined above aggregated about 172,000,000 pounds compared with 256,000,000 pounds as of comparable dates a

year ago. The holdings this year represented an excess of about 5,600,000 pounds over normal holdings for this time of the year.

SURVEY OF RETAIL MARKETING OF FISH AND SHELLFISH

Following an intensive preliminary study to determine the most efficient procedure and coverage, a survey of retail marketing of fish and shellfish was undertaken in March 1939 under the direction of Ralph Russell, Associate Fishery Economist, to include about 50 representative cities east of the Mississippi River.

The annual domestic per capita consumption of fish amounts to only 13 pounds; less than that of most of the important countries of the world. This low consumption not only curbs the potential growth of our commercial fisheries but also is evidence of the restricted volume of these healthful foods in the average diet. Recent studies indicate wide variations in the consumption of fish among various cities as well as among the various social and economic groups of residents of these cities.

It is the purpose of this survey to study the conditions under which fish are sold in retail markets. To accomplish this, the Bureau's investigators are interviewing a large number of dealers representing all segments of the retail trade to obtain information on retail methods, equipment used, prevalence and nature of advertising, consumer preference and response, location of retail outlets, and characteristic as well as unusual merchandising practices and selling methods. The field work of this survey will continue until about the end of June 1939, after which the results of the survey will be tabulated and analyzed to determine the factors which lead to the most favorable response from the public and to establish criteria which may guide retailers toward those practices which are most successful or promising. It is expected that one or more reports will be published following the completion of this work.

COMMERCIAL FISHERIES OF THE WORLD

The world's annual catch of fishery products, based on the most recent available data, amounts to about 33,600,000,000 pounds, valued at \$740,000,000. The United States, including Alaska, with a catch valued at \$93,000,000, leads the countries of the world in the annual value of its yield. Japan's annual catch, valued at \$87,000,000, ranks second. Other countries, the annual catch of which exceeds \$50,000,000 in value are, in order of their importance, Union of Soviet Socialist Republics; England, including Scotland, Northern Ireland, and Wales; China; and France. Japan, with a catch of 6,600,000,000 pounds, leads in the annual volume of the catch among the countries of the world. Following is the United States with a catch aggregating 4,800,000,000 pounds. Other countries whose annual catches exceed 1,500,000,000 pounds are, in order of their importance, Union of Soviet Socialist Republics; China; England, including Scotland, Northern Ireland, and Wales; Norway; and Germany.

THE ROSEFISH FISHERY OF NEW ENGLAND

The rosefish or "redfish" fishery of New England experienced another good year in 1938 from the standpoint of total yield, although the average value to the fisherman decreased to 1.2 cents per pound from

1.5 cents in the previous year. Landings of this species at the ports of Boston and Gloucester, Mass., and Portland, Maine, aggregated 64,700,000 pounds in 1938 as compared with 58,300,000 pounds in 1937, and the all-time high of 66,600,000 pounds in 1936. It will be recalled that prior to the intensive exploitation of this fishery in 1935 the rosefish was of little importance as a commercial species. The entire landings at the three above-mentioned principal New England ports amounted to only 57,000 pounds in 1932.

During the 4 years beginning in 1935, in which this fishery has been one of importance, Boston has received about 67 percent of the landings, Gloucester 32 percent, and Portland 1 percent. However, during these 4 years the relative importance of the individual ports in the receipts of rosefish has undergone considerable change. The landings at Boston, while amounting to 49,400,000 pounds in 1936, decreased to 34,100,000 pounds in 1938. The landings at Gloucester amounted to 17,000,000 pounds in each of the years 1936 and 1937 but increased sharply to 29,400,000 pounds in 1938. The receipts of this species by vessels at Portland have increased from 70,000 pounds in 1935 to 1,150,000 pounds in 1938.

While rosefish are taken widely throughout the fishing banks of the North Atlantic, the Western Side of South Channel alone contributed 35 percent of the landings at these three New England ports during 1937. Other fishing areas of especial importance as contributors to the landings at these three ports were as follows: Southern Nova Scotia 21 percent, Brown's Bank 20 percent, Eastern Side South Channel 11 percent, Inner Grounds 5 percent, and Western Nova Scotia 3 percent. Virtually the entire catch of rosefish is made by otter trawls.

COD FISHERIES OFF THE EAST COAST OF NORTH AMERICA

The average annual catch of cod off the East coast of North America for the 10-year period from 1926 to 1935, inclusive, amounted to 1,108,000,000 pounds, as compared with an annual average of 1,169,000,000 pounds for the preceding 10-year period, according to a report prepared by Edward A. Power, Associate Statistician and the writer, for the use of the North American Council on Fishery Investigations. The present study brings up to date Fisheries Document No. 1034 entitled "Statistics of the Catch of Cod Off the East Coast of North America to 1926," by Oscar E. Sette, which includes available data on the cod fishery prior to 1927. In 1935, the most recent year for which complete statistics are available, the catch of cod in this region amounted to 1,109,000,000 pounds. The cod fisheries off the East coast of North America are prosecuted by the nationals of no less than five countries. The most important among these, with respect to the annual volume of fish taken, is Newfoundland, the catch of which in the years from 1931 to 1935, inclusive, averaged 495,000,000 pounds. Following in order were Canada, which produced an average of 192,000,000 pounds annually during the same period; France, 127,000,000 pounds; United States, 109,000,000 pounds; and Portugal, 40,000,000 pounds.

SOURCES AND SUPPLIES OF STURGEON

Imports of sturgeon into the United States have been consistently decreasing in recent years. In 1931 receipts of sturgeon from foreign countries amounted to 3,435,000 pounds, but decreased to 1,744,000

pounds in 1934 and 1,184,000 pounds in 1938. This decline in imports is reflected principally in receipts from the Soviet Union which is the principal source of supply. Where imports from the Soviet Union amounted to 1,605,000 pounds in 1934, they decreased to 750,000 pounds in 1938.

Contrasted with the decline in receipts of sturgeon from the Soviet Union are the steadily increasing imports from Canada. Such imports amounted to only 124,000 pounds in 1934, but had increased to 353,000 pounds in 1938. Receipts from Canada were augmented during the latter part of 1938 by the development of a new source of supply in the Albany River in northern Ontario. According to a report from Warwick Perkins, American Consul at Toronto, Canada, the capture of sturgeon in this river in the past has been incidental to fisheries for other species, but, due to the high unit value of sturgeon, it has been found profitable to prosecute a fishery specifically for this fish, transporting the catch by aircraft to Nakina for transshipment on the Canadian National Railways.

It is of interest to observe that imported sturgeon furnishes our principal supply, since the domestic annual catch has averaged less than 300,000 pounds in recent years.

STATISTICAL INVESTIGATIONS

Fishery statistics are collected by the Bureau to serve two principal purposes—biological and economic. For this reason the Bureau plans 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.

It is essential that statistics on these latter phases of the industry be collected and published as soon as possible after the close of the business transactions in order that they may be of maximum value to the fishery industry and other interested parties.

BIOLOGICAL ASPECT

The biological aspect must consider two problems—the conservation and sustained supply of the resource, and the prediction of future trends or yields. Since the fisheries are usually prosecuted in areas not under private ownership, the problem of the conservation of these fisheries is of national concern. It 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 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 (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 and statistical information. Such material has been especially valuable during the past few years, when it has been used in national planning. The Bureau endeavors 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 1938 were conducted under the immediate supervision of Edward A. Power, Associate 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, fishing craft and apparatus, and employment in the fisheries. In addition, data were collected on employment and compensation of those engaged in, and products of, fishery wholesale and manufacturing establishments.

Surveys were made during the year covering all coastal sections as well as the Great Lakes for 1937. Statistics of the fisheries of Alaska also were collected by the Division of Alaska Fisheries. A summary of the production of the Mississippi River and tributaries for 1931, which is the most recent year for which a survey of this section was made by the Bureau, is included 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 byproducts of the United States and Alaska; transactions on the sponge exchange at Tarpon Springs, Fla.; 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: D. Y. Aska, C. H. Chilton, L. S. Christey, S. C. Denham, F. F. Dimick, M. J. Fraser, R. L. Greer, R. L. Hacker, V. E. Heffelfinger, H. J. Kumin, B. E. Lindgren, C. H. Lyles, C. E. Peterson, C. J. Robbins, V. J. Samson, C. B. Tendick, R. T. Whiteleather, and F. M. Wood.

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.

FISHERY MARKET NEWS SERVICE

Following a period of necessary preliminary work devoted to planning, and training of personnel during the latter part of 1937, the Fishery Market News Unit of the Division was intensively engaged during 1938 in the problems connected with the opening of field offices and the issuance of daily reports therefrom. By the fall of 1938 offices were operating at four strategic points in important fish-producing and fish-marketing areas of the country, and a fifth office was issuing daily reports early in 1939.

The importance of this service to the fishery industry and allied interests is evidenced by the widespread localities and diverse classes of recipients from which requests for this service have been received. Addresses on the mailing lists include every producing and marketing area of importance in the country. Every branch of the fishing industry and numerous groups from allied fields are represented. Among the various classifications on the mailing lists are fishermen and producers; wholesale dealers; brokers; importers and exporters; buyers; retailers; chain stores; cold-storage plants; canners; salters; smokers; byproducts manufacturers; supply firms; transportation companies; Federal, State, and municipal agencies and officials; unions; associations; fishery publications; newspapers; magazines; libraries; banks; and statistical organizations.

In addition to its activities in connection with the direction and administration of the service, the Washington office of the Fishery Market News Service, in January 1939, began the preparation and dissemination of periodic current reviews of fishery market information. These are prepared in multilith form and distributed to fishermen, dealers in fish, and other interested parties. It is expected that between 10 and 15 of these reviews will be prepared each year. The need for such a service for our fishery interests has long been evident but, obviously, this need has been augmented in recent years as competition in the marketing of fishery commodities has become keener. Fortunately facilities for the preparation and dissemination of such reviews have been developed through the Fishery Market News Service. These periodic reports include summarized data, made available through the daily and monthly reports of the Fishery Market News Service, on movement, prices, and the current status of production and stocks on hand of fishery commodities; articles relating to the fisheries, prepared by members of the Bureau's staff, members of the industry, or other interested parties; excerpts or abstracts from Bureau or other publications relating to the fisheries; and related information.

During 1938 the work of the Fishery Market News Service of the Division was carried on under the immediate supervision of A. W. Anderson, Fishery Marketing Specialist, and the general direction of Fred F. Johnson, Assistant Chief of the Division. Assisting in this work, with headquarters in Washington, D. C., but working both at the headquarters office and in the field, were H. E. Timmis, Fisheries Statistical and Marketing Agent, and P. W. Evans, Junior Fisheries Marketing Agent.

FIELD OFFICES

The locations of the field offices of the Fishery Market News Service have been carefully chosen to be not only of service to the communities near their locations but also to be of the greatest benefit to the industry as a whole. Thus, New York City was selected for the first office, since it is the center of the country's most important consuming area and the market to which fishery commodities are shipped from all parts of the Nation and from foreign countries. The fresh-water and salt-water fish markets of New York exercise considerable influence on the production and price of fishery products in many areas.

The choice of Boston for the second field office was due to its importance as the center of New England's valuable fisheries, and as a port of landing for large quantities of fresh fish. With a Market News office in Boston, and agents in nearby ports, it has been possible to include in the report data on species, quantity, price, and gear used, covering about 75 percent of the fish landed in New England each day. The catch, usually running well over 600,000,000 pounds annually, is a vital factor in the fresh and frozen fish trade of this country. The value of current detailed data to all who handle this tremendous volume of fish from fishing grounds to markets over the Eastern half of the Nation is obvious.

Chicago was selected for the third field office as the most important inland market for fishery products. Much of the harvest of fresh-water fish from the Great Lakes and other interior waters is shipped to this city's wholesale market for distribution. In addition to domestic fish, Chicago receives large quantities of Canadian fresh-water varieties. It also is a marketing area and meeting ground for Eastern haddock and rosefish, Western halibut and salmon, and Gulf Coast shrimp and red snapper, thus demonstrating the distant markets penetrated by our coastal varieties and indicating the possibilities of our inland States as fish-consuming territories.

The Seattle, Wash., office was the fourth to be established. It is at that port that the greatest quantities of halibut from the valuable Pacific Coast halibut fishery are landed. Landings of salmon for the fresh and frozen trade likewise are important. In addition the receipts and transshipments, chiefly from Alaska but also from British Columbia, of both of these species are considerable. Besides covering the local production and prices, the location of the Seattle office makes it possible to obtain similar daily information from important ports in Alaska and British Columbia. A summary of this information, together with the daily carload shipments out of Seattle and Prince Rupert, B. C., is wired to our Eastern offices, providing their local markets with the advance information of probable Western arrivals, which is so essential a factor in stabilizing market prices.

The fifth Market News office was located in Jacksonville, Fla. In contrast to the other offices Jacksonville is neither an important fishing port nor the center of a large consuming area. It is, however, a very important concentrating, distributing, and shipping center, through which most of Florida's fish passes when destined for Northern markets. From this office it not only is possible to indicate market trends in all Southern varieties of fish and shellfish by reporting the production, price, and shipments of the catch in Florida, but it also is favorably situated for obtaining data on cold-storage holdings in important plants in the South Atlantic and Gulf States, and for compiling current records of the valuable canned shrimp pack which runs over a million cases annually. Of equal importance to the Southern producers is the fact that the Jacksonville office is favorably situated to quickly disseminate wired information on receipts and prices of Southern fishery products and competitive varieties in Northern markets.

The field offices are equipped with mimeographs, folders, and addressing machines to facilitate the expeditious preparation and handling of daily reports. The return address and frank are mimeographed on the report, which is folded and sealed in such a manner that it may be mailed without the use of an envelope. Addresses are stenciled on the reports after sealing. Each office also uses a different color of paper for its reports which not only enables the recipient to quickly identify them in the mail each day but also facilitates their filing for future reference.

It is estimated that existing fishery market news offices report market conditions affecting over a billion pounds of fish and shellfish annually.

Reference is made to Figures 1 and 1a which are reproductions of the explanatory statement forwarded to those on the mailing list at the New York Fishery Market News office. Similar statements are furnished from the other offices. Figures 2, 2a, 2b, and 2c are reproductions of a representative daily report issued by the New York office.

The activities of each of the Division's Fishery Market News offices and the coverage of the daily reports emanating from them are here discussed in greater detail.

NEW YORK, N. Y.

The New York office of the Fishery Market News Service issued its first Fishery Products Report on February 14, 1938. Reports have been released daily since then with the exception of Sundays and holidays.

The first section of each daily report includes data on the number of cars and packages of fish and shellfish which have arrived in the metropolitan area by rail freight and express during the preceding 24 hours, or, in the case of intervening Sundays or holidays, the period since the latest report. In the instance of fish, the species rarely can be indicated since it seldom is noted on the bill of lading. For shellfish, however, the species generally is shown. Following the above section of the report, arrivals by coastwise vessels are reported. Imports of fresh and frozen fish and fishery byproducts, such as fish oils, fish meals, etc., are compiled daily from the ship's manifests filed at the local Customhouse, and information concerning the commodity, number of packages, country from which shipped, and the name of the vessel are shown in the daily report.

Direct landings by fishing vessels at the New York market are reported as "hailing fares." Since hailing fares often vary from the actual landings, the exact "weigh-outs" are included in the report for the following day. With the advent of the Fishery Market News Report an accurate record of landings by species at New York City has been made available for the first time.

Landings by fishing craft at Portland and Rockland, Maine, and at Boston, Gloucester, Provincetown, and New Bedford, Mass., are tabulated and included in the report. The number of craft, type of gear used, and the price of each species landed also are shown. Sections on Pacific coast markets include the transactions on the halibut and salmon exchanges in Seattle, Wash., halibut landings at Prince Rupert, B. C., and the number of cars of fresh or frozen fish shipped East from each of these ports. Such information relating to market conditions at other fishing ports is received in New York by telegraph early each morning.

The amount of fish and shellfish entering or withdrawn from cold-storage plants in the Greater New York area is compiled and shown daily in about 60 classifications. Once each week the current holdings are compared with the holdings of the preceding week and also with the holdings for 4 weeks and 1 year previous. Ten cold-storage firms with 14 plants have cooperated with the Bureau in furnishing these data. Of these plants only two actually freeze fish or shellfish, while the rest are storage plants and receive their goods already frozen.

As the salt-water market is separate from the fresh-water market, the prices for the two are included in different sections of the report. Managers and salesmen of the various firms are interviewed daily to obtain the day's wholesale price quotations for the various kinds of fish and shellfish. Prices usually are accompanied by essential qualifying descriptions of the commodity, such as size and quality of the product, locality of capture, gear used, and size and type of package.

At the same time that quotations are being gathered in the salt-water market, a record of the receipts of each firm is obtained. These are compiled and, on the following day, these records furnish the basis for the section of the report showing the total quantity of each species received by States and Canadian Provinces. The record of the receipts of each firm also shows the method of transportation into the market area. In 1939 a summary making use of this information will be compiled for the salt-water market. This summary will classify receipts by origin and by method of transportation, such as truck, express, rail freight, coastwise vessel, and fishing craft.

For the 6 months from March through August 1938, the salt-water market received 79,686,000 pounds of fish; excluding imports and receipts of filleters and some hotel-supply houses. Receipts of shellfish, 22 species in all, are not included in the above figure. The largest poundage arrived by motortruck, accounting for 40 percent of the total. Fishing craft landings were next with 27 percent. Rail freight and rail express followed, with 23 percent and 9 percent, respectively. Coastwise vessels carried only one-half of 1 percent of the total. Seventy-six different species of fish were received.

Two Pages

UNITED STATES DEPARTMENT OF COMMERCE
BUREAU OF FISHERIES
DIVISION OF FISHERY INDUSTRIES, MARKET NEWS SERVICE
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FISHERY PRODUCTS REPORTS

Market News reports cover fresh and frozen fishery products only, unless data concerning salted, smoked, canned, or otherwise preserved fishery products are deemed of sufficient interest to be included. All items are to be understood as fresh when no specification is made. Frozen products are specifically indicated. Misographed reports will be issued daily except Sundays and holidays. They are distributed free, by mail, to those requesting them at the above address. Information in the reports also is available to interested parties by telephone or telegraph, collect, as soon as it is compiled.

For the purpose of these reports, New York City, unless otherwise stated, includes the area supervised by the Port of New York Authority. In general, this includes the five boroughs of New York City and an area along the New Jersey shore of the Hudson River opposite Manhattan.

The weather report is a record of conditions at the Weather Bureau, 17 Battery Place, in New York City at 7:30 A. M. Eastern Standard Time.

RAIL ARRIVALS

This section is prepared from reports received from the terminal agents of the various railroad and express companies bringing fishery products into New York City. These reports are received by telephone daily and cover the activities of the carriers for the twenty-four hour period ending at 8 A. M. each morning, or in the case of intervening Sundays and holidays, the period since the last report. Carloads are listed according to the number of cars arriving, and less than carload (L.C.L.) lots by the number and, where possible, the type of packages. All shipments received are classified by the State or Province from which they were billed. This, however, does not necessarily imply that the fish were produced in the State or Province from which they were shipped.

COAST-WISE VESSEL RECEIPTS

This section is prepared by much the same procedure as "Rail Arrivals", the information being obtained from the freight agents of coastwise steamship companies bringing fishery products into New York.

LANDINGS BY FISHING CRAFT

This section shows the "bailing fare" of fishing craft landing at Fulton Market. The "bailing fare" is an estimate of the weight of the catch by the captain before the fare is weighed out. The "landings" used in "Receipts on Salt-water Market" are the "weighed out" or actual fares reported by dealers.

WEIGH-OUTS BY FISHING CRAFT

This section is compiled from the "weighed out" or actual fares as reported by the dealers purchasing the catch of fishing craft landing at Fulton Market.

IMPORTS ENTERED

This section includes imports of fishery commodities, except canned and preserved, from foreign countries, and is obtained in the Custom House at New York City from the ship's manifests. If these manifests show fishery commodities listed for discharge at nearby Atlantic ports, these items are included with a supplementary statement such as "Due Boston", etc.

OTHER PORTS OR MARKETS

This section is prepared from summarized information received each day by telegram from Bureau of Fisheries agents or Market News offices in the cities mentioned. Quotations generally are only for varieties of interest to this region.

SALT-WATER MARKET

RECEIPTS are compiled daily from the records of direct receipts of fresh and frozen fishery products as furnished by the original receivers in New York City. The "landings" by fishing craft shown in this section are "weighed out fares" and not the "bailing fares" shown on the previous day's report. This section does not include local cold storage withdrawals and imports entered at New York City.

SUPPLY, DEMAND, MARKET AND PRICES are obtained by consulting dealers each morning. Price quotations are actual sales by original receivers in the usual wholesale quantities. Unless otherwise noted, prices are for stocks of good merchantable quality.

FRESH-WATER MARKET

RECEIPTS are determined from rail freight, express and truck reports and conferences with dealers.

SUPPLY, DEMAND, MARKET AND PRICES are obtained in a manner similar to that described under "Salt-water Market" above.

(Over).

FIGURE 1.—Reproduction of page 1 of a typical explanatory statement concerning Fishery Market News Service reports.

COLD STORAGE MOVEMENT AND HOLDINGS

Page 2.

This section is compiled from reports obtained daily from cold storage warehouses in New York City. Firms having cold storage rooms in which they store for brief periods for their own use are not included, nor are cold storage warehouses storing fishery products solely for retail sale.

TERMS USED FOR SUPPLY, DEMAND, AND MARKET

<u>SUPPLY</u>	<u>DEMAND</u>	<u>MARKET</u>
Insufficient to quote.	No demand.	Weak.
Practically no supplies on market.	Slow.	Dull.
Light.	Light.	Unsettled.
Moderate.	Moderate.	Steady.
Liberal.	Good.	Firm.
Heavy.	Active.	Active.
Oversupplied.	Demand exceeds supply.	Strong.

ABBREVIATIONS USED

Alabama	Ala.	North Carolina	N. C.	bag	bg.
Alaska	Alaska	North Dakota	N. Dak.	barrel	bbi.
Arizona	Ariz.	Ohio	Ohio	basket	bskt.
Arkansas	Ark.	Oklahoma	Okla.	bale	bl.
California	Calif.	Oregon	Oreg.	box	bx.
Colorado	Colo.	Pennsylvania	Pa.	bundle	bdl.
Connecticut	Conn.	Rhode Island	R. I.	bushel	bu.
Delaware	Del.	South Carolina	S. C.	can	can
District of Columbia	D. C.	South Dakota	S. Dak.	carton	ctn.
Florida	Fla.	Tennessee	Tenn.	case	ca.
Georgia	Ge.	Texas	Tex.	crate	crf.
Idaho	Idaho	Vermont	Vt.	dozen	doz.
Illinois	Ill.	Virginia	Va.	each	ea.
Indiana	Ind.	Washington	Wash.	express	exp.
Iowa	Iowa	West Virginia	W. Va.	freight	frt.
Kansas	Kans.	Wisconsin	Wis.	gallon	gal.
Kentucky	Ky.	Wyoming	Wyo.	half	hlf.
Louisiana	La.	Canada	Can.	kg.	kg.
Maine	Maine	British Columbia	B. C.	hundredweight	cwt.
Maryland	Md.	Alberta	Alta.	large	lge.
Massachusetts	Mass.	Saskatchewan	Sask.	market	mk.
Michigan	Mich.	Manitoba	Man.	metric	met.
Minnesota	Minn.	Ontario	Ont.	number	no.
Mississippi	Miss.	Quebec	Que.	package	pkg.
Missouri	Mo.	New Brunswick	N. B.	pound	lb.
Montana	Mont.	Nova Scotia	N. S.	piece	pc.
Nebraska	Nebr.	Prince Edward Island	P.E.I.	sack	sk.
Nevada	Nev.	Newfoundland	Newf.	quart	qt.
New Hampshire	N. H.			small	sm.
New Jersey	N. J.			tierce	tc.
New Mexico	N. Mex.			tonnage	tn.
New York	N. Y.			truck	trk.
				tub	tub.

Explanatory Statement, 5/5/39.
UNITED STATES DEPARTMENT OF COMMERCE

BUREAU OF FISHERIES
Division of Fishery Industries
MARKET NEWS SERVICE
33A Fulton Street
New York, N. Y.

OFFICIAL BUSINESS

Penalty for Private Use to Avoid
Payment of Postage \$300.

John Doe

5702 - 26th St., N.E.

Seattle, Wash.

Four Pages. UNITED STATES DEPARTMENT OF COMMERCE WEATHER at 8:30 A. M.
Tel. Beekman 3-4382 or 3. BUREAU OF FISHERIES 62^d Clear.
33A Fulton Street, DIVISION OF FISHERY INDUSTRIES, MARKET NEWS SERVICE Fri., May 26, 1939.NEW YORK, N. Y.

FISHERY PRODUCTS REPORT - NUMBER 123

Unless otherwise specified, all sections refer to NEW YORK CITY; quantities are in pounds; and prices are in cents per pound for stocks of good merchantable quality.

RAIL ARRIVALS

For 24 hours ending 8 A. M. today.

Unless otherwise stated, LCL packages are by express and cartloads are by freight. Shipments are listed by State and Province from which they are billed.

FRESH FISH	LCL	CARLOADS	MTSS.	LCL	CARLOADS
MAINE	3		28		
MASS.	4	*5	30		
R. I.	9	*6	5		
N. Y.	29		34		
N. J.	2		4		
PA.	48		399		
MD.	4		37		
VIRG.	11		102		
N. C.	4		14		
FLA.	12		5		
ALA.	14		451		

Total: 1,193 pkgs; 11 cars.

* Includes some unclassified frozen fish and shellfish as well as all lobsters reported below as "lobsters, unclassified, freight".

FROZEN FISH:

MASS.	LCL
	2

SHELLFISH, ETC.:

CRABS, SOFT: Del. 3 bxs; Va. 29 bxs; Md. 32 bxs.

CRAB MEAT: Md. 3 bbls; Va. 5 bbls, 4 kegs; Ga. 4 bbls; Fla. 10 bbls, 2 bxs; La. 3 bbls.

FROG LEGS: Fla. 4 bbls; La. 3 bbls.

LOBSTERS: Maine 23 bbls; Mass. 11 bbls; UNCL. frt.* 164 bbls.

LOBSTER MEAT: N. S. 6 bbls, 1 bx.

OYSTERS, SHELL: Mass. 1 bbl.

SHELLY: S. C. 7 bxs; N. C. 1 bbl; Ga. 156 bxs; Ala. 10 bxs.

* See foot note above

COASTWISE VESSEL RECEIPTS

For 24 hours ending 8 A. M. today.

None reported.

LANDINGS BY FISHING CRAFT

Hauling fares for 24 hours ending 8 A. M. today.

This Morning			
ANNA S.	Scallops, sea	900	gals.
GIDA ELSE:	" "	1,350	"
JULIA K.:	" "	500	"
3	Total	3,150	"

Thursday - Additional

KATHLEEN: Whiting 2,000; Squid 2,000.

IMPORTS ENTERED

For 24 hours ending 8 A. M. today.

(Except canned & preserved)

Fresh Fish
HALIBUT: Canada 10 cs.
Shellfish, etc.
LOBSTERS, BOILED: Canada 12 tubs.
TURKEYS, LIVER: Mexico 20 pcs; Jamaica 50 pcs.
Miscellaneous
FRESH MEAT: France 11 boxes due Philadelphia.
OIL, COD LIVER: Iceland 250 drums due Norfolk; England 200 drums due Philadelphia.
OIL, MEDICINAL COD LIVER: England 25 drums due Baltimore.
OIL, FOLKERY COD LIVER: England 75 drums due Baltimore; Norway 25 drums due Philadelphia.
Vessels: "FORT POWERSHEAD", Canada; "BALANCA", Jamaica; "WEST CUSSETA", Norway, Iceland, and England; "PIESKICE COUNTY", France; "AGWISTAN", Mexico.

PROVINCETOWN, MASS.

Landings for 24 hours ending 6 A. M. today.

Thursday			
INSHORE: 6 Line Trawlers:	Cod, large	3,000	lbs.
	" market	1,000	"
6	Total	4,000	"

P-11:00 A.M.

Report #123, Fri., May 26, 1939

BOSTON, MASS.

Landings for 24 hours ending 8:30 A. M. today.

This Morning WEATHER: 97° Cloudy. LBS. (#)

3 Sliners:	1 lb. up	67,000	2.25
Small	68,000	0.75	
3	Total	135,000	

OFFSHORE	LBS.	INSHORE	LBS.
4 Otter	244,000	3 Dragners	68,000
4	Total	5 Line Trawlers	7,000
		3	Total
			75,000

BY SPECIES:	OFFSHORE	INSHORE
	LBS. First Sales	LBS. First Sales
Cod, large	6,000	3.5
" market	15,000	2.25
" scrod	3,000	1.75
Cusk	-	1,000
Dabs	2,000	1.1
Haddock	93,000	3.0
" scrod	102,000	2.3
Hake	-	1.0
Pollock	2,000	1.6
Rosefish	3,000	-
Sole, gray	1,000	3.0
" lesson	14,000	1.8
Whiting, dressed-	-	4,000
" steak	-	14,000
Wolfish	3,000	1.75
Total	244,000	75,000

SEATTLE, WASH.

For 24 hours ending Thursday (P. S. T.) as shown.

SALMON EXCHANGE: (9 A. M.)

King, large	LBS.	(#)
" small	1,816	15.5-16.0
" white	1,564	12.0-13.25
Silver	102	9.0-10.5
Total	3,582	9.0-10.0

HALIBUT EXCHANGE: (10 A. M.)

4 Western	LBS.	3 Local	LBS.	(#)
Chicken	5,500	6.75-7.0	10,800	7.0
Medium	94,000	7.1-7.4	11,500	7.1-8.4
Large	34,500	6.75-7.1	500	7.0
Total	134,000		22,300	
		Subfish	5,000	7.0

ADDITIONAL RECEIPTS: (8 A. M.)

COASTWISE:	(Halibut, frozen)	16,838	lbs.
	(Salmon, king)	35,779	"
	(Halibut)	2,263	"

CARS SHIPPED: Wednesday 5 via Express (East).

PRINCE HEPHER, B. C.

For 24 hours ending 10 A. M. P. S. T. Thursday.

HALIBUT LANDINGS:	LBS.	MEDIUM	CHICKEN
CANADIAN VESSELS:	16,000	(#)	(#)
		7.5	5.0

CARS SHIPPED: Wednesday 3 via Express.

PORTLAND, MAINE

Landings for 24 hours ending 6 A. M. today.

INSHORE	LBS.	BY RECEIPTS:	LBS.	(#)
6 Dragners	46,000	Cod, large	9,000	2.0-2.5
9 Gill-		" market	2,000	1.25
netters	13,000	Cusk	6,000	1.5
16 Line		Haddock	3,000	3.0-4.0
Trawlers	18,000	Hake	6,000	1.5
		Pollock	6,000	1.0-1.25
		Rosefish	25,000	1.25
		Sole, gray	1,000	3.0
		Whiting	16,000	0.75
		Yellowtails	1,000	0.75
		Mixed	2,000	-
31	Total	77,000	Total	77,000

Note: Additional landings on Page 2.

(Over).

FIGURE 2.—Reproduction of page 1 of a typical daily Fishery Market News Service report issued by the New York City office.

RECEIPTS ON SALT-WATER MARKET

Page 2.
RECEIPTS ON SALT-WATER MARKET (Cont.)

For 24 Hours ending 8 A.M. Thursday.
Includes arrivals as reported by original receivers by truck, express, rail freight, fishing craft (weigh-outs) and coastwise vessel. Local Cold Storage withdrawals and Imports entered at New York City not included. (Receipts by filleting and hotel supply firms incomplete.)

FISH (Cont.)

FISH:

ALEWIVES: N. Y. 50.
BLUEFISH: Md. 40; Va. 110; N.C. 777; Fla. 600;
Total 1,527.
BROOK TROUT: R.I. 100; Pa. 110; Total 210.
BUTTERFISH: N.Y. 6,330; N.J. 8,200; Md. 360;
Total 14,970.
CANYON & BULLHEADS: Pa. 25; N.J. 95; Md. 200;
Total 320.
COD, LARGE: Landings 3,325.
COD, STEAK: Maine 6,520; Mass. 47,915;
R.I. 655; Landings 15,000; Total 70,090.
COD, MARKET: Maine 300; Mass. 7,735; R.I. 125;
Landings 19,060; Total 28,110.
CROAKER: Md. 28,800.
DOGFISH: N.Y. 405.
EELS, COMMON: Mass. 345; R.I. 536; Conn. 100;
N.Y. 1,650; N.J. 630; Md. 357; N.C. 100;
Total 3,755.
FLOUNDER: Mass. 37,695; R.I. 715; Conn. 17,835;
N.Y. 16,795; Landings 24,855; Total 97,895.
FLUKE: R.I. 2,525; Conn. 4,150; N.Y. 8,862;
N.J. 2,200; Va. 25; Total 17,762.
HADDOCK: Mass. 820; Landings 164,410;
Total 165,230.
HANEY: Mass. 1,775; Conn. 225; Total 1,950.
HALIBUT: Mass. 1,630; Landings 1,393; N.S. 1,900;
Total 4,923.
HEERING, SEA (SARDINE): Maine 2,850; Mass. 5,925;
Total 8,775.
JEWELFISH (WARSAW): Fla. 200.
KING MERING (KINGFISH): R.I. 51; N.Y. 1,720;
N.J. 1,618; Va. 200; Total 3,589.
LAUNCE (SAND EELS): N.Y. 320.
MACKEREL: R. I. 945; N.Y. 11,208; N.J. 77,385;
Total 89,538.
FOLLOCK: Maine 275; Mass. 2,750; R.I. 1,745;
Landings 1,250; Total 6,020.
ROE: N.Y. 200.
SCUP (FORGT): R.I. 18,750; Conn. 900; N.Y. 6,152;
N.J. 5,600; Total 31,402.
SEA BASS: Mass. 400; R.I. 1,070; Conn. 50;
N.Y. 778; N.J. 1,410; Total 3,708.
SEA BOWFIN: N.Y. 350.
SEA BROU, GRAY (WEAUFISH): N. Y. 15,708; Md. 400;
N.J. 1,871; Va. 1,070; Total 19,049.
SHAD: Conn. 2,368; N.Y. 4,618; N.J. 4,384;
Del. 155; Va. 50; Total 11,575.
SHARK: N.Y. 49.
SILVERSIDES (SEPARING): N.Y. 290.
SKATE WING: Conn. 150.
SMELT, FROZEN: Mass. 2,100.
SNAPPER, RED: Fla. 2,625.
SOLE, GRAY: Maine 8,735; Mass. 5,560;
Total 14,295.
STIPED BASS: Mass. 300; R.I. 205; N.Y. 2,911;
Md. 100; Va. 100; Total 3,616.
STURGEON: N.Y. 10.
SWELLFISH (BLONFISH): N.Y. 45; N.J. 100;
Total 145.
TAUPOG (BLACKFISH): Conn. 345; N.Y. 171;
Total 516.
TILEFISH: Landings 39,970.

WHITEHAIT: N. Y. 340.
WHITE PERCH: R.I. 40.
WHITING: N.Y. 15,705; Landings 2,000;
N.J. 9,600; Total 27,305.
YELLOWTAILS (DASS): Mass. 3,035; Landings, 1,480;
Total 4,515.
FILLETS: Mass. 38,000.
FILLETS, FROZEN: Mass. 2,600.
UNCLASSIFIED FISH: Mass. 300; R.I. 325; Conn. 100;
N.Y. 3,520; N.J. 895; Md. 200; Va. 100;
Total 5,840.
TOTAL FRESH FISH: 771,557
TOTAL FROZEN FISH: 4,700
GRAND TOTAL FISH: 776,257

SHELLFISH, ETC.:

CLAMS, HARD: Maine 9; N.Y. 959; N.J. 41; Va. 31;
Total 1,040 bu.
CLAMS, SOFT: N.Y. 140; N.J. 16; Total 156 bu.
CONCHS: R.I. 10; Conn. 27; N.Y. 28; N.J. 8;
Va. 3; Total 75 bu.
CRAB MEAT: Md. 1,064; Va. 250; N.C. 884;
Ga. 150; Fla. 972; La. 300; Total 3,640 lbs.
CRABS, HARD: N.Y. 41; Md. 45; Total 49 bu.
CRABS, SOFT: N.J. 45; Md. 5,372; Va. 1,076;
Total 6,493 doz.
LOBSTERS: Maine 810; Mass. 1,430; Conn. 100;
Uncl. 13,590; Total 15,930 lbs.
MUSSELS: N.Y. 183; Landings 60; Total 243 bu.
PERIWINKLES: Maine 2; N.Y. 2; Pa. 1; N.J. 2;
N.B. 1; N.S. 3; Total 11 bu.
SCALLOPS, SEA: Mass. 370; Landings 3,584;
Total 3,954 gals.
SHRIMP (PRAWNS): N.C. 2,650; S.C. 16,500;
Ga. 18,320; Fla. 1,910; La. 6,400
Total 45,780 lbs.
SQUID: Conn. 1,600; N.Y. 64,975; Landings 2,140;
N.J. 9,600; Total 78,315.

GLoucester, Mass.

Landings for 24 hours ending 6 A. M. today.
This Morning
OFFSHORE: 4 Vessels: Rosefish 360,000 lbs.
Mixed 20,000 "
Total 380,000 "
Thursday - Additional
OFFSHORE: 1 Vessel: Cod, large 5,000 lbs.
(Split trip via " market 1,000 "
Boston) Hake 5,000 "
Total 11,000 "
INSHORE LBS. BY SPECIES: LBS. (#)
8 GILL- Cod, whale 1,000 1.5
netters 18,000 " large 20,000 3.0
5 Line " market 2,000 1.5-2.0
Trawlers 4,000 Fallock 5,000 1.5-1.25
10 Jiggers 6,000
23 Total 28,000 Total 28,000
ROSEFISH: Thursday's ex-vessel price--1.1¢ lb.
NEW BEDFORD, MASS.
Landings for 24 hours ending 9 A. M. today.
This Morning
None reported.
Thursday - Additional
MACKEREL: 1 Seiner; Large 11,000 lbs. @ 2.5¢
E-10100 A. M. Wm. H. Dumont, Agent In Charge.

5/26/39-#123-1,2
UNITED STATES DEPARTMENT OF COMMERCE
BUREAU OF FISHERIES
Division of Fishery Industries
MARKET NEWS SERVICE
334 Fulton Street
New York, N. Y.
OFFICIAL BUSINESS

Penalty for Private Use to Avoid
Payment of Postage \$300.

John Doe
5702 - 25th St., N.E.
Seattle, Wash.

FIGURE 2a.—Reproduction of page 2 of the report shown on the preceding page.

Tel. Beekman 3-4322 or 3. UNITED STATES DEPARTMENT OF COMMERCE
334 Fulton Street BUREAU OF FISHERIES
NEW YORK, N. Y. DIVISION OF FISHERY INDUSTRIES, MARKET NEWS SERVICE May 26, 1939. Page 3.
Friday.

FISHERY PRODUCTS REPORT - NUMBER 123 (CONTINUED)

Unless otherwise specified, all sections refer to NEW YORK City; quantities are in pounds; and prices are in cents per pound for stocks of good merchantable quality.

COLD STORAGE MOVEMENT & HOLDINGS

	Thurs., May 25		This Week	Last Week	4 Weeks Ago	Last Year
	IN	OUT	Thurs., May 25.	Thurs., May 18.	Thurs., April 27.	Thurs., May 26.
Salt-Water						
BAIT & BUNKERS	-	-	35,696	35,246	35,806	48,391
BLUFTISH	-	522	4,681	12,964	32,594	283,880
BOBTO	-	-	-	-	-	-
BUTTERFISH	-	511	171,630	137,337	142,529	266,920
COD, FILLET	-	-	4,931	5,111	1,895	2,221
COD STEAK	-	300	1,127	1,458	439	7,216
COD, MARKET	-	-	4,527	4,365	2,837	17,021
CROAKER	-	-	13,160	13,160	5,219	36,342
DABS	-	-	14,707	15,007	-	95,28
EELS, COARSE	-	943	179,954	132,508	139,478	138,480
FLOUNDER & SOLE	9,101	353	154,319	138,428	105,983	159,635
HADDOCK, FILLET	-	460	54,510	3,666	3,206	17,434
HADDOCK	1,075	-	15,205	12,759	6,887	44,547
HAKE	-	-	134	134	526	663
HALIBUT	-	447	40,866	33,016	75,004	134,177
HERRING, SEA & SANDY	-	100	80,866	81,861	24,869	69,375
KINGFISH (TIG MACKEREL)	-	-	3,793	3,793	970	17,536
KING MULLET (KINGFISH)	-	10	12,245	9,550	9,161	2,318
LACKEREL	10,400	-	72,609	50,555	38,480	1,313,729
MULLET	-	-	938	938	750	1,464
POLLOCK	-	-	225	225	225	6,113
SABLEFISH	-	200	42,081	17,414	1,979	159,106
SALMON, CASPIAN	-	-	230,340	230,340	217,100	***
CHESNOCK	500	9,153	87,642	103,163	126,714	-
FALL	-	200	66,913	69,237	47,303	80,793
SILVER	10,000	11,900	97,119	101,521	170,630	20,380
UNCLASSIFIED	-	9	7,892	18,062	32,479	331,938
SCUP (POKEY)	-	-	33,262	33,262	1,666	69,304
SEA BASS	105	-	56,499	58,124	42,771	33,313
SEA TROUT, GRAY (WHAFFISH)	206	-	19,734	15,799	11,732	92,718
SHAD	-	7,667	345,685	375,503	282,729	215,575
SHAD ROE	264	489	97,697	57,215	61,617	76,326
SKEET PL.	-	203	27,821	30,150	32,479	71,865
ST.	-	-	5,959	5,959	5,369	19,701
EXTRA	-	40	15,821	17,175	17,536	62,430
SHARPER, RED	-	62	21,998	23,124	22,693	23,250
SPANISH MACKEREL	-	36	3,669	4,531	5,131	12,834
STEELHEAD TROUT	200	-	5,988	5,897	9,765	9,208
STRIPPED BASS	-	146	41,705	42,743	-	***
SWEETFISH, JAPANESE	-	4,103	389,345	389,345	450,294	371,149
WHITING	-	74	30,006	20,761	8,287	3,973
UNCLASSIFIED	-	267	146,478	145,737	186,021	426,742
TOTAL	32,311	37,595	2,671,854	2,478,069	2,455,938	4,599,601
Fresh-Water						
SUFFALO & CARP	-	800	69,174	75,718	75,990	107,548
CATTISH	-	-	-	-	-	560
CRABS & PINS	-	-	1,975	1,439	272	7,221
CISCOS	-	787	252,166	227,275	260,221	53,491
LACZ TROUT	-	352	43,293	43,907	51,046	66,127
FICKEREL (LACKS)	-	-	5,863	6,109	6,315	3,777
FICE, BLUE	-	-	3,341	3,324	2,867	2,668
FICE, YELLOW	-	311	88,298	85,781	82,722	35,873
SPOTTBELL	836	-	13,873	11,878	5,205	15,795
STURGEON	5,391	8,400	597,834	613,511	661,784	326,037
WHITISH	157	1,407	434,106	470,275	414,218	509,040
YELLOW PERCH	758	-	5,987	4,637	8,313	2,707
UNCLASSIFIED	495	240	18,166	15,647	18,311	19,660
TOTAL	7,637	12,337	1,534,116	1,563,583	1,594,864	1,752,833
Shellfish, etc.						
CRABS	3,600	-	50,294	41,784	28,414	16,975
CRAB LEAF	-	-	-	-	-	78
LOBSTER TAILS, SPINY	-	390	*341,386	356,777	193,821	602,368
MULP	-	150	19,193	20,653	10,829	15,510
SCALLOPS	-	90	69,118	69,891	52,631	398,736
SEPIA	-	50	14,290	21,575	19,505	12,340
SERPUP	-	2,417	562,533	539,027	506,397	275,073
SKUD	73,188	36	274,337	146,472	39,096	269,922
UNCLASSIFIED	262	470	8,778	9,753	8,643	9,247
TOTAL	77,036	3,603	1,339,869	1,265,442	853,093	1,600,249
GRAND TOTAL	116,984	53,895	5,495,879	5,247,094	4,903,095	7,352,683

*Includes 232,000 lbs. which is not for sale in this country.

**Included in FLOUNDER & SOLE.

***Included in SALMON, UNCLASSIFIED.

****Included in SALT-WATER UNCLASSIFIED.

Report # 123, Fri., May 26, 1939.

(Over)

SALT-WATER MARKET

Unless otherwise stated prices quoted below cover sales of stocks of good merchantable quality by original receivers, in the usual wholesale quantities, on this morning's market.

SUPPLY, DEMAND, MARKET & PRICES:

Supplies moderate, demand light, market quiet.
 BLUEFISH: Supplies light, demand moderate.
 NORTH CAROLINAS and NEW JERSEY: Large 35; Medium 25; Small 20.
 BONITO: Supplies light; 8.
 BUTTERFISH: LONG ISLAND: Pound Nets Large 5-6, NEW JERSEY: Large 3-4. VIRGINIA and MARYLAND: Pound Net; Large 5.
 COD: Supplies moderate, demand moderate.
 INSHORE: Steak 5-7; Market 3-4; OFFSHORE: Steak 4.
 CHICKEN: Large 3-3 1/2.
 FLOUNDER: Supplies liberal, demand light.
 MASSACHUSETTS: Lemon Sole 3-4; Large Mixed 2-3.2. CONNECTICUT: Large Mixed 3; Small 1; market not sold out.
 FLUKE: Large 8-10; Medium 4-6; Small mostly 1-1 1/2, few 2.
 HAKE: 3-3 1/2.
 HERRING, SEA (SARDINE): \$2.00 keg.
 KING WHITING (KINGFISH): LONG ISLAND AND NEW JERSEY: 1-1 1/2.
 MACKEREL: Supplies moderate, demand light, market quiet, Pound Net: Large 3-3/4-4; Gill Net Large 2-3.
 PELLOWS: Steak 3-4-4.
 SCUP (PORGY): Supplies moderate. Sailed 2-2 1/2. MARYLAND 2-2. LONG ISLAND and NEW JERSEY: Pound Net: Mostly 3, some 3; Drag 1 1/2-1 3/4.
 SEA BASS: Supplies moderate. Pound Net Large 7-8; Medium 4-5; Small 2-3.
 SEA TROUT, GRAY (SEAUTS); Outted: Large 12-14; Medium 8-10; Small 5-6. Round Large 10-12; Small 2-3.
 SHAD: HUDSON RIVERS: Supplies light; No demand moderate, 8-12; Buck demand slow, 1-2; Outer 4-5.
 SHAPPER, RED: Supplies moderate, moved very slowly. FLORIDA: Small asking; 8. ALABAMA: Medium asking 10.
 STEELHEAD BASS: Supplies moderate, demand good. LONG ISLAND: Pound Net: Mixed 16-18.
 GEORGETOWN BASS: Pound Net: Mixed 12 1/2.
 TAPPOC (BLACKTIPS): 2-3.
 TELEFISH: Carried Over: Large 4.
 WHITING: Supplies moderate, demand moderate, market firm; \$1.00 tub, few \$1.50 tub.
 YELLOWTAILS: Supplies light; Large 2.8; Small 2-2 1/2.
 CLAMS, HARD: Supplies liberal, demand light, market weak. Clambers \$1.00-\$1.25 tub; Cherrystones \$1.50-\$1.75 tub; Little Nests \$2.00-\$2.25 tub.
 CLAMS, SOFT: 75-\$1.00 tub and bakt.
 CRABS, HARD: \$2.00 bakt.
 CRABS, SOFT: Supplies heavy, demand light, market dull. Jumbo mostly 40-50 doz, few 60 doz; Prizes mostly 20-30 doz, few 35 doz; Medium 10-20 doz.
 CRAB MEAT: NORTH CAROLINA: Jumbo Lump 60; Lump 50. FLORIDA: Jumbo Lump 55-65; Lump and Flakes Mixed 35-40; Lump 50-55. LOUISIANA: Lump 50-55.
 LOBSTERS (100 lb. lbs): Supplies liberal, demand good, market steady. Large, 1 1/2 lb., Chicken 20.
 LOBSTER MEAT: 55-60 can.
 SCALLOPS, SEA: \$1.10 gal.

FRESH-WATER MARKET

Unless otherwise stated prices quoted below cover sales of stocks of good merchantable quality by original receivers, in the usual wholesale quantities, on this morning's market.

RECEIPTS:

LCs (Express & truck)—900 pkgs. delivered by 8 A. M.

SUPPLY, DEMAND, MARKET & PRICES:

Trading light today. Market sold out on all varieties except on Buffalo fish and Whitefish of which only a small quantity of each species is being carried over.
 BLUE PIKE: Mostly 12-13, few 10-11.
 BUFFALOFISH: Very light movement; mostly 10-12 few higher.
 CARP, CARPED OVER WISCONSIN: Freight Jumbo 3-4; MICHIGAN: Jumbo 4-5, 21-4; LAKE PERCH: Jumbo 5-6.
 LAKE HERRING: BAYPORT: New Large 8. Carried Over: Small few at 1-2, the remainder dumped or given to charity.
 LAKE TROUT: GEORGIAN BAY: Mostly 15, few 16.
 PICKEREL (JACKS): 10-12.
 SAUNDERS: 12.
 SHEEPSHEAD: New Few at 4-5; Carried Over: 1-1 1/2 and remainder dumped.
 SUNFISH: JEROME: Carried Over: 5-8.
 SUCKER (ALLEY): MICHIGAN: New 7-8; Carried Over: 6-7.
 WHITE BASS: New Few at 5-6; Carried Over: Some at 1-2, remainder dumped.
 WHITEFISH: Demand light, market carrying over small quantity. LAKE ONTARIO: Gill Net: 16-20. LAKE ERIE: Gill Net: 25-27; Pound Net: 28-30; Mixed 23-25. LAKE HURON: Pound Net: 28-30; ST. IGNACE: Gill Net: 21-25; Pound Net: Mostly 27-28, few 25. PARRY SOUND: Dressed 17-18. ALBERTA: Mostly 12-14, few 15. KEY JUNCTION: 22-26. THUNDERBAY: KEY JUNCTION: Arrived late Thursday morning: 25-27.
 YELLOW PIKE: LAKE ERIE: #1—mostly 18-20, few lower; #2—12-14. MICHIGAN: 20-22. SAUNDERS: Mostly 18-20, some 16-17; Carried Over: Jumbo 13-15.

WEIGHS-OUT BY FISHING CRAFT

PRIMA, May 26, 1939.

ANNA S.: Scallops, sea 933 gals.
 GUYA ELSE: Scallops, sea 1,372 gals.
 JULIA K.: Scallops, sea 929 gals.

THURSDAY - ADDITIONAL, May 25, 1939.

KATHLEEN: Whiting 2,000; Squid 2,140.
 TOTAL: Scallops, sea 3,234 gals; Fish 4,140 lbs.

SALT-WATER MARKET (CONTINUED)

SHRIMP: NORTH CAROLINA: Southport Large 12 1/2. SOUTH CAROLINA: Beaufort Large 12-13. GEORGIA: Darien Large 12-12 1/2. Brunswick Large Medium 10-12. FLORIDA: St. Augustine Large 13-14.
 SQUIDS: Supplies liberal. \$1.00-\$1.50 box. Mostly 35-60 tub, few 75 tub.
 P-4:00 P.M. Wm. H. Duont, Agent In Charge.

Penalty for Private Use to Avoid Payment of Postage \$300.

5/26/39—#123—3.4.
 UNITED STATES DEPARTMENT OF COMMERCE
 BUREAU OF FISHERIES
 Division of Fishery Industries
 MARKET NEWS SERVICE
 374 Fulton Street
 New York, N. Y.

 OFFICIAL BUSINESS

John Doe
 5702 - 26th St., N.E.
 Seattle, Wash.

FIGURE 2c.—Reproduction of page 4 of the report shown on page 186.

Twenty-two species accounted for 74,564,000 pounds, or 94 percent of all salt-water fish received. Over 2,000,000 pounds of each of the 11 leading varieties were received, forming 79 percent of the total. In order of their importance they were cod, flounders (blackbacks or winter flounders), mackerel, haddock, butterfish, scup (porgy), yellowtails (dabs), whiting, halibut, shad, and croaker. Receipts of six species ranged from one to two million pounds, or 10 percent of the total. They were gray sea trout (weakfish), fluke (summer flounder), bluefish, gray sole, sea bass, and salmon (Western). The five species received in amounts from one-half to one million pounds were sea herring (including sardines), hake, striped bass, pollock, and tilefish.

Groundfish (cod, haddock, hake, and pollock) accounted for 26 percent of the total receipts during the 6-month period. Flatfishes from the East coast, consisting of blackbacks, flounders, fluke (summer flounder), gray sole and yellowtails, formed 21 percent; and Western halibut and salmon, a little over 5 percent. Varieties caught in large quantities in the Middle Atlantic States, such as butterfish, mackerel, scup (porgy), gray sea trout, sardines, and whiting, made up 10 percent. Of the remaining species, those fish taken in large amounts in other areas as well as in the Middle Atlantic (bluefish, croaker, sea bass, shad, and striped bass) represent 31 percent of the receipts.

The three leading varieties of shellfish received during these 6 months were shrimp, 5,343,000 pounds; lobsters, 2,150,000 pounds; and squid, 1,671,000 pounds.

Since detailed receipts for the fresh-water market were not collected, exact quantities cannot be given. However, from daily experience in the market it can be stated that whitefish and yellow pike were the leading species among the higher-priced fish, while carp was important in the lower-priced group.

The distribution of fresh and frozen fish and shellfish in the New York area was effected largely through 92 wholesale dealers, 20 hotel and restaurant supply firms, and 7 brokers. Of the wholesale dealers, 24 handled fresh-water fish exclusively, 3 sold fresh-water and salt-water fish, while the remainder were mainly either salt-water fish or shellfish firms. There were 12 fillet-cutting firms in addition to several of the hotel-supply firms that produced their own fillets.

The delivery of fish and shellfish to local or suburban purchasers generally is made by trucks owned by the buyers. Trucking agencies and rail express carry the balance.

The retail outlets for fish in New York City have been estimated by the City Bureau of Markets to include 1,500 independent stores that handle fish exclusively, 1,800 meat stores selling fish part of the time, and 700 general markets and chain stores which handle fish.

The wholesale dealers handling fresh and frozen fishery products in New York are centered in a marketing area comprising about four square blocks along the East River near the foot of Fulton Street and just south of the Manhattan end of the Brooklyn Bridge. Known as Fulton Market, the wholesale fish trade has been in this location over a century. Dealers handling salt-water fish and shellfish occupy the greater part of the area, the fresh-water fish dealers practically being limited to one street known as Peck Slip. As there are no direct rail or express connections all shipments must be trucked between the market and the terminals. Many of the latter are situated at a considerable distance across the city. Two freezers adjoin the market

area while the remaining plants storing frozen fish are widely scattered. Fishing vessels discharge their fares at one of several piers extending into the East River. The catch usually is barreled or boxed on the pier for trucking to the dealer's stand or for immediate shipment.

On the site of a market building which collapsed into the East River in 1936, a modern structure has been erected by the city and leased to an organization of the wholesale dealers. It contains well-designed stands on the ground floor with ample office space and dressing rooms above, and is supplemented by a large parking area in front and a receiving platform and bulkhead dock in the rear. Providing many advantages over the older types, the new market building was opened in June 1939. The Fishery Market News Service office is located in a building on the edge of the market area.

The operations of the Fishery Market News Service office in New York City during 1938 were carried on and the daily report issued under the supervision of W. H. Dumont, Senior Fisheries Marketing Agent, assisted by E. C. Hinsdale, Fisheries Marketing Agent (transferred to Chicago during the year), F. J. Anderson, and W. D. Glidden, Jr., Junior Fisheries Marketing Agents, and Joseph Pileggi and Peter DiMarco, Senior and Junior Clerk-Stenographers, respectively.

BOSTON, MASS.

The first issue of the Boston Fishery Market News Report was released on May 26, 1938. It covers the daily activities of this important fishing port in considerable detail. Hailing fares of the offshore and inshore fleets landing at Boston Fish Pier—otter trawlers, draggers, line trawlers, hand liners, gill netters, purse seiners, and harpooners—are listed in one large table, which also includes the first sales prices of each species in the catch. To aid in the orderly marketing of Boston's huge supply of fish much additional information is included. The current landings at other ports, both nearby and distant—Gloucester, New Bedford, and Provincetown, Mass.; Portland and Rockland, Maine; New York, N. Y.; Seattle, Wash.; and Prince Rupert, B. C.—are received by telegraph and made available early each morning. Rail freight, rail express, and coastwise steamship arrivals are not only covered for the period since the preceding report, but a section for additional receipts includes shipments by rail and steamship, mostly fish and shellfish from Canada, due to arrive later in the day. Other daily compilations include imports of fishery products from all countries, prices paid to shippers of fishery products by dealers on the pier, and the movement of over 30 fishery commodities into and out of cold storage. Weekly, comparative holdings are published for the current and preceding weeks and for 4 weeks and 1 year previous. In order to be of the greatest aid to the industry, the daily report is completed and delivered to the dealers on and in the vicinity of the pier each forenoon and, for delivery outside Boston, is placed in the mail at noon.

Boston is primarily a production center, supplying enormous quantities of fresh and frozen fishery products to the Nation. It is well situated with the natural advantages of an excellent harbor and nearness to both producing and marketing areas. It also has good handling and shipping facilities.

The Boston Fish Pier, the largest in the world devoted exclusively to the fish business, is the outgrowth of the importance of the fishing industry to Boston. The pier itself extends 1,200 feet into the harbor and is 300 feet in width, the entire property comprising 537,000 square feet. It was built at a cost of \$3,000,000 and was opened on March 30, 1914. Approximately 350,000,000 pounds of fish are landed at the pier annually.

The pier is divided by a wide center street flanked on each side by buildings especially designed and constructed to house the activities of the wholesale dealers occupying the individual stores. Besides sufficient space for the receiving, processing, packing, and shipping of fish, they also contain offices and storage rooms. Each store has a front entrance on the center street and a rear entrance on a mooring side of the pier, thus making it possible for fish to be taken directly from the vessel into the rear entrance, processed, packed, and delivered to a waiting truck at the front entrance.

A large cold-storage plant is located at the shore end of the pier. It has a capacity of 15,000,000 pounds of frozen fish as well as adequate freezing and icing facilities. In addition, there are three other public cold-storage plants near at hand that freeze and store fish.

The New England Fish Exchange is located in a building on the outermost end of the pier. It is here that all trips of fish are sold. The Exchange is open early each morning, except on Sundays or holidays. If desiring to sell in or over the Exchange the captain of each vessel is required to register his catch with an officer of the Exchange before it can be auctioned. The detailed fare of each individual trip is posted on blackboards for the inspection of the buyers. All bidders or buyers must be members of the Exchange. Every effort is made by the vessel captains to make port prior to the opening of the Exchange in order to obtain top prices.

The bidding commences at 7:15 a. m. Each captain has the alternative of making his own sale or engaging an authorized agent to do his selling for him. The auctioneers are on a raised stand in the center of the Exchange around which the buyers gather. The auctioneer announces the amount and kind of fish he has to offer, accepts bids, and sells to the highest bidder. The buyer may buy part or all of any trip. All purchasers are presented with settlement slips which must be paid before the closing of that day's business. The sales continue throughout the day until all fish are sold. Each morning the sales begin with new arrivals, since fish seldom are carried over unless the owner or captain finds it advantageous to do so.

The Boston Fish Pier is a scene of great activity throughout the day. Fish is being moved in all directions as soon as the first sales are consummated. From the vessel's side to the dealer's premises the fish generally are transported in large two-wheeled carts, hauled by hand or motortrucks.

Good transportation facilities add to the importance of Boston as a producing center. On the pier a railroad spur on each side of the cold-storage plant makes it possible to load directly into cars or unload directly into the freezer. Two large trucking firms have platforms to receive and send shipments. All of the stores have loading platforms to accommodate trucks of various sizes. The finished products are loaded at these points for local or State-wide distribution. In addition, large refrigerated trucks receive cargoes for distant de-

livery. These trucking lines maintain daily schedules and extend as far west as Denver. A fleet of trucks carries express shipments from the pier to rail terminals. Much of the fish shipped to New York is transported in carlots on special freight trains operating on a fast schedule.

There are about 90 wholesale fish establishments and manufacturers of fishery products in Boston. They handle fresh and frozen fish and shellfish, and produce filets, salted, smoked and canned fish, crab and lobster meat, cod-liver oil, glue, fish meal, and fish oil. In addition, there are a number of commission merchants who handle shipments of fish and shellfish to the Boston market.

Boston is not only an important producing center, but it also offers a market for fish from other sections of the country. Receipts of salmon and halibut from the Pacific Coast; frozen swordfish from Japan; frozen shrimp from the Gulf; fresh-water fish from the Great Lakes and inland States; and large quantities of lobsters, other shellfish, and fish from the Maritime Provinces of Canada and from Newfoundland add to the supply of native varieties.

The importance of Boston as a fishing port is emphasized by the amount of fish landed during the last 7 months in 1938, the period during which the Market News office operated. Landings totaled 174,569,000 pounds, valued at \$4,249,000, during this period. Haddock accounted for 67,565,000 pounds, valued at \$1,596,000, or 39 percent of the total receipts and 38 percent of the total value. Cod followed with 40,173,000 pounds, valued at \$873,000. This represents 23 percent of the landings and 21 percent of the value. Rosefish (redfish) came next in poundage with 18,132,000 pounds, valued at \$222,000, forming 10 percent of the catch and 5 percent of the value. Mackerel, with 11,545,000 pounds, valued at \$386,000, made up 7 percent of the receipts and 9 percent of the value. Species landed in lesser quantities included, in the order of their importance, pollock, flounders (blackbacks, dabs, gray sole, lemon sole, and yellowtails), whiting, hake, cusk, swordfish, halibut, and wolffish (catfish).

The above totals do not include the fish landed and sold to dealers across the harbor on Atlantic Avenue; the quantity landed by undertonnage boats; imports; nor the receipts of fish and shellfish by truck, rail express, rail freight, and coastwise vessels.

Early in 1939 the Boston office began to release a monthly summary of the receipts and prices of a number of the more important species landed at the Fish Pier and sold through the New England Fish Exchange. The summary is a daily compilation of the quantities landed, the first sales prices, and the average prices. A series of comparative figures for the current month, the preceding month, and the preceding year also are included.

The activities of the Boston office and the issuance of the daily report and the monthly summary were under the supervision of B. E. Lindgren, Senior Fisheries Marketing Agent. He was assisted by C. W. Morrison, Junior Fisheries Marketing Agent, and J. J. O'Brien, Senior Clerk-stenographer.

CHICAGO, ILL.

The Chicago Fishery Market News office, through a daily Fishery Products Report and a monthly summary of wholesale receipts, records the receipts, prices, and similar valuable information con-

cerning fishery products, mainly fresh water, entering Chicago. The first daily report was released September 1, 1938. The daily report provides current information on the arrivals of fish by means of a tabulation of truck, rail express, and rail freight arrivals each morning. Species and poundage are shown as well as the shipping State or Canadian Province. Market prices received by shippers are quoted daily in considerable detail. The movement of fishery products into and out of cold storage is reported daily for approximately 45 varieties. Each week holdings are published for the current and preceding weeks and for 4 weeks previous. When sufficient data have accumulated, holdings for the previous year also will be incorporated.

Summaries of the wholesalers' receipts have been issued monthly since September 1938. They include tabulations of receipts by quantity, species, method of transportation, and State or Province of origin.

During the first 6 months the Chicago office operated, nearly one-fourth of Chicago's fresh- and frozen-fish receipts consisted of two species—lake trout and halibut. The large contribution of these two single species to the total receipts is surprising, in view of the fact that scores of other varieties of fresh- and salt-water fish are handled in the local market.

The species leading in importance with respect to receipts included, in addition to lake trout and halibut, the following, in order: Sauger, shrimp, yellow perch, oysters, whitefish, lake herring, yellow pike, rosefish, carp, and chubs. These 12 species accounted for more than 80 percent of the total receipts for the 6 months. During the same period, 18 additional species of fresh and frozen fresh-water fish, 32 additional salt-water species, and 13 other shellfish and miscellaneous commodities—a total of 75 species—were received in Chicago.

During the 6-month period aggregate receipts of fresh and frozen fish and shellfish in the Chicago market amounted to 19,200,000 pounds, or an average of 3,200,000 pounds each month. This quantity would supply 1 pound of fish per capita each month to Chicago's population. However, a considerable part of the fish received in Chicago is not consumed locally but is reshipped to communities outside Chicago. During the month of February 1939 reconsignments of fishery commodities amounted to about 1,000,000 pounds, or nearly one-third of the total receipts during the month. Such reconsignments are said to reach as high as 60 to 75 percent of the total receipts in some months, but in others they may amount to only 20 to 25 percent, or less.

As might be expected, due to its closer proximity to the fresh-water producing areas of the United States and Canada, Chicago is primarily a fresh-water fish market. About 3 pounds of fresh-water varieties are received to each 2 pounds of salt-water species. It is interesting to note, however, that 4 salt-water species are included among the 12 most important varieties. These are halibut, from the Pacific Northwest; shrimp, from the Gulf Coast; oysters, from the Atlantic Coast; and rosefish, from New England. The fresh-water varieties emanate largely from the Great Lakes of the United States and Canada; Lakes Manitoba, Winnipeg, Rainy, Dauphin, Nipissing, and Nipigon, Lake of the Woods, and the Pigeon River of Canada; and the Mississippi River and tributaries of the United States.

Virtually all fish received in Chicago arrive by three types of carriers. These are, in order of their importance: Rail freight, motor-truck, and rail express. While rail freight leads among the types of carriers when considering all receipts, we find that it follows the motor-truck when considering receipts from domestic sources only. This predominance of the motortruck in carrying domestic fish is influenced especially by the hauling of fresh-water fish from neighboring States. However, the truck also is an important factor in more distant hauls; for instance, truck receipts of rosefish from Massachusetts for the 6-month period amounted to the equivalent of nearly 30 carloads. Considerable quantities of other groundfish also were received by truck from New England and truck shipments of shucked oysters from Chesapeake Bay were important. In earlier years steamers transported quantities of fresh-water fish from lake ports to Chicago by water. More recently, this factor in the receipt of fish at this market is considered negligible. Between a million and a million and a half pounds of fish normally are landed each year on Chicago's lake front by local commercial fishermen.

Chicago's distribution of fresh and frozen sea food is largely effected through its 62 wholesale dealers, 10 brokers, 10 hotel and restaurant supply firms, and 14 fish smokers; all of which are primarily direct receivers. Some 200 retail dealers who handle fish exclusively may at times receive direct shipments; however, most of their requirements are purchased through the Chicago wholesale market.

With only a few exceptions Chicago's wholesale dealers, who are direct receivers of fishery products, are concentrated in a central location west of the downtown business section. All receipts must be brought to this market by truck since it is not located on the water nor is it served directly by rail. Cold-storage plants are situated in the same general area, being readily accessible for either the storage or withdrawal of fishery products. The Fishery Market News Service office is within one block of the market area.

Delivery of fish from the Chicago wholesale market to local and suburban buyers may be effected either by trucks owned by the wholesale dealers or in the trucks of the buyers. The services of trucking agencies or rail express are used for longer hauls. Frequently, in the instance of carlot sales, the entire car is diverted to the buyer without a preliminary opening in Chicago. This occurs quite frequently in sales of halibut and salmon arriving from the Pacific Coast.

The old-style fish hucksters are factors of decreasing importance in the distribution of Chicago's fish, but they are being replaced by modern so-called hucksters who operate up-to-date refrigerated trucks on established routes throughout the outlying sections of the mid-Central States.

During 1938 the activities of the Chicago office and the issuing of the daily report and monthly summary were supervised by E. C. Hinsdale, Fisheries Marketing Agent, assisted by B. F. Lucarz, Junior Clerk-stenographer.

SEATTLE, WASH.

The Seattle office of the Fishery Market News Service issued its first daily Fishery Products Report on October 1, 1938. The report includes data on the daily receipts and prices of fishery products at Seattle, with separate sections for each major fishery. Statistics on

imports of fresh, frozen, and cured fishery products from British Columbia and coastwise vessel receipts from Alaska are also shown. Other features include halibut landings and prices at Prince Rupert, as well as carloads of fish shipped daily from Prince Rupert and Seattle. Through daily telegrams from New York and Boston, data are included on Eastern market supplies and prices of West coast fish and competing species, as well as the cold-storage movement and holdings of important varieties.

An addition to the Seattle Market News report, effective May 1, 1939, is the daily coverage of halibut and salmon landings in southeastern Alaska. The receipts and prices of these species at Juneau, Ketchikan, Petersburg, and Sitka on a daily basis, and Wrangell on a weekly basis, are now incorporated in these reports. During 1938, Alaska halibut landings amounted to nearly 8,000,000 pounds, and troll-caught salmon landings in southeastern Alaska exceeded 10,000,000 pounds. Information on the daily receipts and prices of these species in Alaska adds materially to the value of the reports.

During the 12-month period ending December 31, 1938, there were nearly 51,000,000 pounds of fishery products landed at Seattle by vessels of the halibut fleet and other local craft. These products had a basic value of \$3,275,000 to the fishermen. In addition, it is estimated that approximately 20,000,000 pounds of halibut and salmon were received in Seattle by coastwise vessels from Alaska and freighters from British Columbia.

Of the Seattle fish receipts, two species—halibut and salmon—contributed over 72 percent; halibut leading all species with 41 percent of the total receipts. Only 8 other species of fish were received regularly by Seattle wholesale dealers during 1938. These, in the order of their importance, were: Flounders, 4,048,500 pounds; sablefish, 2,756,400 pounds; "lingcod," 2,708,200 pounds; herring, 727,400 pounds; rockfishes, 620,500 pounds; cod (true cod), 432,200 pounds; smelts (eulachon and silver), 320,800 pounds; and perch, 121,900 pounds. There were also approximately 800,000 pounds of albacore tuna received in Seattle, nearly all of which was frozen for canning at Anacortes. In addition, small quantities of California mackerel, barracuda, bonito, sea bass, and yellowfin and bluefin tuna are also received for the Oriental trade.

Of the shellfish receipts at Seattle, the "Dungeness" crab is the leading item, amounting to 1,752,900 pounds, valued at \$79,068 to the fishermen. Most of these crabs are taken in the ocean off Willapa and Grays Harbors. Other species of shellfish received in Seattle include Pacific and Olympia oysters, hard-shell clams (butter and little-neck), razor clams, bay scallops, shrimp, octopus, and squid. The Olympia oyster is one of the highest-priced species of shellfish in this country, selling wholesale in Seattle at \$8 per gallon. Octopus and squid are consumed almost entirely by the Orientals. In this connection it is interesting to note that the Puget Sound production of squid is not nearly enough to take care of the local demand. Considerable quantities of fresh squid are received from Monterey, Calif., and last fall a carload of frozen squid was shipped from Massachusetts to Seattle. The local supply of shrimp is nearly exhausted, and Seattle depends largely on Alaska shrimp meat for this sea food. There are

occasional shipments of California shrimp to Seattle, and an attempt is now under way to market frozen headless shrimp from Texas in Seattle.

Over 90 percent of the Seattle wholesale fish business is conducted by 12 establishments. Of these, six firms handle over 75 percent of the fishery products coming into Seattle. There are two fish exchanges, one for halibut-fleet landings and the other for selling troll-caught salmon of the Fishermen's Cooperative Association. The halibut exchange is operated by 10 wholesale firms and is called the Seattle Fish Exchange. Bidding is open only to member dealers, and the minimum bid change permitted is one-eighth cent per pound. The hailing fare of a halibut vessel must be posted on the board by 9 a. m., if it is to sell that day. A dealer must bid on the entire fare. There are no split trips sold over the exchange.

The salmon exchange, operated by the Fishermen's Cooperative Association, is similar to the halibut exchange. Bidding is graduated in eighths of a cent, and is open only to members of the Seattle Fish Exchange. Truck deliveries of salmon from the Washington coast, as well as deliveries by fishing craft and transporters from Neah Bay, are sold over this exchange. Receipts of other fishery products at Seattle are by direct purchases. In this case a price is usually set at the beginning of the season and is generally constant throughout its duration. Most of these prices are for delivery in Seattle, which leaves the trucking charges to the fishermen. As a rule the dealers send their fishermen a check once a week when several deliveries are made during the week.

There are five fish freezers and cold-storage plants in Seattle, in addition to one cold-storage plant for mild-cured salmon and salted herring. Two of the fish freezers are owned by wholesale fishery firms, two are privately owned freezers, and the other two are operated by the Port of Seattle.

Fishery products arrive at Seattle almost entirely by vessel or truck. An occasional "less than carload" rail shipment from Vancouver, B. C., or Astoria, Oreg., is received. In the past there have been carloads of fish and shellfish to Seattle from the Atlantic Seaboard, but these are now rare. At times Seattle receives large quantities of fresh and frozen halibut and salmon from Alaska and British Columbia. Arrivals of over 250,000 pounds of fish from Alaska in 1 day are not unusual. Receipts of white king salmon for kippering and large red kings for mild cure from British Columbia have exceeded 3,000,000 pounds annually at Seattle.

Unlike most cities, Seattle's wholesale fishery dealers are not concentrated in one location. There is no "fish pier" or wholesale fish-trade section. Most of the dealers are located on piers at which fishing craft may discharge their fares. Although the dealers are situated at widespread intervals along the water front the arrangement is not necessarily inefficient, since most vessels sell their entire catch to one firm. All companies on the water front are adequately served with spur tracks and facilities for transportation by truck over short or long hauls. The Fishery Market News Service office is located near the fish exchanges and the greatest concentration of dealers.

The cold-storage plants are spread out as widely as the dealers. Most are served both by steamship and railroad.

During 1938 the Seattle office was operated and the daily reports were issued under the supervision of V. J. Samson, Fisheries Statistical and Marketing Agent, assisted by K. G. Nordquist, Junior Clerk-stenographer.

JACKSONVILLE, FLA.

Late in 1938 the Jacksonville Fishery Market News office was established and preparations made to issue a daily report on fishery products. The first report was issued on March 6, 1939. Current data are published covering the production and prices of fish and shrimp produced on both coasts of Florida—from Fernandina to the Florida Keys on the Atlantic Coast, and from Everglades to Pensacola on the Gulf. Since the coast lines are long, and the fishing areas not only numerous but also widely separated, it is not possible to procure complete information on all varieties and for all localities with the funds and personnel available. To improve this situation part-time agents are being placed in several of the more important production centers on both coasts in order that a full report may be secured for these areas. It is believed that complete knowledge of the activities in several areas on each coast will be more valuable than partial information from the whole State, and will indicate the trend of production and price in the State generally.

Since Jacksonville is an important distribution point for fishery products bound for markets in other States, a record of outgoing shipments by rail freight, rail express, and motortruck is carried in the report. Through a cooperative arrangement with the Florida State Department of Agriculture, data on truck shipments are obtained in considerable detail. This information includes the quantity of each species and the destination by State. Data on the county of loading in Florida also are secured but not published. Receipts and prices of Southern fish and shellfish and competitive Northern species on the New York market are received by wire, and reported together with a summary of landings and first sales prices at Boston. The movement and holdings of fishery products in a number of the most important cold-storage plants in the South Atlantic and Gulf States are shown on a weekly basis with comparative holdings for the preceding week and for 4 weeks previous. The cold-storage plants are located from North Carolina to Texas. The varieties stored are divided into 34 classifications, 24 being salt-water fish, 4 fresh-water fish, and 6 shellfish.

At frequent intervals, through the cooperation of the Food and Drug Administration, data on shrimp packed in canneries utilizing its Seafood Inspection Service are released. The information includes, for each period and for the season, the number of plants operating, the number of days operated, the quantity of raw shrimp received, the pounds of raw shrimp packed, and the number of standard cases of shrimp canned. The shrimp canneries number about 40 and are situated in Georgia, Florida, Alabama, Mississippi, Louisiana, and Texas.

The Fishery Market News Service office is located in the downtown section of Jacksonville, one block from the St. Johns River. In this area most of the wholesale fish dealers are concentrated. They

are favorably situated with respect to all forms of transportation utilized for either incoming receipts or outgoing shipments. Spur tracks are available near most of the establishments for carlot shipments, and the express terminal is easily reached with a minimum of interference from city traffic. Fishing craft and commercial steamships berth at piers extending into the river. Shipment by truck is facilitated, since the location is but one block from the main highway traversing the city. Although the cold-storage plants do not adjoin the wholesale fish-trade section they are readily accessible.

In 1938 the Jacksonville Fishery Market News office was supervised by S. C. Denham, Fisheries Statistical and Marketing Agent. He was assisted by J. E. Borum, Junior Clerk-stenographer.

COOPERATIVE MARKETING

The cooperative marketing unit of the Division was under the direction of L. C. Salter from the time of its organization in 1935 until December 31, 1937, when he resigned from the Bureau's service to accept a position with the Tennessee Valley Authority. Following this the unit was administered directly under the chief of the Division until August 1938 when Ralph Russell, Associate Fishery Economist, was appointed to take charge of the unit.

Since his resignation, Mr. Salter has been working on the preparation of a report incorporating the results of much of his survey work with the Bureau. This report, when completed and released, will cover much valuable information concerning the operation of fishery cooperatives.

During 1938 work was continued on the collection of data relating to fishermen's cooperatives and other organizations in this country and abroad. During the past year cooperatives have been organized in several States. Appeals for assistance in the organization of cooperatives have been received from many sections of the country, and such assistance has been rendered as has been possible with the limited staff and funds available for this work.

Arrangements have been completed to enlist the aid of statistical and marketing agents of the Bureau, who visit virtually all the commercial fishing areas of the United States each year, to assist in keeping the data on fishermen's organizations current. They will obtain reports from fishermen's cooperatives during the course of their surveys and forward them to the Washington office for study. This procedure should facilitate the maintenance of adequate files on the status and activities of domestic cooperatives.

A possibility for further cooperative activity by fishermen, which seems at present to have been but little explored, is the opportunity of joining cooperatives already formed. For instance, supplies of various kinds, particularly petroleum products, are handled by cooperatives operating over large areas. Fishermen in some cases may become members of these cooperatives or induce the cooperatives to set up branches in locations accessible to the fishermen. Credit unions, which are cooperative savings and loan associations, have been extensively developed. These would seem to offer to fishermen a possibility of assistance through accumulating and borrowing capital by membership in such organizations. Cooperatives furnishing groceries and

other consumers' goods also are available to fishermen in some parts of the country. Through joining these and other cooperatives, fishermen may make economic gains and learn cooperative techniques which may apply in their own occupation.

The Bureau offers its assistance to groups of fishermen interested in the forming of cooperatives to the extent that its facilities can be devoted to this end.

TECHNOLOGICAL INVESTIGATIONS

As has always been emphasized in previous annual reports of this Division, the primary purpose of our technological investigations is to bring about more efficient and more profitable utilization of the products of our fisheries. This is in line with, and in the best interests of, the conservation of the natural resources of this country because, in its broader sense, conservation includes the wisest and most complete utilization of our fishery harvest that modern science can make possible. Thus, technological investigations of the Bureau of Fisheries have been devoted to the improvement of existing methods and the development of new methods of utilization and preservation of aquatic products. Widening the uses of these products is another important phase of the work of our technologists. As the result of such studies during the past years, our technologists have been able to suggest gradual improvements in the industry and some of these suggestions have been placed in practical use. It is believed that there could be more widespread utilization of these improvements to the ultimate profit of the industry.

Furthermore, our technological investigations, from time to time, have resulted in outstanding discoveries which have been the basis of new industries in the fisheries. A number of these discoveries were discussed in the 1937 annual report of this Division and referred to such subjects as the new domestic industry of producing fish oils and fish-liver oils as sources of vitamins A and D for both human and animal nutrition, the rapid discoveries and developments in the quick-freezing industry in which technologists of this Bureau pioneered, and the improvements and increases in the manufacture of fish meal as a highly important ingredient of livestock feeds.

LABORATORIES

During 1938 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, members of our technological staff cooperated in the conduct of investigations in the laboratories of the University of Maryland and Maryland State Agricultural Experiment Station at College Park, Md.; the University of Washington, Seattle, Wash.; and Washington State College, Pullman, Wash.

By means of funds allotted from the Public Works Administration and the Works Progress Administration, improvements were made during the year to the technological byproducts laboratory building and the chemical laboratories in Seattle, Wash. These included the placing of a brick veneer on the outer walls of the byproducts building, painting the interior, and staining the roof of this building, installing compressed-air lines and an additional sink, including lead linings in

the floor drains and sumps, painting the walls in the chemical laboratories, and constructing a tunnel dryer and a combination brine and sharp freezing cabinet.

The major portion of the work of the Seattle laboratory organization in 1938, as in past years, consisted of investigations of byproducts, although some studies were made in the general field of preservation of fishery products for food. The greater part of the work of the College Park laboratory organization was devoted to chemical and bacteriological studies in connection with the preservation of fishery products for food, and pharmacological and nutrition studies of the constituents of fishery products, although some work was done on byproducts in connection with the chemical preservation of fish waste or waste fish. The work of the Washington laboratory was confined to studies on the canning of fishery products.

The following personnel, in the various laboratories listed below, contributed to the technological investigations described in the ensuing pages of this report:

College Park, Md.—J. M. Lemon, Technologist in Charge; W. T. Conn and S. R. Pottinger, Assistant Technologists; Dr. H. W. Nilson, Assistant Pharmacologist; C. F. Lee, W. B. Lanham, Jr., and A. L. Fowler, Junior Chemists; J. F. Puncocar and Dr. R. J. Reedy, Junior Bacteriologists; H. E. Crowther, C. E. Swift, and R. H. Flowers, Research Associates; L. F. Ortenzio, H. F. Kraybill, N. G. Sprague, L. J. Barton, R. C. Dawson, Roscoe Dwiggin, J. D. Rollow, D. K. Worgan, and Ned Oakley, student assistants.

Seattle, Wash.—R. W. Harrison, Technologist in Charge; M. E. Stansby, Assistant Technologist; Charles Butler, William Clegg, Jacob Ash, and Mrs. Marie Sater, Research Assistants.

Washington, D. C.—N. D. Jarvis, Associate Technologist.

PRESERVATION OF FISHERY PRODUCTS FOR FOOD

During 1938 studies on the preservation of fishery products for food consisted of the following projects: Studies of rancidity in fish; studies of lactic acid as a possible index of decomposition in frozen fish; identification of canned salmon; changes in the composition of pink salmon (*Oncorhynchus gorbuscha*); composition of commercial species of fish taken on the Pacific coast; and canning aquatic products.

STUDIES OF RANCIDITY IN FISH

This project has been under investigation for the past several years. It is one which presents some very difficult technical problems. We have been conducting it in cooperation with the Musher Foundation, Inc., of New York City, as that organization is interested in the application of certain antioxidants in all of the food industries and had already carried out considerable original research on the problem of preventing the various forms of rancidity in different types of foods before our technologists undertook a study of the aspects dealing specifically with fishery products. The Bureau's Seattle and College Park laboratories have both been working on the project, but dealing with different phases of it, and the Musher Foundation has employed and stationed research associates in both of these laboratories for this purpose. Progress reports have been published from time to time,

as described in previous annual reports of this Division and, during 1938, a report was given at the September meeting of the American Chemical Society in Milwaukee, Wis. This report deals specifically with the use of a water extract of the active principle of oat flour as the antioxidant. Boston mackerel were treated with this extract and then frozen by the usual commercial method. As a means of comparison, control samples of Boston mackerel were given the usual commercial handling without the application of the extract of antioxidant and were frozen. Periodic examinations of these samples over a period of 6 months indicated that those fish treated with the oat flour extract were of definitely superior quality to the untreated samples.

These results are very interesting because earlier studies of the direct application of oat flour, or solvent extracts prepared from oat flour, gave only a very mild protective action, not sufficiently pronounced to attract the interest of the fishery industries for commercial application. Moreover, the direct application of oat flour detracted from the appearance of the resultant product and the solvent extracts were of limited application because of their oily nature. However, tests conducted in the College Park and Seattle laboratories thus far of the water-soluble extracts of oat flour and concentrates prepared therefrom did not affect the appearance of the fish so treated and, as indicated above, were much more effective in retarding rancidity. Therefore, these water-soluble extracts of oat flour are being tested on fresh salmon prior to canning, mild-cure salmon, kippered salmon, frozen salmon, and frozen halibut. In the case of the mild-cure and kippered salmon, the extracts were used in conjunction with the normal brining processes while in the frozen products the extracts are being used in connection with washes prior to freezing and in the glazing bath. Since these latter tests are now being run under commercial storage conditions, sufficient time has not elapsed to permit definite conclusions. So far, only moderate improvement has resulted. Such results must be attributed more to the extreme difficulty of retarding rancidity in fish oils than to the lack of effectiveness of the cereal flour products as antioxidants.

STUDIES OF LACTIC ACID AS A POSSIBLE INDEX OF DECOMPOSITION IN FROZEN FISH

Progress on this project was interrupted during 1938 because of the resignation of the investigator assigned to the problem. Another chemist has recently been assigned to the work.

It is known that lactic acid rises to a maximum content in fish muscle during the rigor of death, and the importance of muscular rigor, in its relation to the onset of spoilage in sea fish, has been emphasized by other investigators in this field. It has also been shown that the alkaline reaction of fish muscle and the accompanying onset of spoilage of the fish follows after the loss of muscular rigor. Thus it is evident that, since spoilage occurs after the lactic acid content of the fish muscle reaches a maximum, the determination of lactic acid in fish flesh before and during a period of cold storage is of value in obtaining direct knowledge of the processes of decomposition of fish.

Recently, sea trout have been obtained by our technologists from Chesapeake Bay and have been frozen under varying conditions of

freshness. Lactic acid determinations have been made on these fish before storage and at regular intervals during storage. Results obtained at this point of the investigation indicate that the lactic acid content of sea trout muscle varies from 0.05 percent to 0.40 percent. Sea trout frozen while in muscular rigor show a higher lactic acid content than those frozen under the other conditions of relative freshness or decomposition.

IDENTIFICATION OF CANNED SALMON

Studies on the possibility of differentiating between the species of salmon, on the basis of the refractive index and color of the free oil in the canned product, were continued. A statistical analysis of the data obtained during the preceding year indicated that the data at hand were not sufficient for satisfactory interpretation. Accordingly, additional samples have been taken, and sampling will be continued until enough data have been obtained to permit a thorough investigation of the reliability of such a method for identifying the various species of salmon after canning.

CHANGES IN THE COMPOSITION OF PINK SALMON (*Oncorhynchus gorbusha*)

Pacific salmon, especially the pink or humpback, are known to undergo considerable physical change during their spawning migration. This change is manifest by a gradual decrease in the pigmentation of the flesh, softening of flesh texture, and a decrease in the fat content of the edible portions. Generally speaking, the fish are believed to become poorer in quality until a point is reached where they are considered no longer suitable for canning. Salmon, however, are consumed as a protein food and very little information is available regarding the relation of these apparent changes to the nature of the protein present.

A chemical study of this problem was undertaken during the summer of 1937 and was continued during the past year. The actual chemical determinations have been completed and the data are being assembled and analyzed for publication. While it is considered inadvisable to draw definite conclusions at this time, the data, which involve analyses for moisture, fat, protein, ash, soluble nitrogen, heat coagulable soluble nitrogen, free amino nitrogen, copper precipitable nitrogen, phosphotungstic acid precipitable nitrogen, and the amino acids cystine, tyrosine, tryptophane, and arginine, would indicate that the pronounced change in the appearance and texture of the flesh is accompanied by much less change in its chemical nature.

COMPOSITION OF COMMERCIAL SPECIES OF FISH TAKEN ON THE PACIFIC COAST

The Bureau of Fisheries receives numerous inquiries from both the producer and consumer of fishery products regarding the composition of various food fish and the relative amounts of wastage involved in dressing. In seeking the necessary information, it is found that much of the data required is either not available or of a very fragmentary nature. Accordingly, during the past year studies were undertaken

for the purpose of determining the relative proportion of edible and inedible material in food fish taken commercially on the Pacific coast and to determine the "proximate" chemical composition of the edible portion. The measurements include percent dressed weight, percent trimmings, percent viscera, percent liver, percent flesh, percent bone, percent skin based on the round weight of the fish, the proportion of the dressed weight which is flesh, bone, and skin, and percent moisture, fat, protein, and ash in the edible portion. Numerous samples of each of 22 different species of fish have been analyzed to date. These are: Albacore tuna, sea bass, gray cod, "lingcod," red cod, rock cod, lamprey eel, starry flounder, halibut, herring, sea perch, pilchard, orange rockfish, sablefish, chum salmon, pink salmon, silver salmon, sockeye salmon, roe shad, English "sole," king "sole," and turbot. The analyses are being continued and the data will be assembled in report form.

CANNING AQUATIC PRODUCTS

For the past several years one of our technologists has been engaged in the development of methods for home or noncommercial canning of fish. Several publications, described in previous annual reports of this Division, have been published by the Bureau on this subject. The work on this project has now been completed and a final report has been prepared for publication. This report will include recommended methods of canning many fishery products not discussed in previous publications on the subject. These methods are designed primarily for the housewife or for the canning of fish in small quantities in the home, and cover enough species of fish so that all sections of this country where fish are taken may benefit from the results of this work. The species of fish and shellfish for which home canning methods have been developed, are: Alewives, herring, alewife or river herring roe, carp, suckers, fish roe, mackerel, lake trout, whitefish, mullet, mackerel (ready cooked salt-mackerel style), smoked mackerel and mullet, salmon, shad, spiced fish, king mackerel, mackerel and swordfish (tuna style), whiting, whole clams, minced clams, oysters, Atlantic and Gulf coast crab, Dungeness or Pacific coast crab, devilled crab, crab gumbo, crab soup (Norfolk style), shrimp (wet-pack method), fish chowder, New England clam chowder, and Manhattan or Coney Island clam chowder.

Studies on the canning of the blue crab were continued, with the preparation of experimental packs under commercial conditions and on a semicommercial scale. Other experimental packs were made to confirm conclusions reached in the work of the previous year. Examination of these packs of crab meat showed no deterioration or discoloration after a storage of as much as 18 months. We expect to publish the results of this work during the coming year.

As has been discussed in the annual reports of this Division in recent years, there has been a considerable demand from the various commercial fish-canning industries of the United States for a comprehensive manual describing existing methods of canning fish and shellfish in the United States, thus bringing this information up-to-date with any recommendations for improvements that a technical survey might reveal. Surveys of the fish-canning industries of the South Atlantic and Gulf of Mexico areas, and of the Pacific coast, were made

during 1938; thus completing the study for the whole country. A full report covering the information obtained in this Nation-wide survey, showing cannery plans, illustrations, and other useful information, is almost finished and will be ready for publication in the near future.

In addition to the above-mentioned investigations in the canning of fishery products for the home and in commercial operations, interest in the Bureau's work in this field has been stimulated to the point that we have had to supply a rather complete technological consulting service to the industry on the various technical problems in fish canning.

BACTERIOLOGICAL STUDIES

During 1938 the need for expanding our facilities for bacteriological research became acute and, as indicated earlier in this report, the Bureau established at College Park, Md., a new bacteriological laboratory in additional space provided free of charge by the University of Maryland in its Horticultural Building on the same floor and across the hall from space now occupied by the Bureau's other technological laboratories. The separation of the bacteriological laboratory unit from the chemical laboratory has been of considerable help in furthering the work of this unit.

STUDIES OF ULTRAVIOLET RAYS IN KILLING BACTERIA

This project was begun late in 1937 and a part of it has been completed. Results on the completed portion are described in Investigational Report No. 43, "Some Effects of Ultraviolet Irradiation of Haddock Fillets," published by the Bureau. According to the conclusions in this paper, irradiation of haddock fillets for a period of 2 minutes produced definite bactericidal effect, and irradiation for a period of 2 hours was found to increase the vitamin D potency of the fillets. Further tests are being conducted to determine the extent to which this process may be applicable on a commercial scale by experiments on more species of fish under varying conditions and periods of irradiation.

STUDIES IN THE HANDLING OF FRESH OYSTERS

As stated in last year's Divisional report, the purpose of this investigation is to develop and recommend improved methods for handling fresh oysters. When oysters are first shucked, the pH is nearly 7.0, indicating a neutral reaction of the flesh. During the first few days of storage, the pH rapidly decreases until a point of approximately 6.10 is reached. It then decreases much more slowly until it reaches a pH of 4.50. Below this point oysters become so sour that they are unfit for food. During this same period of change in the pH, the bacterial count declines to a minimum, after which it begins to rise rapidly as a result of the increased acidity of the oysters. The experiments also show that the bacterial flora changes with the acidity of the oysters. It was further found that excessive washing of the oysters with fresh water caused a loss of mineral content, in some cases from 1.50 percent to 0.18 percent.

STUDIES OF METHODS OF PREPARING CRAB MEAT

At the request of a group of crab-meat packers, funds were provided to this Bureau by Congress, effective July 1, 1938, for the purpose of making a chemical and bacteriological investigation of existing methods of preparing crab meat, in the hope that improvements in such methods could be recommended to the industry. The 6 months which have been devoted to this survey have been concerned largely with the bacteriological phases of the problem. Following a survey of equipment and methods used by the packers of crab meat in the Chesapeake Bay area, a temporary field laboratory was established at Crisfield, Md., in which bacteriological and chemical examinations of commercial samples of prepared crab meat were made for the purpose of making definite recommendations designed to improve handling practices.

As a result of a thorough study of the methods employed by the various crab-packing plants, several recommendations were made to the packers which should result in definite improvement of the product. A detailed report on the results obtained thus far in this investigation has been prepared and will be published in the near future.

PHARMACOLOGICAL STUDIES

As more has become known in recent years concerning the importance and significance of fishery products in the diet of man and his domestic animals, there has been an increasing demand for knowledge concerning the physiological effects of the different constituents of fishery products under the varying conditions under which they are manufactured and included in man's diet or in the rations of livestock. This particularly involves the metabolism of mineral constituents such as copper, arsenic, and fluorine. It also concerns studies of possible toxicity of products such as fish meal when improperly manufactured, or when decomposed due to careless conditions of handling after manufacture and before reaching the feed manufacturer or ultimate consumer.

CHEMICAL AND PHARMACOLOGICAL STUDIES OF THE FLUORINE IN FISHERY PRODUCTS

As stated in the 1937 report of this Division, a high content of fluorine in the diet has been responsible for mottled enamel of teeth in both man and domestic animals. In cases where this difficulty has been particularly noticeable, the fluorine has been traced to mineral mixtures of inorganic origin incorporated in the diet. However, as a result of this difficulty, there has been a demand for more knowledge concerning the fluorine content of such food products as meat and fish and the physiological effect of fluorine from a natural food source as compared with fluorine of inorganic origin. Because of this situation, our technologists, in 1937, began chemical and pharmacological studies of fluorine in fishery products. Our work thus far has been confined to canned salmon and canned mackerel. Chemical analyses of the samples used in the tests showed a content of 5.8 parts per million of fluorine in the salmon on a fresh basis and 27

parts per million of fluorine in the mackerel under similar conditions. These samples, supplemented only by vitamin concentrates, were fed as the diet of albino rats in the Bureau's laboratories. No gross toxic effects were observed in any of the rats fed either species of fish during a test period of 12 weeks. However, an examination of the teeth of the experimental animals with a low power lens at the close of the test showed that the rats receiving the mackerel had developed fine white striations across the normal yellow of the enamel. None of the rats receiving the salmon showed any effects of striations and in no case was there any structural defect or abnormal growth of the teeth noted.

Analyses of the carcasses of the rats showed a close correlation between the amount of fluorine ingested in the food and the amount stored in the body of the rat. Whether the source of fluorine was mackerel or salmon, approximately 20 percent of the ingested fluorine was stored in the body of the animal in most cases. The average amount of fluorine in the bodies of the rats at the close of the test was slightly over 18 parts per million for the groups fed salmon, and about 74 parts per million for those fed mackerel. The data show an inverse correlation between rat weight and the unit level of fluorine (in terms of parts per million). This was most marked where the variation in weight of the rats, within a group at the close of the test, was large. In other words, when the food intake and the rate of growth were below normal, a higher than normal percentage of the ingested fluorine was stored, and vice versa. These statistical or mathematical ratios, along with more detailed data, will be presented in a separate report to be published in the near future. However, it is well to point out here that, at the low levels of percentages of fluorine fed in the diet, a much higher percentage of the fluorine of inorganic origin added to the diet of the rat was stored in its body than was the case with the fluorine of inorganic origin.

POSSIBLE TOXIC PROPERTIES OF CERTAIN FISH MEALS

Fish meals, as now produced on a commercial scale in the United States, are manufactured under a great variety of conditions and, therefore, differ considerably in composition and quality. These variations are due to differences in chemical composition and relative freshness of the raw material from which the fish meal is made, differences in methods of manufacture and equipment used, and differences in conditions of handling, storage, and shipment. Furthermore, fish scrap or meal was originally produced in this country primarily for use as an ingredient of commercial fertilizers, and it has only been in recent years that the major portion of it has been used as an ingredient of mixed feeds and of livestock rations. Therefore, the transition of the industry from the old methods of processing, suitable for a product of a fertilizer grade, to improved methods of manufacture necessary to produce feed concentrates of quality has naturally been a gradual one. Consequently, in a situation as described above, Federal and State regulatory feed officials and chemists have encountered quite a problem in the equitable judging of quality of fish meals in connection with the administration of feed laws. Likewise,

feed manufacturers have expressed a desire for sufficient information to determine when a fish meal is suitable for animal feeding and when it is only of fertilizer grade. Since decomposition or spoilage of any food or feed product is a progressive change and a relative term, and since it is well known that some types of decomposition are not objectionable or harmful, there was a considerable demand from both producing and consuming industries interested in fish meal that the Bureau's technologists investigate the possible toxic properties of fish meals prepared from partially decomposed fish or under other adverse conditions of manufacture, handling, or storage.

Therefore, during 1938, chemical and pharmacological studies were inaugurated on this project. The fish meals used in these tests were menhaden, California sardine or pilchard, and so-called white fish meal prepared from trimmings of cod, haddock, and other ground fish. Good commercial meals of varying quality and experimentally spoiled meals were fed to groups of albino rats and baby chicks. There were no significant differences in gains in weight and food intakes of rats fed the commercial and the spoiled meals. Groups of chicks fed the spoiled meal in an otherwise purified diet generally grew faster and had a decreased mortality rate over groups fed the commercial meals. Apparently, conditions in the spoiled fish meals favored the bacterial synthesis of vitamin K and possibly of other vitamins required by the chicks. Data thus far indicate that the spoiled fish meal can be used to advantage as a protein supplement in any ration adequately balanced in vitamins and minerals.

MANUFACTURE OF FISHERY BYPRODUCTS

Studies in this field cover the utilization of the various byproducts of the fisheries and methods for testing and improving their quality.

UTILIZATION OF SALMON CANNERY TRIMMINGS

For the past several years the Bureau has devoted a portion of its technological activities to a study of the problem of utilizing salmon cannery waste. During this time a rather complete survey has been made regarding the nature and the composition of salmon waste, information has been obtained which fully demonstrated the value of salmon oils as sources of vitamins A and D, data have been obtained on the varied chemical and physical properties of these oils which may be expected to elucidate their utility in technical consumption, and assistance has been given the industry in developing an edible oil which can be added to the canned product. This line of attack has been followed because it was believed a better understanding of the nature and potential utility of salmon waste and the products available therefrom would stimulate a natural expansion in utilization.

However, due to the varied economic and technical obstacles prevailing throughout the salmon-canning industry, the general line of study outlined above could not be expected to be of definite help in all situations. Also, increasing utilization of waste material for the manufacture of edible canning oil has led to new problems regarding the best methods of converting the unused waste portions into their most valuable state. Therefore, after having provided a general background, attention is being directed to the development of methods

which can be used in meeting specific situations prevailing in the industry.

During 1938 studies have been made on the suitability of small-unit rendering equipment for small canneries not producing enough waste to warrant installation of standard fish-meal and oil machinery. Attention has been given to the response of salmon waste to dry rendering and the conditions necessary to retain the natural properties of the rendered oil. Studies have been undertaken regarding the preparation of dehydrated protein concentrates which would also serve as vitamin A and D concentrates.

In considering conditions where huge quantities of waste are accumulated during an extremely short operating period and where a reduction plant of large capacity would have to be idle over 10 months out of a year, studies have been undertaken regarding methods of chemical preservation and chemical treatment for conversion into entirely different type products which could be prepared with a minimum of equipment. However, because of the limited period during which salmon waste representative of commercial operations can be obtained, the data from these more specialized studies are as yet incomplete and no conclusions can be drawn. The last of a series of papers covering the general aspects of salmon byproducts has been published. This report is entitled, Investigational Report No. 40, "Pacific Salmon Oils."

The results show that the waste material or cannery trimmings of chinook salmon will yield between 30 and 40 gallons of oil per ton; Alaska and coho salmon, from 25 to 35 gallons; pink salmon trimmings, from 15 to 25 gallons; and chum salmon waste, from 10 to 15 gallons. Since between 80 and 90 percent of the total catch of salmon is canned and thus most of the waste material consisting of heads, tail portions, fins, and visceral organs are accumulated in connection with cannery operations, it can be readily seen that there is a large supply of waste material in the salmon canning industry from which oil may be manufactured. The survey further shows that about 30 percent of the round weight of chinook salmon is waste material, about 33 percent of Alaska red, coho, and chum salmon, and about 35 percent of pink salmon constitute waste material from which byproducts may be made. This report also contains tables showing the chemical and physical characteristics and properties of salmon oils such as iodine number, refractive index, specific gravity, etc. This information is of value in determining commercial uses for which the oils are best suited.

STUDIES ON THE PEROXIDE TEST AS A MEASURE OF OXIDATIVE DETERIORATION OF FISH OIL

Oxidative deterioration of fatty fish is a gradual process which eventually manifests itself in rancid odors and flavors readily detected by organoleptic means. When such a condition has been reached, the product is definitely of poorer quality and less desirable as food. In investigations on fish spoilage, the preservation of fish by various methods, and in commercial handling of fish, it is highly desirable to have some measure of the progress of oxidative deterioration prior to the development of rancid flavors and odors, since the problem of marketing is to get a product into consumption before the odor and flavor is definitely affected.

Because of the importance of this problem to all food industries, numerous methods have been proposed for measuring or following the progress of incipient rancidity. One of the most popular tests is that predicated upon the assumption that peroxides are formed as an intermediate step in the development of rancid products and such peroxide compounds break down in the presence of potassium iodide with the liberation of iodine, which can be easily measured. However, when the test, as prescribed for other fatty materials, is applied to highly unsaturated fish oils, the results obtained are not entirely satisfactory. Data are frequently inconsistent and the values obtained appear to be affected by a number of factors which tend to decrease the sensitivity of measurement. In spite of these drawbacks, the method has considerable merit on account of its simplicity, the speed with which determinations can be made, and the fact that no complicated or expensive apparatus is required. Therefore, an investigation was undertaken to determine the possibility of improving the peroxide test so that it could be used as a more reliable tool in investigating oxidative deterioration in fishery products. The progress of the work so far has been most encouraging. Numerous conditions of the reactions have been investigated and a modified procedure has been devised whereby a number of the drawbacks of other procedures are eliminated. The test, however, must be subjected to more rigorous examination before definite conclusions can be made. Should these studies result in a more effective measure of incipient rancidity, future investigations, both scientific and practical, on the handling and preservation of fatty fish will be greatly facilitated.

UTILIZATION OF FISH LIVERS AND VISCERAL ORGANS

The sustained commercial interest in sources of concentrated vitamins A and D has led to increasing demands upon the Bureau for information regarding the utilization of fish livers and visceral organs. In recent reports reference has been made regarding the development of methods for extracting oil or vitamins from various types of material which would not respond to normal treatment. As a result of the data obtained, the Bureau's technologists have been able to advise with the industry on extraction problems and have contributed materially to the expansion in vitamin oil manufacture.

During the past year attention has been directed to a general survey of the potential value of the liver and viscera from all types of food fish taken on the Pacific coast. Analyses for oil content and vitamin A potency have been made on periodic samples involving 22 different species of fish. The oil content of the livers from the species examined ranged from 1.5 to 35 percent and the vitamin A potency of the extracted oil varied from 6,000 to 380,000 units per gram. Viscera less liver and stomachs ranged in oil content from 0.3 to 45.3 percent and yielded oils having vitamin A potencies ranging from 4,500 to 450,000 units per gram. The data will be summarized for publication when the survey is completed.

PREPARATION OF FISH MEALS OF IMPROVED NUTRITIONAL VALUE

The Bureau's interest in fish meal in animal feeding pertains to both terrestrial and aquatic animals. During the year technologists of the Division have continued to cooperate with the Department of Poultry

Husbandry at the State College of Washington, the Bureau's Division of Fish Culture, and the School of Fisheries at the University of Washington.

Studies carried on by the Division of Fish Culture and the University of Washington in recent years have resulted in the preparation of a fish meal especially suitable for fish feeding. During the year technologists of the Division of Fishery Industries have cooperated in production studies in order to clarify the steps in preparation responsible for the improved nutritional properties and to determine means of obtaining the same feeding effectiveness by a simpler process of manufacture. The results indicate that the preservation of water-soluble, heat-sensitive extractives contributes to the improved feeding properties and this can be accomplished in simple dry rendering equipment operating under reduced pressure. The studies are being repeated, since the final conclusions may provide the basis for future fish-food plants to be installed by the Bureau and other agencies engaged in fish-cultural work.

STUDIES ON FAT IN FISH MEAL

This project was begun in 1937 and consists of collaborative work of various Government laboratories in the development and gradual improvement of methods of analysis sponsored and coordinated by the Association of Official Agricultural Chemists. Specifically, present studies involve methods of determining oil or fat in fish meal more accurately than existing methods permit. A progress report on the work was prepared and presented at the annual meeting of the Association of Official Agricultural Chemists in November 1938. The accuracy and efficiency of various chemical or organic solvents for determining the amount of oil or fat in fish-meal samples by solvent extraction were tested. Thus, this report contains a table showing the percentages of oil extracted by the various solvent reagents under differing conditions. These figures are of interest to the analytical chemist in determining the comparative accuracy of these solvents in making analyses of this kind.

CHEMICAL PRESERVATION OF FISH AND FISH WASTE

As described in the 1937 annual report of this Division, this project was established by the Bureau as a cooperative arrangement with the Aquacide Co., Washington, D. C., and the studies are being conducted by research associates employed by that company and stationed in the Bureau's laboratories. The work consists in the development and application of chemical compounds for preserving fish livers, cannery trimmings, scrap and other fish waste, either temporarily until these materials can be transported to a central point for further mechanical processing or reduction, or as a permanent preservative in a few instances. Most of the work in 1938 was devoted to the application of a chemical solution, developed by this company, to the preservation of dogfish livers landed at isolated points for subsequent shipment to central fish-oil rendering plants.

About 1,500 barrels of dogfish livers were preserved by treatment with a formaldehyde-soda-ash compound, and, at the end of 9 months of storage, were found to be in good condition. The treated livers

were then extracted and the oil was still in good condition, containing approximately 2,000 international units of vitamin A per gram. However, this oil was too low in vitamin D content to be considered as a commercial source of this vitamin.

NUTRITIVE VALUE OF AQUATIC PRODUCTS

This has always been an important phase of our technological investigations because the relative nutritive value of the finished product is in most instances the true yardstick or measure of the value of a new method of processing or an improvement in existing methods in the industry. For example, assuming that costs of production are equal in each case, if a new method of manufacturing fish meal, or a new method of freezing fish fillets, produces a finished product of better quality measured in terms of food value, then that is a true estimate of its worth or justification for its commercial application.

MINERAL CONSTITUENTS OF FISHERY PRODUCTS

In recent years, members of our technological staff have been making a detailed study of the mineral content of some of the more important commercial species of fish and shellfish. Although this work was interrupted by resignation of personnel, it is now completed and detailed data on the calcium, phosphorus, magnesium, iron, copper, and iodine content of the edible portion of various species of fish and shellfish have been published in Investigational Report No. 41, entitled "The Mineral Content of the Edible Portions of Some American Fishery Products." Fish fillets are about equal to the muscle cuts of beef in mineral content, except that the fish greatly exceeds the meat in iodine content. Canned salmon contains about 15 times as much calcium, almost twice as much phosphorus, 20 times as much iodine, and approximately equal quantities of other minerals as beef round. Oysters, shrimp, and crab meat contain approximately half as much calcium, more than five times as much magnesium, and more phosphorus than an equal quantity of milk. In addition, these shellfish are a particularly good source of iron, copper, and iodine.

CHEMICAL COMPOSITION AND NUTRITIVE VALUE OF FISH PROTEINS

This study, begun several years ago, has now been completed. A report of the results of one phase of the project has been published in the scientific journal, *Food Research*, 1938, Volume 3, No. 5, under the title of "Nutritive Value for Growth of Some Proteins of Fishery Products." By using an arbitrary factor of 100, the proteins of the following fish and shellfish fell into groups according to relative growth-promoting value, as compared to beef at a factor of 63: Oyster 100; pilchard, red snapper, shrimp and Boston mackerel 90; and shad, cod, croaker, and silver salmon 80.

The chemical determinations of the principal amino acids in the proteins of several species of fish and shellfish have also been completed and a report is now being prepared for publication. Arginine, histidine, and lysine were determined in the proteins of 20 species of fish and shellfish as follows: Cod, croaker, haddock, halibut, sea herring, lake trout, Boston mackerel, Spanish mackerel, mullet, pilchard,

red snapper, chum salmon, king salmon, silver salmon, shad, squeeteague, hard clam, blue crab, oyster, and shrimp. Tryptophane was determined in the proteins of 28 species as follows: Catfish, cod, croaker haddock, halibut, lake herring, sea herring, lake trout, Boston mackerel, Spanish mackerel, mullet, pilchard, red snapper, chum salmon, king salmon, pink salmon, silver salmon, sockeye salmon, shad, squeeteague, albacore tuna, bluefin tuna, bonito, skipjack, hard clam, blue crab, oyster, and shrimp. Cystine was determined in the proteins of the following 13 species: Cod, croaker, haddock, halibut, Boston mackerel, Spanish mackerel, mullet, red snapper, king salmon, pink salmon, silver salmon, shad, and shrimp.

VITAMIN CONTENT OF FISHERY PRODUCTS

The only work done on this subject in 1938 was a series of assays of the vitamin D content of experimentally prepared fish-liver oils forwarded by our Seattle laboratory, in connection with its byproducts studies, to our nutrition laboratory at College Park. These determinations were used as a method of evaluating various methods of handling and extracting fish livers and are discussed in Investigational Report No. 40, entitled "Pacific Salmon Oils," previously discussed in this report.

SODIUM ALGINATE AS A STABILIZER IN PRODUCTS OF THE DAIRY INDUSTRY

Sodium alginate is a very useful preparation produced from the giant kelp (*Macrocystis pyrifera*) harvested from waters on the Pacific coast. It is used extensively as a stabilizer in such dairy products as chocolate milk, ice cream, etc. The results have been very satisfactory to the dairy industry from the mechanical standpoint, but regulatory authorities have expressed a desire to learn whether sodium alginate has any toxic properties. Accordingly, two commercial samples of sodium alginate were used in feeding tests with experimental animals and were tested in the diet in percentages much higher than would be used as a stabilizer in dairy products. The results of these experiments showed no indications whatsoever of any toxicity of the sodium alginate. The detailed conclusions of this study have been assembled in a report.

KELP MEAL IN ANIMAL FEEDING

This project was inaugurated several years ago by the Dairy Department of the University of Maryland and of the Maryland State Agricultural Experiment Station at College Park, Md., in cooperation with our technologists, to determine whether kelp meal, as a mineral supplement, had value in improving reproduction in dairy cattle. The tests thus far have been conducted with heifers and the preliminary results have been very encouraging. The study is being continued with producing or lactating dairy cows on a more extensive scale and it is hoped that information of considerable interest and benefit to the dairy industry will result from these experiments. Tests of this kind with large farm animals, such as dairy cows, require several years for the production of conclusive results. However, quite definite improvement in the reproductive record of the animals fed kelp meal has resulted thus far.

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.

In the preceding sections of this report we have given the names of organizations which are conducting cooperative projects under the supervision of our technological staff and which have employed research associates for this purpose. In the preceding section on laboratories, we have given the individual names of these research associates and student assistants. The plan of utilizing graduate student assistants for working part-time on research projects has been so successful that the University of Maryland employed from its own funds additional graduate students, by establishing two research fellowships for work on fishery technological research. Some of these new research problems assigned to these research fellows at the beginning of the school year in October 1938, are: (1) Studies on the enzymes in fresh and frozen fish; (2) chemical and pharmacological studies on the oxidized oils in fish meals; (3) chemical and pharmacological studies on the decomposition of protein in fish meals; and (4) studies of certain bacterial enzymes responsible for certain types of fish spoilage. These projects are selected by the student in accordance with his qualifications, approved by both the Bureau and the University, and the results are prepared in a thesis submitted for a master's or a doctor's degree at the end of 3 years of part-time work. These students usually do excellent work, the results of such studies are usually of value to the industry, and this plan serves to educate and train scientific fishery investigators.

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 especially where the request has come from a large group or industry. However, we have not been able to comply with all of the requests received because of insufficient personnel and because of inadequate funds to provide for the travel expenses of the demonstrators.

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 marketing of aquatic products.

Another phase of this service has consisted of answering thousands of letters directed to the Bureau on fishery subjects and of 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 1938 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 from the sources of publication.

Those wishing to receive copies of this report and statistical bulletins as issued 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; 128b for monthly cold-storage reports; and 128d for periodic fishery market news reports. Those desiring daily fishery market news reports from any one of the Division's Fishery Market News offices which have been established should apply direct to the Bureau of Fisheries, Division of Fishery Industries, Fishery Market News Service at the nearest of the following five addresses: 33A Fulton Street, New York, N. Y.; 253½ Northern Avenue, Boston, Mass.; 200 North Jefferson Street, Chicago, Ill.; 309 Duval Building, Jacksonville, Fla.; or 421 Bell Street Terminal, Seattle, Wash. For historical statistical data on the domestic fish-

eries for the period 1880 to 1929 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 1936, inclusive, may be obtained from the annual reports of the Division for the years 1931 to 1937, inclusive.

DOCUMENTS, REPORTS, AND CIRCULARS

DELOACH, BARTON.

Trade in fresh and frozen fishery products and related marketing considerations in the San Francisco Bay area. 8°, 51 pp. Investigational Report No. 39. 10 cents.

FIEDLER, R. H.

Fishery industries of the United States, 1937. 8°, 460 pp. Administrative Report No. 32. Appendix III to Report of Commissioner of Fisheries, 1938. 25 cents.

JOHNSON, FRED F.

Marketing of shad on the Atlantic coast. 8°, 44 pp. Investigational Report No. 38. 10 cents.

SPECIAL ARTICLES AND ADDRESSES

FIEDLER, R. H.

Fishing industry—chart your course. Bureau of Fisheries' Memorandum S-347, Washington, D. C., also published in Pacific Coast News, Vancouver, B. C., in issue of December 15, 1938, as "Dry" statistics tell history of fishing industry.

Review of the fishery industry. Address before National Fisheries Convention, Boston, Mass., October 6, 1938. In minutes of National Fisheries Convention and Exposition, October 6-9, 1938, Massachusetts Fisheries Assoc., Boston, Mass.

HARRISON, ROGER W.

The addition of oil to canned salmon. Address before Sixth Annual Canned Salmon Cutting Demonstration, March 11, 1938, Seattle, Wash.; also mimeographed by Northwest Branch, National Cannery Association, Seattle, Wash.

Report on fat in fish meal. Journal of Association of Official Agricultural Chemists, vol. XXI, No. 4, pp. 618-621, November 1938. Washington, D. C.

Fat in fish meal. Address before the Feedstuffs Section of the Association of Official Agricultural Chemists, November 15, 1938. Washington, D. C. Developments in the field of byproducts. 1938 Annual Review Number, Fishing Gazette, pp. 62-63 and 109. New York, N. Y.

JARVIS, NORMAN D.

The canning of herring (alewives) and herring roe. Address before Ridge Fishermen's Cooperative, February 10, 1938. Ridge, Md.

Home canning of Maine fish and sea foods. Canning demonstration and address at the Rural Women's Short Course, University of Maine, March 31, 1938. Orono, Maine.

Smoking Maryland fish at home. Demonstration and address at the Women's Short Course, University of Maryland, June 16, 1938. College Park, Md.

Home canning of Maryland fish and sea foods. Canning demonstration and address at the Women's Short Course, University of Maryland, June 17, 1938. College Park, Md.

Fish and shell fish canapes and hors d'oeuvres. Bureau of Fisheries' Special Memorandum 3219-A. Washington, D. C.

JOHNSON, FRED F.

Species of fish and shellfish of principal importance in the retail trade of certain cities. Bureau of Fisheries' Memorandum S-346. Washington, D. C.

LANHAM, WILLIAM B. JR., and JAMES M. LEMON

Nutritive value for growth of some proteins of fishery products. Bureau of Fisheries' Special Memorandum 2195-C. Washington, D. C. Reprinted from Food Research, vol. 3, No. 5, 1938. Champaign, Ill.

LEMON, J. M.

Refrigeration—A great development in the fishing industry. *Ice and Refrigeration*, vol. 94, No. 2, p. 98, February 1938. Chicago, Ill.

Technological research in the oyster industry. Address before the Oyster Institute of North America, June 6, 1938. Providence, R. I.

The relation of technological research to the fisheries. Address before seminar of graduate students in bacteriology, University of Maryland, October 6, 1938. College Park, Md.

Selection and handling frozen fish for the hotel and restaurant trade. Address before the Southeastern Section of the Hotel and Restaurant Managers Association at the Mayflower Hotel, December 7, 1938. Washington, D. C.

Sea food refrigeration comes of age. 1938 Annual Review Number, *Fishing Gazette*, vol. 55, No. 10, pp. 80-82. New York, N. Y.

LEMON, JAMES M., and C. E. SWIFT.

The effect of oat flour as an anti-oxidant in frozen fatty fish. Paper prepared for the American Chemical Society, September 8, 1938. Milwaukee, Wis. Abstracted in *Fishing Gazette*, vol. 55, No. 12, pp. 13-30, November 1938. New York, N. Y.

MANNING, J. R.

What technology is doing for the fish industry. Bureau of Fisheries' Special Memorandum 3509. Washington, D. C. Reprinted from *Food Industries*, April 1938. New York, N. Y.

Fishery technology today. Address before local branch of the American Chemical Society, April 19, 1938. Penns Grove, N. J.

Scientists must achieve the power of expression. Lecture to seminar of graduate students in bacteriology, University of Maryland, October 19, 1938. College Park, Md.

Problems of technical supervision in the Government service. Lecture to Colgate University student group at Brookings Institution, October 26, 1938. Washington, D. C.

Relation of technological investigations of the Bureau of Fisheries to chemical work of the Bureau of Customs. Address before the annual conference or meeting of chief chemists of field laboratories of the Bureau of Customs, Treasury Department, November 16, 1938. Washington, D. C.

Report on fish meal before Association of American Feed Control Officials on November 17, 1938. Washington, D. C.

STANSBY, MAURICE E.

Simple electrode support for electrometric titrations. *Industrial and Engineering Chemistry, Analytical Edition*, vol. 10, No. 9, p. 529, September 15, 1938. Easton, Pa.

STATISTICAL BULLETINS

Fisheries of the Chesapeake Bay States, 1936. Statistical Bulletin No. 1259.
Fisheries of the South Atlantic and Gulf States, 1936. Statistical Bulletin No. 1264.

Fisheries of the Pacific Coast States, 1936. Statistical Bulletin No. 1279.

Lake fisheries, 1935. Statistical Bulletin No. 1275.

Lake fisheries, 1936. Statistical Bulletin No. 1278.

Fisheries of the United States and Alaska. Statistical Bulletin No. 1280.

Manufactured fishery products of the United States and Alaska. Statistical Bulletin No. 1282.

Fishery products frozen and cold-storage holdings of frozen and cured fishery products in the United States and Alaska, 1937. Statistical Bulletin No. 1267.

Production of fresh and frozen packaged fish in the United States, 1937. Statistical Bulletin No. 1293.

Canned fishery products and byproducts of the United States and Alaska, 1937. Statistical Bulletin No. 1289.

Fisheries of Alaska, 1937. Statistical Bulletin No. 1285.

Landings by fishing vessels at the three principal New England ports, 1937—by months. Statistical Bulletin No. 1263.

Landings by fishing vessels at the three principal New England ports, 1937—by gear and fishing grounds. Statistical Bulletin No. 1269.

Fishery products landed by United States vessels at Seattle, Wash., 1937. Statistical Bulletin No. 1270.

Part 2. FISHERY STATISTICS, 1937**GENERAL REVIEW**

Available statistics indicate that there was a decrease in the volume but an increase in the value of fishery products taken in the United States and Alaska during 1937, as compared with the preceding year. Data on the catch were collected for both 1936 and 1937 in the Chesapeake, South Atlantic and Gulf, Pacific, and Lake States, and in Alaska. The combined catch in these sections alone shows a decrease of 13 percent in volume but an increase of 7 percent in value. Decreased catches were made in each of the five geographical sections; however, the principal reductions occurred in the Pacific Coast States where greatly reduced catches of pilchards were taken, and in Alaska where there was a large decline in the catch of salmon. The value of the production of canned fishery products in all sections increased 11 percent as compared with 1936; byproducts increased 5 percent; frozen fish about 1 percent; and packaged fish 3 percent.

The total catch of fishery products in the United States and Alaska, as based on the most recent surveys, amounted to 4,352,549,000 pounds, valued at \$100,845,000. About 130,000 fishermen were employed in making this catch.

The production of canned fishery products in the United States and Alaska during 1937 amounted to 742,197,065 pounds, valued at \$105,174,935; the output of byproducts was valued at \$36,804,045; the production of frozen fishery products, excluding packaged products, amounted to 103,111,549 pounds, estimated to be valued at \$8,800,000; and fresh and frozen packaged fish and shellfish, 201,802,529 pounds, valued at \$27,677,899. Based on surveys for 1937 in all sections except the Mississippi River area, and for 1931 in that area, the production of cured fishery products amounted to 104,339,340 pounds, valued at \$15,635,280. It is estimated that about 686,000,000 pounds of fresh fishery products (excluding packaged fish and shellfish) valued at about \$57,000,000, were marketed during 1937. The total marketed value to domestic primary handlers of all fishery products in 1937 is estimated at \$251,000,000.

Fishery products imported for consumption were valued at \$50,635,515 and domestic exports were valued at \$14,567,252.

New England States.—In 1937 the commercial catch of fishery products in these States showed an increase in both volume and value as compared with 1935, when the first preceding survey of the total catch of these States was made. The yield of the fisheries in this section during 1937 was the largest that has been recorded, with the exception of the catch for the years of 1929 and 1930.

A comparison of the combined vessel landings at Boston and Gloucester, Mass., and Portland, Maine, which are available for both 1936 and 1937, show that those landings declined in 1937.

Middle Atlantic States.—The 1937 commercial catch of fishery products in the Middle Atlantic States decreased in volume but increased

in value as compared with 1935, when the first preceding survey of the total catch was made. Available data for both 1936 and 1937 show that the production of frozen fish in these States declined in 1937, while the catch of shad in the Hudson River was the largest on record since 1901.

Chesapeake Bay States.—In 1936 the catch of fishery products in the Chesapeake Bay States decreased in both volume and value, as compared with the previous year. The value of menhaden products, which were produced in Virginia, declined during the year, while both the quantity and value of fresh-shucked oysters, and packaged fresh-cooked crab meat increased.

South Atlantic and Gulf States.—The catch of fishery products in the South Atlantic and Gulf States during 1937 declined in volume but increased in value, as compared with the previous year. There was a large increase in the value of manufactured fishery products produced in these States in 1937 due to material increases in the production of packaged fresh-cooked crab meat, fresh-shucked oysters, and canned shrimp and oysters.

Pacific Coast States.—The commercial catch of fishery products in these States during 1937 decreased in volume, but increased in value. The decrease in volume resulted principally from reduced catches of pilchards in California. The 1937 production of canned sardines, salmon, and tuna increased as compared with 1936, while the packs of mackerel and oysters decreased. The value of fishery byproducts, which consist largely of fish meal and oil also declined.

Lake States.—In 1937 the commercial catch of fishery products in the Lake States decreased in both volume and value, as compared with 1936. The decreases resulted principally from reduced catches of blue pike.

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, for 1937 showed a decrease in the catch of fishery products in Lake Pepin and the Mississippi River between these lakes, but an increase in the catch in Lake Keokuk as compared with the previous year. The production of fresh-water mussel-shell buttons declined in 1937 as compared with 1936.

Alaska.—The catch of fishery products in Alaska in 1937 decreased in volume but increased in value, as compared with 1936. There was a material decline in the yield of salmon for the year, while the catches of herring and crabs increased. The production of frozen fishery products and byproducts increased in quantity and value in 1937, while the output of fresh, cured, and canned products decreased.

Fisheries of the United States and Alaska, 1937¹

SUMMARY OF CATCH: BY SECTIONS

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

Product	New England area XXII		Middle Atlantic area XXIII		Chesapeake area XXIII		South Atlantic and Gulf areas XXIV and XXV		Pacific	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Fish.....	615,167	13,524	230,194	3,700	209,484	2,376	343,669	5,648	1,553,757	26,723
Shellfish, etc.....	55,697	6,413	34,458	4,196	82,761	3,965	203,082	8,578	21,982	2,013
Whale products.....									1,138	41
Total.....	670,864	19,937	284,652	7,896	292,245	6,361	546,751	14,226	1,576,877	28,777

Product	Lakes		Mississippi River and tributaries		Alaska		Total	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Fish.....	83,105	6,006	44,062	2,258	822,724	14,019	3,902,162	74,254
Shellfish, etc.....	853	27	38,321	640	3,059	219	440,213	26,071
Whale products.....					9,036	479	10,174	520
Total.....	83,958	6,033	82,383	2,898	834,819	14,717	4,352,549	100,845

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 Eng- land	Middle At- lantic	Chesapeake	South At- lantic and Gulf	Pacific
Fishermen:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
On vessels.....	5,345	2,627	2,486	4,322	9,099
On boats and shore.....	14,279	5,093	14,043	25,922	12,456
Total.....	19,624	7,720	16,529	30,244	21,555
Vessels:					
Steam.....	39	10	25		4
Net tonnage.....	5,977	1,212	2,833		96
Motor.....	630	438	171	1,026	1,213
Net tonnage.....	18,330	7,324	2,671	12,013	37,060
Sail.....		3	151	69	5
Net tonnage.....		32	1,886	645	2,198
Total vessels.....	669	451	347	1,095	1,222
Total net tonnage.....	24,307	8,568	7,390	12,658	39,344
Boats:					
Motor.....	4,469	1,504	6,109	7,913	5,167
Other.....	4,732	2,261	4,692	9,281	811
Accessory boats.....	712	223	105	216	853
Apparatus:					
Haul seines.....	98	239	271	1,186	227
Purse seines.....	103	44	36	48	598
Lampara nets.....					233
Otter trawls.....	509	213	19	4,201	64
Beam trawls.....					25
Paranzella nets.....					14
Gill nets.....	6,608	1,936	9,842	12,257	3,789
Trammel and bar nets.....					954
Pound nets, trap nets, and weirs.....	466	435	2,388	3,104	33
Stop nets.....	78	70	2		
Fyke nets.....	247	1,638	2,596	1,083	1,989
Bag nets.....	155				9
Other nets ²	617	200	2,303	10,060	532
Hooks, baits, or snoods.....	2,485,280	687,480	2,032,491	1,538,766	1,099,859
Fish wheels.....				10	
Eel pots and traps.....	3,083	3,304	11,273	1,502	
Brush traps.....				28,300	
Lobster pots and traps.....	306,130	23,664			5,721

¹ All figures are for 1937, except those for the Mississippi River and tributaries, which are for 1931.

² Includes dip, push, reef, scap, drag, cast, and drop nets.

Fisheries of the United States and Alaska, 1937—Continued

OPERATING UNITS: BY SECTIONS—Continued

Item	New Eng-land	Middle At-lantic	Chesapeake	South At-lantic and Gulf	Pacific
Apparatus—Continued.					
Crab, crawfish, and turtle pots, and traps.....	Number 3,660	Number 10	Number 1,060	Number 9,381	Number 29,162
Clam dredges.....	112	124	198	1	.....
Crab dredges.....	.....	73	.....	.....	.....
Mussel dredges.....	4	2	.....	.....	.....
Oyster dredges.....	150	291	459	897	4
Scallop dredges.....	3,696	78	2	37	.....
Crab scrapes.....	.....	.....	746	.....	.....
Tongs, rakes, shovels, hoes, forks, picks, etc.....	6,485	3,947	8,478	3,563	4,266
Diving outfits.....	.....	.....	.....	72	24
Other apparatus ¹	1,231	11,291	235	6,779	416

Item	Lakes	Mississippi River and tributaries	Alaska	Total
Fishermen:				
On vessels.....	Number 1,662	Number	Number 2 11,570	Number 37,111
On boats and shore.....	4,756	15,884	.....	92,433
Total.....	6,418	15,884	11,570	129,544
Vessels:				
Steam.....	49	.....	6	133
Net tonnage.....	1,146	.....	488	11,762
Motor.....	433	.....	866	4,777
Net tonnage.....	5,200	.....	11,847	94,435
Sail.....	.....	.....	.....	228
Net tonnage.....	.....	.....	.....	4,761
Total vessels.....	482	.....	872	5,138
Total net tonnage.....	6,346	.....	12,335	110,948
Boats:				
Motor.....	1,637	4,426	1,692	32,907
Other.....	1,408	10,120	3,494	36,769
Accessory boats.....	9	.....	.....	2,118
Apparatus:				
Haul seines.....	259	1,013	209	3,502
Purse seines.....	.....	.....	862	1,691
Lampara nets.....	.....	.....	.....	1,233
Otter trawls.....	.....	.....	.....	4,996
Beam trawls.....	.....	.....	13	38
Paranzella nets.....	.....	.....	.....	14
Gill nets.....	162,829	101	4,121	201,483
Trammel and bar nets.....	115	518	.....	1,618
Pound nets, trap nets, and weirs.....	10,252	374	457	17,509
Stop nets.....	.....	.....	.....	150
Fyke nets.....	2,800	32,541	.....	42,894
Bag nets.....	.....	.....	.....	164
Other nets ².....	.....	191	.....	13,903
Hooks, baits, or snoods.....	1,222,970	2,459,179	(¹)	11,526,034
Fish wheels.....	.....	.....	255	265
Eel pots and traps.....	.....	.....	.....	19,222
Brush traps.....	.....	.....	.....	28,300
Lobster pots and traps.....	.....	.....	.....	335,515
Crab, crawfish, and turtle pots, and traps.....	850	458	3,479	48,058
Clam dredges.....	.....	.....	.....	237
Crab dredges.....	.....	440	.....	271
Mussel dredges.....	.....	.....	.....	446
Oyster dredges.....	.....	.....	.....	1,801
Scallop dredges.....	.....	.....	.....	3,813
Crab scrapes.....	.....	.....	.....	746
Tongs, rakes, shovels, hoes, forks, picks, etc.....	37	3,994	.....	30,770
Diving outfits.....	.....	.....	.....	96
Crowfoot bars.....	158	4,480	.....	4,638
Other apparatus ³.....	.....	3,781	.....	23,733

¹ Includes persons in boats and shore fisheries.² Number not determined.³ Includes periwinkle, cockle, and fish pots; harpoons, spears, hooks, coquina scoops, octopus and slat traps, and wire baskets.

NOTE.—The South Atlantic and Gulf section includes the fisheries of Lake Okeechobee, Fla.

Fisheries of the United States and Alaska, 1937—Continued

CATCH: BY SECTIONS

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

Species	New England		Middle Atlantic		Chesapeake		South Atlantic and Gulf		Pacific	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Alewives	4,207	22	715	10	18,883	188	6,218	60		
Amberjack							51	1		
Anchovies	32	(⁶)					9	(⁶)	226	4
Angelfish									2,933	161
Barracuda					41	5				
Black bass					609	30	5,294	258		
Bluefish	221	19	2,348	170			784	9		
Blue runner or hardtail							1	(⁶)		
Bonito	48	4	224	10	35	1	3	(⁶)		
Bowfin							716	37		
Buffalofish							13	(⁶)		
Butterfish	2,870	110	4,956	229	2,048	33	2	(⁶)		
Cabio or crab eater					20	1		(⁶)		
Cabrilla									131	7
Carp	41	3	508	36	633	22	324	7	163	5
Catfish and bullheads	(⁶)	(⁶)	115	6	1,107	30	7,067	334	303	34
Cero			51	1			(⁶)	(⁶)		
Cigarfish							17	(⁶)		
Cod	134,605	2,657	6,415	223	1	(⁶)			12,637	195
Crappie					3	(⁶)	524	18		
Crevalle	2	(⁶)					196	4		
Croaker	866	28	4,236	71	34,095	516	10,286	127		
Cunner	43	1								
Cusk	10,172	196	91	1						
Dolphin							3	(⁶)		
Drum:										
Black			5	(⁶)	47	1	1,894	49		
Red or redfish	3	(⁶)	10	(⁶)	46	1	3,221	164		
Eels:										
Common	404	35	478	41	317	28	104	3		
Conger	63	1	32	1	1	(⁶)				
Flounders	48,202	1,830	10,876	604	530	28	997	64	16,285	749
Flyingfish									42	2
Frigate mackerel			185	2						
Garfish							6	(⁶)		
Gizzard shad			1	(⁶)	351	5	38	(⁶)		
Goosefish	37	(⁶)								
Grayfish	32	1	58	1	5	(⁶)			2,533	29
Groupers			22	1			5,546	175	58	3
Grunts							59	1		
Haddock	169,487	4,172	2,282	76						
Hake	25,109	363	367	6	3	(⁶)			63	1
Halibut	2,439	257	3	(⁶)					24,418	2,176
Hardheads									54	5
Harvestfish or "starfish"					1,093	20	641	10		
Herring, sea	53,042	297	371	4					1,792	17
Herring smelt	10	(⁶)								
Hickory shad	13	(⁶)	2	(⁶)	113	2	230	7		
Hogchoker							18	(⁶)		
Hogfish							1	(⁶)		
Horse mackerel									6,542	65
Jewfish							85	3		
Kingfish (California)									846	16
Kingfish or "king mackerel"			149	6			3,359	124		
King whiting or "kingfish"	15	1	150	4	143	4	1,726	40		
Lamprey	3	(⁶)								
Launce	268	3								
"Lingcod"									2,731	101
Mackerel	23,381	959	3,117	95	103	2			60,936	669
Marlin									4	(⁶)
Menhaden	294	2	148,505	657	121,980	485	211,358	616		
Minnnows	2	1								
Mojarra							349	7		
Moonfish							5	(⁶)		
Mullet			65	3	14	(⁶)	38,210	1,197	9	1
Mummichog	1	(⁶)	1	(⁶)						
Muttonfish							233	14		
Paddlefish or spoonbill cat							71	4		
Permit							12	(⁶)		
Pigfish			(⁶)	(⁶)			117	2		
Pike or pickerel					40	6	(⁶)	(⁶)		
Pilchard									1,139,505	6,815

* Less than 500 pounds or dollars.

Fisheries of the United States and Alaska, 1937—Continued

CATCH: BY SECTIONS—Continued

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

Species	New England		Middle Atlantic		Chesapeake		South Atlantic and Gulf		Pacific	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity 70	Value 1	Quantity	Value
FISH—continued										
Pinfish										
Pollock	37,566	524	118	3						
Pompano			(^o)	(^o)	11	1	700	139	5	2
Rock bass									324	18
Rockfishes									4,889	214
Rosefish	58,356	887	1	(^o)						
Rudderfish			2	(^o)					36	2
Sablefish									3,949	192
Salmon:										
Atlantic	29	6								
Blueback, red or sock-eye									7,042	737
Chinook or king									35,592	2,867
Chum or keta									11,435	294
Humpback or pink									25,425	637
Silver or coho									16,167	391
Sockeye									146	11
Sculpin										
Scup or porgy	10,062	214	6,752	135	1,958	31	50	2		
Sea bass	2,553	141	2,639	154		213		394	21	714
Sea bass, white (California)										602
Sea catfish							272	7		57
Sea robin	181	2	71	1	3	(^o)				
Shad	445	27	4,394	406	3,491	313	1,317	192	1,214	46
Sharks	127	3	66	2		(^o)	2,557	14		
Sheepshead:										
Fresh-water					(^o)	(^o)	604	17		
Salt-water							1,148	37	82	3
Silversides	(^o)	(^o)							448	9
Skates	399	3	121	1	16	(^o)	3	(^o)		
Skipper or "billfish"	1	(^o)							2,065	122
Smelt	639	71	1	(^o)						
Snapper:										
Mangrove							195	7		
Red			54	4	(^o)	(^o)	7,522	516		
Snook or sergeantfish							533	21		
Spadefish							51	1		
Spanish mackerel			51	4	839	21	6,433	292	27	1
Splittail									11	(^o)
Spot	2	(^o)	18	(^o)	3,006	56	5,806	105		(^o)
Squawfish									1	(^o)
Squeteagues or "sea trout":										
Gray	201	12	12,264	358	13,697	268	7,531	214		
Spotted					148	7	7,616	578		
White							493	20		
Squirrel hake	4	(^o)	120	1					2,065	122
Steelhead trout									34	1
Striped bass	450	36	405	47	3,016	220	713	70	154	5
Sturgeon	10	1	8	1	13	2	69	7	8	(^o)
Suckers	139	5	70	4	3	(^o)	3	(^o)		
Sunfish			2	(^o)	1	(^o)	981	29		
Surfishes (perch)									336	14
Swellfish			56	1	9	(^o)				
Swordfish	1,868	291	109	20					625	85
Tautog	294	9	21	(^o)	1	(^o)				
Tenpounder							455	8		
Thimble-eyed mackerel	5	(^o)	63	2						
Tilefish	36	1	2,390	102						
Tomcod	8	(^o)	3	(^o)	(^o)	(^o)			1	(^o)
Tripletail								25	(^o)	
Tuna and tunalike fishes:										
Albacore									3,520	287
Bluefin	929	32	94	4	(^o)	(^o)			12,694	725
Bonito									7,808	286
Skipjack									47,104	2,319
Yellowfin									91,522	5,458
Turbot	(^o)	(^o)							86	5
Whitebait									57	3
Whitefish, common										
White perch	3	(^o)	102	10	492	18	162	7		
Whiting	22,480	258	13,813	179	17	(^o)				
Wolfish	2,558	49	6	(^o)						

^o Less than 500 pounds or dollars.

Fisheries of the United States and Alaska, 1937—Continued

CATCH: BY SECTIONS—Continued

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

Species	New England		Middle Atlantic		Chesapeake		South Atlantic and Gulf		Pacific	
	Quantity (⁶)	Value (⁶)	Quantity (⁶)	Value (⁶)	Quantity (⁶)	Value (⁶)	Quantity (⁶)	Value (⁶)	Quantity	Value
FISH—continued										
Yellow perch.....			41	3	264	15	7			
Yellowtail.....			1	(⁶)			109	8	5,371	212
Miscellaneous.....									167	3
Total	615,167	13,524	230,194	3,700	209,484	2,376	343,669	5,648	1,553,757	26,723
SHELLFISH, ETC.										
Crabs:										
Hard.....	2,514	68	1,411	38	44,126	958	29,084	434	8,356	721
King or "horseshoe".....			3,256	8						
Rock.....	2	(⁶)								
Soft and peelers.....	1	(⁶)	180	38	4,989	436	483	75		
Stone.....							46	9		
Crawfish.....									85	9
Lobsters:										
Common.....	10,936	2,304	640	133						
Spray.....							293	22	1,322	163
Shrimp.....	7	1	116	16	2	(⁶)	141,273	5,009	1,158	24
Abalone.....									573	98
Clams:										
Coquina.....							4	(⁶)		
Hard.....	3,809	442	5,078	877	1,695	282	1,186	84	979	70
Pismo.....									56	11
Razor.....	726	19							480	94
Soft.....	14,677	934	1,960	156					30	8
Surf.....	9	1	1,586	79						
Mixed.....									78	7
Conchs.....	19	1	13	1			7	1		
Mussels, sea.....	16	1	93	5	28	1			(⁶)	(⁶)
Octopus.....									88	4
Oysters, market:										
Eastern, public.....	187	29	896	141	22,549	1,543	19,472	978		
Eastern, private.....	11,229	1,521	13,721	2,229	9,167	758	10,166	717	68	23
Japanese.....									7,891	562
Western.....									281	202
Periwinkles and "cockles".....	72	2								
Scallops:										
Bay.....	1,552	304	36	9			191	21	24	5
Sea.....	5,659	629	3,053	343	11	2				
Squid.....	3,295	42	2,353	67	185	3			503	16
Sea urchins.....	82	(⁶)								
Terrapin.....			1	(⁶)	3	2	29	3		
Turtles.....			22	1	6	(⁶)	225	5		
Irish moss.....	182	16								
Kelp.....	120	1								
Sponges.....							631	1,220		
Bloodworms.....	264	42	35	27						
Sandworms.....	327	55	38	28						
Starfish.....	12	1								
Trepang.....									10	1
Total	55,697	6,413	34,458	4,196	82,761	3,985	203,082	8,578	21,982	2,013
WHALE PRODUCTS⁷										
Meat.....									625	12
Oil, whale.....									513	29
Total									1,138	41
Grand total	670,864	19,937	264,652	7,896	292,245	6,361	546,751	14,226	1,576,877	28,777

⁶ Less than 500 pounds or dollars.⁷ The weight of whales caught was not determined; therefore, the weight of manufactured products is shown. This tabulation does not include data on the whale fishery, conducted by United States enterprise in the Southern Hemisphere. For data on this fishery, the reader is referred to the following sections of this report: "Manufactured Fishery Products," "Canned Fishery Products and Byproducts Trade," the manufactured products table in the section entitled "Middle Atlantic States," and to the section entitled "Whaling."

Fisheries of the United States and Alaska, 1937—Continued

CATCH: BY SECTIONS—Continued

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

Species	Lakes		Mississippi River and tributaries		Alaska		Total		
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	
FISH									
Alewives.....							30,023	280	
Amberjack.....							51	1	
Anchovies.....							258	4	
Angelfish.....							9	(*)	
Barracuda.....							2,933	161	
Black bass.....			14	2			55	7	
Bluefish.....							8,472	477	
Blue pike.....	11,021	640					11,021	646	
Blue runner or hardtail.....							784	9	
Bonito.....							308	15	
Bowfin.....	1	(*)	428	9			432	9	
Buffalofish.....			15,772	687			16,488	724	
Burbot.....	494	7					494	7	
Butterfish.....							9,887	372	
Cable or crab eater.....							22	1	
Cabrilla.....							131	7	
Carp.....	5,160	136	11,892	456			18,721	666	
Catfish and bullheads.....	1,120	70	10,267	878			19,979	1,358	
Cero.....							51	1	
Chub.....	6,044	903					6,044	903	
Cigarfish.....							17	(*)	
Cisco.....	64	7					64	7	
Cod.....						624	4	154,282	8,079
Crappie.....	(*)	(*)	41	3			568	21	
Creville.....							198	4	
Croaker.....							49,483	742	
Cunner.....							43	1	
Cusk.....							10,263	187	
Dolly Varden trout.....						55	3	55	3
Dolphin.....							3	(*)	
Drum:									
Black.....							1,946	50	
Red or redbfish.....							3,280	166	
Eels:									
Common.....	10	(*)	7	1			1,820	108	
Conger.....							96	2	
Flounders.....						200	4	77,090	3,270
Flyingfish.....							42	2	
Frigate mackerel.....							185	2	
Gardfish.....	6	(*)	73	1			85	1	
Gizzard shad.....							390	5	
Goldfish.....	267	5					267	5	
Goosefish.....							37	(*)	
Grayfish.....							2,628	31	
Grouper.....							5,626	179	
Grunts.....							59	1	
Haddock.....							171,769	4,248	
Hake.....							25,542	370	
Hallbut.....						18,974	1,006	45,834	34,438
Hardheads.....							54	5	
Harvestfish or "starfish".....							1,734	30	
Herring:									
Lake.....	21,557	621					21,557	621	
Sea.....						206,446	1,032	261,651	1,350
Herring smelt.....							10	(*)	
Hickory shad.....							358	9	
Hogchoker.....							18	(*)	
Hogfish.....							22	(*)	
Horse mackerel.....							6,542	65	
Jewfish.....							85	3	
Kingfish (California).....							646	16	
Kingfish or "king mackerel".....							3,508	130	
King whiting or "kingfish".....							2,034	49	
Lake trout.....	9,428	1,521					9,428	1,521	
Lamprey.....							3	(*)	
Launce.....							268	3	
"Lingcod".....						3	1	2,734	102
Mackerel.....							87,537	1,725	
Marlin.....							4	(*)	
Menhaden.....							482,137	1,760	
Minnnows.....			1	(*)			3	1	
Mojarra.....							349	7	
Mooneye.....	18	(*)	3	(*)			18	(*)	
Moonfish.....							5	(*)	

* Less than 500 pounds or dollars

Fisheries of the United States and Alaska, 1937—Continued

CATCH: BY SECTIONS—Continued

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

Species	Lakes		Mississippi River and tributaries		Alaska		Total	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
FISH—continued								
Mullet							36,208	1,201
Mummichog							2	(⁶)
Muttonfish							233	14
Paddlefish or spoonbill cat.			951	43			1,022	47
Permit							12	(⁶)
Pigfish							117	19
Pike or pickerel	259	12	5	1			304	19
Pilchard							1,139,505	6,815
Pinfish							70	1
Pollock							37,684	527
Pompano							716	142
Quillback			268	11			268	19
Rock bass	37	1					361	19
Rockfishes					26	(⁶)	4,915	214
Rosefish							58,357	887
Rudderfish							38	2
Sablefish					2,990	91	6,939	283
Salmon:								
Atlantic							29	6
Blueback, red, or sockeye					193,459	5,458	200,501	6,195
Chinook or king					21,435	549	57,027	3,416
Chum or keta					80,465	805	91,900	1,189
Humpback or pink					282,284	4,616	307,709	5,253
Silver or coho					15,741	350	31,908	1,250
Sauger	1,636	88	2	(⁶)			1,638	88
Sculpin							146	11
Scup or porgy							18,822	382
Sea bass							6,513	366
Sea bass, white (California)							602	57
Sea catfish							272	7
Sea robin							255	3
Shad							10,861	984
Sharks							2,756	19
Sheepshead:								
Fresh-water	4,069	65	3,905	143			8,578	225
Salt-water							1,230	40
Silversides							(⁶)	(⁶)
Skates							987	13
Skipper or "billfish"							1	(⁶)
Smelt	1,426	67			(⁶)	(⁶)	4,151	260
Snapper:								
Mangrove							195	7
Red							7,576	52 ⁶
Snook or sergeantfish							533	21
Spadefish							51	1
Spanish mackerel							7,350	318
Spittail							11	(⁶)
Spot							8,892	161
Squawfish							1	(⁶)
Squeteagues or "sea trout":								
Gray							33,693	852
Spotted							7,764	585
White							493	20
Squirrel hake							124	1
Steelhead trout					22	2	2,087	124
Striped bass							4,618	374
Sturgeon	18	6					272	22
Sturgeon, shovelnose			87	8			87	8
Suckers	5,892	161	315	13			6,430	183
Sunfish	32	1	22	1			1,038	31
Surfshes (perch)							336	14
Swellfish							65	1
Swordfish							2,602	396
Tautog							226	9
Tenpounder							455	8
Thimble-eyed mackerel							68	2
Tilefish							2,426	103
Tomcod							12	(⁶)
Tripletail							25	(⁶)
Tullibees	223	5					223	5
Tuna and tunalike fishes:								
Albacore							3,520	287
Bluefin							13,717	761
Bonito							7,808	296

⁶Less than 500 pounds or dollars.

FISHERY INDUSTRIES OF THE UNITED STATES, 1938 227

Fisheries of the United States and Alaska, 1937—Continued

CATCH: BY SECTIONS—Continued

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

Species	Lakes		Mississippi River and tributaries		Alaska		Total	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
FISH—Continued								
Tuna and tunalike fishes— Con.								
Skipjack							17,104	2,319
Yellowfin							91,522	5,458
Turbot							(⁶)	(²)
White bass	425	20	4	(⁶)			430	20
Whitebait							86	5
Whitefish:								
Common	3,228	668					3,285	671
Menominee	138	13					138	13
White perch							759	35
Whiting							36,310	437
Wolfish							2,564	49
Yellow perch	5,067	433					5,379	451
Yellow pike	5,458	590	5	1			5,463	551
Yellow tail							5,481	220
Miscellaneous							167	3
Total	83,105	6,006	44,062	2,258	822,724	14,109	3,902,162	74,254
SHELLFISH, ETC								
Crabs:								
Hard:								
King (Pacific coast)					1,393	138	86,886	2,357
King or "horseshoe"					6	(⁶)	6	(⁶)
Rock							3,250	8
Soft and peelers							2	(⁶)
Stone							5,623	549
Crawfish	6	1	29	(⁶)			46	9
Lobsters:							120	10
Common							11,576	2,437
Spiny							1,015	185
Shrimp			49	4	843	33	143,448	5,087
Ahalone							573	93
Clams:								
Coquina							4	(⁶)
Hard					13	1	12,760	1,756
Pismo							56	11
Razor					804	47	2,010	160
Soft							16,667	1,098
Surf							1,595	80
Mixed							78	7
Conchs							39	3
Mussels, sea							137	7
Mussel shells	847	26	37,254	421			38,101	447
Ottopus							88	4
Oysters, market:								
Eastern, public							43,104	2,691
Eastern, private							44,351	5,248
Japanese							7,891	562
Western							281	202
Periwinkles and "cockles"							72	2
Scallops:								
Bay							1,793	339
Sea							8,723	974
Squid							6,336	128
Sea urchins							82	(⁶)
Terrapin			19	(⁶)			52	8
Turtles			95	4			348	10
Frogs			875	131			875	131
Irish moss							182	16
Kelp							120	1
Sponges							631	1,220
Pearls and slugs		(⁶)		80				80
Bloodworms							299	69
Sandworms							365	83
Starfish							12	1
Trepang							10	1
Total	853	27	38,321	640	3,059	219	440,213	26,071

⁶ Less than 500 pounds or dollars.

Fisheries of the United States and Alaska, 1937—Continued

CATCH: BY SECTIONS—Continued

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

Species	Lakes		Mississippi River and tributaries		Alaska		Total	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
WHALE PRODUCTS¹								
Meat.....							625	12
Fertilizer.....					2,410	33	2,410	33
Oil, sperm.....					1,262	46	1,262	46
Oil, whale.....					5,364	400	5,877	429
Total.....					9,036	479	10,174	520
Grand total.....	83,958	6,033	82,383	2,898	834,819	14,717	4,352,549	100,846

CATCH: BY STATES

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

States	Marine and coastal rivers		Mississippi River and tributaries		Lakes ²		Total	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Alabama.....	10,917	461	1,822	33			12,739	494
Arkansas.....			15,733	412			15,733	412
California.....	1,352,128	18,945					1,352,128	18,945
Connecticut.....	16,063	1,440					16,063	1,440
Delaware.....	50,940	319					50,940	319
Florida.....	230,149	4,983			2,026	68	232,175	5,051
Georgia.....	22,443	406					22,443	406
Illinois.....			14,263	367	1,461	193	15,724	560
Indiana.....			7,717	157	781	84	8,498	241
Iowa.....			7,778	302			7,778	302
Kansas.....			455	17			455	17
Kentucky.....			1,622	61			1,622	61
Louisiana.....	97,010	3,601	19,214	995			116,224	4,596
Maine.....	101,179	2,806					101,179	2,806
Maryland.....	49,953	2,532					49,953	2,532
Massachusetts.....	534,110	14,198					534,110	14,198
Michigan.....					28,984	2,435	28,984	2,435
Minnesota.....			3,498	139	8,150	293	11,648	431
Mississippi.....	39,060	1,731	2,650	123			41,730	1,854
Missouri.....			928	77			928	77
Nebraska.....			145	16			145	16
New Hampshire.....	664	96					664	96
New Jersey.....	129,516	3,201					129,516	3,201
New York.....	84,161	4,371			2,451	187	86,612	4,558
North Carolina.....	112,755	1,658					112,755	1,658
Ohio.....			185	7	21,088	1,013	21,273	1,020
Oklahoma.....			40	4			40	4
Oregon.....	68,945	2,609					68,945	2,609
Pennsylvania.....	35	5			3,007	238	3,042	243
Rhode Island.....	18,847	1,398					18,847	1,398
South Carolina.....	7,166	268					7,166	268
South Dakota.....							114	11
Tennessee.....			114	11			3,435	104
Texas.....	25,205	1,050	139	6			25,344	1,056
Virginia.....	242,292	3,829					242,292	3,829
Washington.....	155,805	7,222					155,805	7,222
Wisconsin.....			2,645	68	18,036	1,590	20,691	1,658
Alaska.....	834,819	14,717					834,819	14,717
Total.....	4,184,182	91,846	82,383	2,898	85,984	6,101	4,352,549	100,846

¹ The weight of whales caught was not determined; therefore, the weight of manufactured products is shown. This tabulation does not include data on the whale fishery conducted by United States enterprises in the Southern Hemisphere. For data on this fishery, the reader is referred to the following sections of this report: "Manufactured Fishery Products," "Canned Fishery Products and Byproducts Trade," the manufactured products table in the section entitled "Middle Atlantic States," and to the section entitled "Whaling."

² Includes Lake Ontario, Lake Erie, Lake Huron, Lake Michigan, Lake Superior, Rainy Lake, Namakan Lake, Lake of the Woods, Lake Okechobee, and several mus el-bearing streams tributary to Lakes Huron, Erie, and Michigan.

Fisheries of the United States and Alaska, 1937—Continued

SEED OYSTER FISHERY

Item	New England		Middle Atlantic	
	Number		Number	
OPERATING UNITS				
Fishermen:				
On vessels.....	189		1,226	
On boats and shore:				
Regular.....	162		192	
Casual.....	71		159	
Total.....	422		1,577	
Vessels:				
Steam.....	3			
Net tonnage.....	279		7	
Motor.....	20		7	
Net tonnage.....	461		172	
Sail.....	23		108	
Net tonnage.....	169		2,460	
Total vessels.....	46		115	
Total net tonnage.....	909		2,632	
Boats:				
Motor.....	3		95	
Other.....	1		249	
Apparatus:				
Dredges.....	193		230	
Yards at mouth.....	172		191	
Tongs.....	97		346	
Rakes.....	11		5	
CATCH				
Oysters, seed:	<i>Bushels</i>	<i>Value</i>	<i>Bushels</i>	<i>Value</i>
Public, spring.....	62,945	\$47,685	1,184,439	\$432,685
Public, fall.....	43,087	29,856	24,323	16,740
Private, spring.....	284,800	278,700	5,766	4,996
Private, fall.....	63,727	60,492	32,161	33,290
Total.....	454,559	416,733	1,246,689	507,691

Item	Chesapeake		South Atlantic and Gulf		Total	
	Number		Number		Number	
OPERATING UNITS						
Fishermen:						
On vessels.....	37				1,452	
On boats and shore:						
Regular.....	1,051		17		1,422	
Casual.....	132				362	
Total.....	1,220		17		3,236	
Vessels:						
Steam.....					3	
Net tonnage.....					279	
Motor.....	13				40	
Net tonnage.....	69				702	
Sail.....					131	
Net tonnage.....					2,629	
Total vessels.....	13				174	
Total net tonnage.....	69				3,610	
Boats:						
Motor.....	433				531	
Other.....	33		8		401	
Apparatus:						
Dredges.....			14		437	
Yards at mouth.....			14		477	
Tongs.....	910				1,353	
Rakes.....					16	
CATCH						
Oysters, seed:	<i>Bushels</i>	<i>Value</i>	<i>Bushels</i>	<i>Value</i>	<i>Bushels</i>	<i>Value</i>
Public, spring.....	249,900	\$62,479	6,000	\$1,760	1,505,284	\$564,589
Public, fall.....	544,200	136,006			611,610	182,602
Private, spring.....					290,566	283,696
Private, fall.....	2,400	600			98,288	94,382
Total.....	796,500	199,085	8,000	1,760	2,505,748	1,125,269

NOTE.—Of the total number of persons fishing for seed oysters 2,574 are duplicated among those fishing for market oysters or other species. Similarly the following craft and gear are duplicated: 68 vessels, 390 motor boats, 332 other boats, 162 dredges, 951 tongs, and 4 rakes.

Yield of the fisheries of the United States, 1937:¹ By gear

Gear	New England		Middle Atlantic		Chesapeake	
	Pounds	Value	Pounds	Value	Pounds	Value
Purse seines	14,775,000	\$584,818	147,436,300	\$722,603	119,763,000	\$478,923
Haul seines	1,127,000	41,516	1,887,300	117,419	9,759,100	230,994
Gill nets	23,197,900	490,123	4,800,800	351,330	1,653,000	125,247
Lines	72,862,900	1,783,735	10,638,200	436,016	38,996,500	809,985
Pound nets	21,196,800	408,294	42,114,900	991,296	70,577,000	1,316,354
Floating traps	13,271,800	266,195				
Other traps	40,500	3,708	13,400	730	11,200	275
Weirs	21,528,100	111,148	998,200	2,170		
Stop nets	28,266,500	161,577	196,300	14,331	26,700	560
Fyke nets	135,200	6,022	467,500	30,035	1,525,500	80,145
Dip nets	4,359,300	70,571	332,600	36,281	2,200,600	194,692
Cast nets			3,800	280		
Scap nets	7,900	395				
Bag nets	157,700	16,700				
Drag nets			13,800	3,450		
Push nets	63,000	21,000	20,300	5,075		
Other trawls	415,434,200	9,348,456	20,563,300	1,018,889	6,234,900	146,539
Pots	13,718,800	2,390,429	2,472,000	234,353	836,700	36,588
Harpoons	2,070,400	296,856	107,200	19,857		
Spears	26,500	2,435	50,800	3,955		
Scrapes, crab					2,016,900	156,312
Dredges	18,584,100	2,374,098	18,793,300	2,656,969	11,631,300	713,515
Tongs	2,269,700	329,597	4,257,700	720,575	24,245,600	1,817,852
Rakes	1,324,600	154,607	2,305,000	335,342	1,835,200	127,300
Forks	601,500	71,734	73,200	54,812		
Hoes	15,425,600	981,650	1,177,700	68,646		
Picks	84,800	640			277,000	49,200
By hand	334,500	20,984	928,300	71,567	645,200	76,753
Total	670,864,300	19,937,288	264,651,900	7,895,990	292,244,400	6,361,234

Gear	South Atlantic and Gulf		Pacific		Lakes	
	Pounds	Value	Pounds	Value	Pounds	Value
Purse seines	210,932,000	\$618,515	996,664,800	\$8,720,325		
Haul seines	38,761,800	1,227,825	5,328,700	323,462	5,820,600	\$171,690
Gill nets	45,732,100	1,787,321	35,677,500	2,070,844	40,779,300	3,391,081
Tammel nets	8,991,500	449,945	1,069,700	82,272	113,900	1,953
Lines	50,952,900	1,695,667	213,774,000	12,103,395	2,239,500	361,178
Pound nets	12,650,100	268,025	1,499,900	80,915	7,571,300	476,305
Other traps	143,000	21,650	9,903,500	897,116	23,334,800	1,397,352
Weirs			407,000	4,343		
Wheels	32,300	377				
Fyke nets	985,500	34,381	345,300	36,652	3,246,100	206,926
Dip nets	2,164,300	94,091	2,089,200	162,072		
Cast nets	461,700	15,043				
Bag nets			694,900	10,052		
Push nets	3,700	450				
Reef nets			1,409,500	70,057		
Lampara and ring nets			276,948,700	2,233,772		
Paranzella nets			12,913,000	617,448		
Other trawls	139,596,800	4,958,463	5,411,400	140,224		
Beam trawls			509,900	19,505		
Pots	3,365,000	99,219			6,400	642
Harpoons			1,764,200	126,242		
Spears	303,200	21,578				
Dredges	17,836,000	903,163	(⁵)	(⁵)		
Tongs	9,275,400	712,564	9,863,600	976,035		
Crowfoot bars			(⁵)	(⁵)	635,200	18,727
Rakes	493,900	46,148				
Forks	4,700	702				
Grabs	1,717,400	68,070				
Picks					109,100	3,862
Hooks	167,100	265,584				
Diving apparatus, abalone and sponge	471,700	954,674	572,600	92,654	102,200	3,368
By hand	1,708,900	72,915				
Total	546,751,000	14,228,370	1,576,877,400	28,776,385	83,958,400	6,033,084

¹ Data are for 1937 except that for Mississippi River and tributaries which are for 1931.² Includes the catch by drop nets and wire baskets.³ This catch was made by scoop nets.⁴ Includes a small catch by other trawls.⁵ The catch by shovels, rakes, and dredges is included with tongs.

Yield of the fisheries of the United States, 1937: By gear—Continued

Gear	Mississippi River and tributaries		Total	
	Pounds	Value	Pounds	Value
Purse seines			1,488,571,100	\$11,134,184
Haul seines	13,739,657	\$374,641	76,424,157	2,687,447
Gill nets	166,598	6,647	162,007,198	8,222,493
Trammel nets	1,134,206	75,616	11,339,306	609,785
Lines	10,140,037	772,245	399,604,037	17,872,221
Round nets	224,275	9,541	155,834,275	8,550,730
Floating traps			13,271,800	266,195
Other traps			33,446,400	2,320,831
Wells			22,933,800	117,661
Wheels			32,300	377
Stop nets			28,469,500	176,468
Fyke nets	18,507,204	797,130	25,212,304	1,191,291
Dip nets	30,045	3,307	11,185,045	661,014
Cast nets			465,500	15,332
Scap nets			7,900	395
Bag nets			852,600	26,752
Drag nets			13,800	3,450
Push nets			87,000	20,525
Reef nets			1,409,500	70,067
Lampara and ring nets			276,948,700	2,233,772
Paranzella nets			12,913,000	617,448
Otter trawls			593,240,600	15,612,671
Beam trawls			609,900	19,505
Pots	310,455	26,277	20,709,355	2,787,608
Harpoons			3,941,800	442,955
Spears	2,260	270	382,750	28,238
Scrapes, crab			2,016,900	156,312
Dredges	3,699,100	40,958	70,543,800	6,688,703
Tongs	1,601,876	21,091	51,513,876	4,577,714
Crowfoot bars	20,593,550	265,443	21,528,750	284,170
Rakes	370,130	4,029	6,328,830	667,426
Forks	4,812,737	76,214	5,492,137	203,462
Hoes			16,603,300	1,050,295
Grabs	873,099	130,621	2,590,499	198,692
Picks			470,900	53,701
Hooks			167,100	265,584
Diving apparatus, abalone and sponge			1,044,300	1,047,328
By hand	5,877,304	93,628	9,596,404	359,115
Total	82,382,623	2,897,357	3,517,729,923	86,127,708

* Includes catch by baskets.

Industries related to the fisheries of the United States and Alaska, 1937¹

Item	New England	Middle Atlantic	Chesapeake	South Atlantic and Gulf
Transporting:				
Persons engaged:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
On vessels	202	57	1,196	344
On boats	32	69		208
Total	234	126	1,196	552
Vessels:				
Steam			1	
Net tonnage			83	
Motor	87	20	600	137
Net tonnage	1,294	482	6,358	1,876
Sail			1	34
Net tonnage			21	326
Total vessels	87	20	602	171
Total net tonnage	1,294	432	6,457	1,702
Boats	18	68		147
Wholesale and manufacturing:				
Establishments	400	419	561	725
Persons engaged:				
Proprietors	332	211	718	725
Salaried employees	802	1,020	385	532
Wage earners:				
Average for season	10,988	5,608	10,902	17,277
Average for year	6,559	4,229	4,645	5,757
Salaries and wages paid	\$7,705,479	\$8,611,693	\$3,068,069	\$3,868,777
Manufactured products	\$24,038,947	\$18,658,605	\$10,006,939	\$15,110,653
Fishermen's manufactured products:				
Persons engaged	3,416	285	80	1,476
Products	\$1,098,993	\$208,641	\$14,220	\$240,902

¹ Data for Mississippi River and tributaries are for 1931 except that the value shown for manufactured products includes that of mussel-shell products for 1937.

Industries related to the fisheries of the United States and Alaska, 1937—Continued

Item	Pacific	Lakes	Mississippi River and tributaries	Alaska	Total
Transporting:					
Persons engaged:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
On vessels.....	210	23	29	2, 159	4, 220
On boats.....		12		(*)	321
Total.....	210	35	29	2, 159	4, 541
Vessels:					
Steam.....				7	8
Net tonnage.....				23, 986	24, 069
Motor.....	76	14	8	421	1, 363
Net tonnage.....	1, 724	164	104	14, 505	25, 952
Sail.....					35
Net tonnage.....					347
Total vessels.....	76	14	8	428	1, 406
Total net tonnage.....	1, 724	164	104	38, 491	60, 368
Boats.....		4		775	1, 012
Wholesale and manufacturing:					
Establishments.....	330	230	217	236	3, 118
Persons engaged:					
Proprietors.....	377	167	204		
Salaried employees.....	1, 154	445	355	16, 602	93, 606
Wage earners:					
Average for season.....	18, 261	2, 266	4, 275		(*)
Average for year.....	6, 989	1, 277	3, 483	(*)	(*)
Salaries and wages paid.....	\$10, 669, 409	\$2, 594, 914	\$3, 080, 430	(*)	(*)
Manufactured products.....	\$56, 146, 695	\$3, 196, 461	\$4, 056, 296	\$49, 865, 339	\$181, 085, 935
Fishermen's manufactured products:					
Persons engaged.....	152	223	216	(*)	(*)
Products.....	\$212, 151	\$51, 546	\$8, 751	(*)	(*)

* Included on vessels.

† Includes scows, houseboats, pile drivers, etc.

‡ Statistics not available.

NOTE.—Of the total number of persons engaged in the preparation of fishermen's manufactured products 5,574 have also been included as fishermen, and 1,509 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 was valued at \$185,292,159. Of this amount, canned products accounted for 57 percent, byproducts 20 percent, fresh and frozen packaged products 15 percent, and cured products 8 percent.

Since complete general statistical surveys were conducted for 1937 data in each of the geographical sections of the United States and Alaska except the Mississippi River area, the following compilation of manufactured fishery products consists of data for 1937 with the exception of a small quantity of salted and smoked fish produced in the Mississippi River section.

Manufactured fishery products of the United States and Alaska, 1937¹

Item	Quantity	Value
Alewives:		
Salted:		
Corned.....pounds..	5,841,359	\$83,178
Pickled.....do.....	2,471,575	70,701
Spiced.....do.....	1,828,353	122,160
Round.....do.....	1,450,900	40,728
Tight-pack cut.....do.....	1,667,150	56,787
Tight-pack roe alewives.....do.....	66,925	3,129
Smoked.....do.....	242,450	12,655
Canned.....standard cases..	54,993	139,585
Roe, canned.....do.....	51,272	304,922
Dry scrap.....tons.....	750	31,327
Oil.....gallons.....	12,450	3,073
Amberjack, smoked.....pounds..	900	225
Barracuda, fresh fillets.....do.....	650,000	97,500
Bluefish:		
Salted.....do.....	28,600	1,688
Smoked.....do.....	2,500	500
Blue runner, salted.....do.....	360,000	12,589
Buffalofish, smoked ².....do.....	925,500	239,878
Butterfish, smoked ³.....do.....	822,090	209,701
Cabrilla, fresh fillets.....do.....	55,000	8,450
Carp, smoked ².....do.....	206,207	45,119
Catfish and bullheads, smoked.....do.....	4,100	825
Chub, cisco, and tullibees, smoked ².....do.....	7,616,061	2,023,206
Cod:		
Fresh fillets.....do.....	11,229,478	1,305,840
Frozen fillets.....do.....	11,026,784	930,838
Fresh sticks.....do.....	251,090	25,469
Salted:		
Green.....do.....	15,900,219	300,433
Dry.....do.....	3,862,549	263,843
Boneless and absolutely boneless.....do.....	10,035,072	1,810,519
Pickled.....do.....	40,510	2,136
Tongues.....do.....	18,940	1,615
Smoked.....do.....	1,500	300
Smoked, fillets.....do.....	793,702	104,497
Stockfish.....do.....	22,043	3,013
Oil:		
Cod.....gallons.....	7,429	2,889
Cod-liver.....do.....	275,802	167,572
Croaker:		
Fresh fillets.....pounds..	97,800	12,070
Fresh pan-dressed.....do.....	107,600	9,550
Cusk:		
Fresh fillets.....do.....	919,268	104,772
Frozen fillets.....do.....	161,649	13,777
Fresh sticks.....do.....	487,319	54,670
Salted, green.....do.....	42,200	1,633
Smoked fillets.....do.....	513,863	66,113
Drum, red, smoked.....do.....	200	50
Eels:		
Salted.....do.....	76,550	6,482
Smoked ².....do.....	156,194	40,592
Flounders:		
Fresh fillets.....do.....	6,324,497	1,038,227
Frozen fillets.....do.....	1,540,379	247,580
Fresh pan-dressed.....do.....	5,100	694
Grayfish, fresh fillets.....do.....	25,000	3,125
Groupers:		
Fresh fillets.....do.....	167,801	28,906
Fresh steaks.....do.....	436,900	67,590
Haddock:		
Fresh fillets.....do.....	17,491,840	2,088,705
Frozen fillets.....do.....	22,714,862	2,066,806
Fresh sticks.....do.....	34,472	6,105
Salted, green.....do.....	201,800	9,063
Smoked.....do.....	52,900	9,054
Finnan haddie.....do.....	796,019	95,382
Hake:		
Fresh fillets.....do.....	1,863,932	182,510
Frozen fillets.....do.....	431,885	28,467
Fresh sticks.....do.....	457,799	49,772
Salted:		
Green.....do.....	1,204,675	39,028
Dry.....do.....	1,664,816	76,704
Boneless.....do.....	1,279,400	99,977
Hallbut:		
Fresh fillets.....do.....	44,608	13,507
Frozen steaks.....do.....	118,665	19,232

See footnotes at end of table.

Manufactured fishery products of the United States and Alaska, 1937—Continued

Item	Quantity	Value
Herring, lake:		
Fresh fillets..... pounds.....	229,386	\$28,570
Salted..... do.....	4,673,770	187,440
Smoked..... do.....	1,166,800	100,505
Herring, sea:		
Salted:		
Pickled, scotch cure..... do.....	2,098,040	107,968
Pickled and spiced..... do.....	1,878,126	140,091
Roused..... do.....	10,400	385
Split..... do.....	232,800	7,084
Unclassified..... do.....	1,102,642	64,807
Smoked:		
Bloaters, hard..... pounds.....	151,220	5,910
Bloaters, soft..... do.....	21,768	1,136
Bloaters, unclassified..... do.....	1,128,827	90,894
Boneless..... do.....	2,096,272	204,841
Lengthwise..... do.....	84,845	4,725
Medium scaled..... do.....	263,362	16,949
Klipped..... do.....	251,738	34,309
Unclassified..... do.....	105,000	10,490
Canned, "sardines"..... standard cases.....	1,680,241	4,998,373
Dry scrap..... tons.....	1,452	40,622
Meal..... do.....	20,460	680,382
Oil..... gallons.....	5,628,045	2,114,548
Hogchoker, salted..... pounds.....	9,075	475
King whiting, fresh fillets..... do.....	1,060	237
Lake trout:		
Fresh fillets..... do.....	25,857	7,524
Smoked..... do.....	734,534	242,557
"Lingcod," fresh fillets..... do.....	213,618	25,721
Mackerel:		
Fresh fillets..... do.....	242,640	31,936
Frozen fillets..... do.....	111,865	18,407
Salted:		
Fillets..... do.....	678,876	77,714
Split..... do.....	1,122,649	113,283
Smoked..... do.....	900,560	134,032
Canned..... standard cases.....	840,832	2,678,608
Meal..... tons.....	2,194	77,827
Oil..... gallons.....	80,811	30,812
Menhaden:		
Acid scrap..... tons.....	31,600	618,104
Dry scrap..... do.....	22,768	685,075
Meal..... do.....	13,088	596,144
Oil..... gallons.....	3,895,613	1,456,838
Mooneye, smoked..... pounds.....	8,200	1,064
Mullet:		
Salted..... do.....	2,715,500	149,193
Roed, salted..... do.....	40,850	9,628
Smoked..... do.....	32,550	5,599
Paddlefish or spoonbill cat:		
Roed, salted..... do.....	1,595	812
Smoked..... do.....	329,100	132,625
Pike, pickerel and sauger:		
Fresh fillets..... do.....	4,215,282	941,436
Frozen fillets..... do.....	1,025,806	286,244
Smoked..... do.....	2,420	605
Pikehard:		
Canned, "sardines"..... standard cases.....	2,812,456	8,592,117
Meal..... tons.....	59,422	3,325,282
Oil..... gallons.....	15,993,216	6,208,616
Pollock:		
Fresh fillets..... pounds.....	1,506,452	123,042
Frozen fillets..... do.....	11,616,993	710,601
Fresh sticks..... do.....	68,520	6,031
Salted:		
Green..... do.....	434,405	10,851
Dry..... do.....	97,143	4,043
Rockfishes, fresh fillets..... do.....	1,103,298	163,266
Rosefish:		
Fresh fillets..... do.....	686,112	75,525
Frozen fillets..... do.....	14,822,908	1,419,018
Sablefish:		
Fresh steaks..... do.....	25,000	3,750
Klipped..... do.....	496,068	91,030
Pickled..... do.....	190,185	6,794
Salted..... do.....	282,375	14,620
Smoked..... do.....	106,087	27,519
Salifish, smoked..... do.....	10,000	2,200

See footnotes at end of table.

Manufactured fishery products of the United States and Alaska, 1937—Continued

Item	Quantity	Value
Salmon:		
Fresh and frozen fillets..... pounds..	13,507	\$3,494
Fresh and frozen steaks..... do.....	98,480	23,600
Dried..... do.....	1,148,000	79,900
Salted:		
Dry..... do.....	11,725	1,900
Mild-cured..... do.....	9,615,175	1,862,868
Pickled..... do.....	765,396	100,550
Eggs for caviar..... do.....	274,000	29,740
Kippered..... do.....	1,848,896	401,718
Kippered, canned..... standard cases..	157	1,794
Smoked ¹ pounds.....	10,323,848	3,113,577
Canned:		
Blueback, red, or sockeye..... standard cases..	2,176,924	22,475,958
Chinook or king..... do.....	370,480	4,778,689
Chum or keta..... do.....	796,829	3,660,357
Humpback or pink..... do.....	3,954,169	19,639,749
Silver or coho..... do.....	239,946	2,193,725
Steelhead trout..... do.....	16,689	190,456
Eggs for bait..... do.....	5,349	85,398
Caviar..... do.....	1,534	36,001
Meal..... tons.....	1,608	49,356
Oil ² gallons.....	167,265	94,122
Scup or porgy:		
Fresh fillets..... pounds.....	24,400	3,690
Fresh pan-dressed..... do.....	30,500	2,845
Sea bass:		
Fresh fillets (Atlantic coast)..... do.....	114,800	18,770
Black, fresh steaks (Pacific coast)..... do.....	250,000	40,000
White, fresh fillets (Pacific coast)..... do.....	175,000	41,000
Fresh pan-dressed (Atlantic coast)..... do.....	62,500	6,860
Shad:		
Smoked..... do.....	179,160	35,441
Canned..... standard cases..	9,219	30,554
Roe, canned..... do.....	1,891	49,868
Sharks:		
Fins..... pounds.....	30,283	13,888
Skins..... do.....	138,058	12,306
Oil..... gallons.....	9,880	4,096
Sheepshead:		
Fresh fillets..... pounds.....	25,700	3,820
Smoked ¹ do.....	22,817	2,830
Snapper, red:		
Fresh fillets..... do.....	82,067	24,013
Fresh steaks..... do.....	24,475	5,262
Spanish mackerel:		
Fresh fillets..... do.....	9,500	1,750
Salted..... do.....	80,000	4,630
Smoked..... do.....	300	75
Spot, salted do.....	218,400	8,866
Squeteagues or "sea trout":		
Fresh fillets..... do.....	186,500	26,310
Fresh pan-dressed..... do.....	844,952	26,046
Salted..... do.....	20,800	3,120
Smoked..... do.....	650	163
Sturgeon:		
Smoked and kippered ¹ do.....	1,624,588	1,032,076
Roe, salted ¹ do.....	436	608
Caviar, canned..... standard cases..	3,053	435,370
Swordfish, fresh and frozen steaks pounds.....	133,625	30,868
Totauve, fresh steaks do.....	515,000	93,000
Tuna and tunalike fishes:		
Canned:		
Albacore..... standard cases..	114,461	806,391
Bluefin..... do.....	217,251	1,236,324
Bonito..... do.....	152,175	771,498
Striped..... do.....	695,007	3,917,454
"Tonno"..... do.....	252,857	1,915,779
Yellowfin..... do.....	1,649,776	10,038,641
Yellowtail..... do.....	62,974	309,692
Meal..... tons.....	10,872	378,531
Oil..... gallons.....	141,963	30,702
White bass:		
Fresh and frozen fillets..... pounds.....	6,644	1,215
Smoked..... do.....	1,400	181

See footnotes at end of table.

Manufactured fishery products of the United States and Alaska, 1937—Continued

Item	Quantity	Value
Whitefish:		
Fresh and frozen fillets..... pounds..	42,971	\$12,230
Smoked..... do.....	2,494,731	707,809
Roe, salted..... do.....	60	60
Caviar, canned..... standard cases	1,332	49,395
Whiting:		
Fresh fillets..... pounds..	458,828	32,188
Frozen fillets..... do.....	922,065	49,710
Smoked..... do.....	44,874	6,836
Wolfish, fresh and frozen fillets..... do.....	93,545	9,082
Yellow perch:		
Fresh fillets..... do.....	608,556	143,232
Frozen fillets..... do.....	42,682	10,636
Crabs, hard:		
Meat, packaged, fresh-cooked..... do.....	8,300,484	2,822,485
Canned..... standard cases	13,646	268,634
Dry scrap..... tons..	1,303	26,629
Crab, king:		
Dry scrap..... do.....	535	19,371
Meal..... do.....	25	625
Lobsters:		
Common, meat, packaged, fresh-cooked..... pounds..	157,085	168,290
Spiny, meat, packaged, fresh-cooked..... do.....	92,800	36,620
Shrimp:		
Fresh-packaged..... do.....	519,704	170,520
Frozen-packaged..... do.....	6,587	2,627
Cooked and peeled..... do.....	924,896	272,854
Sun-dried..... do.....	1,384,251	252,747
Canned..... standard cases	1,286,406	7,130,747
Bran or meal..... tons..	1,452	33,793
Abalone steaks..... pounds..	541,000	165,154
Clams, hard:		
Fresh-shucked..... gallons	56,500	89,298
Canned:		
Whole..... standard cases	30,019	144,012
Minced..... do.....	32,777	178,835
Chowder..... do.....	419,622	1,468,476
Juice..... do.....	12,751	44,376
Broth, bouillon, and cocktail..... do.....	7,935	36,243
Shells, ground, poultry feed..... tons..	1,050	9,100
Clams, razor:		
Fresh-shucked..... gallons	37,467	15,107
Canned:		
Whole..... standard cases	1,529	13,021
Minced..... do.....	42,259	367,281
Clams, soft:		
Fresh-shucked..... gallons..	5,928,956	699,721
Canned:		
Whole..... standard cases..	135,197	499,806
Chowder..... do.....	76,051	240,109
Juice..... do.....	14,116	25,789
Steamed..... pounds..	157,220	14,801
Clams, mixed, fresh-shucked..... gallons..	75,644	10,374
Marine-shell products:		
Buttons..... gross.....	6,732,051	4,316,961
Novelties..... do.....		762,934
Mussel, fresh-water, shell products:		
Buttons..... gross.....	17,145,649	4,732,918
Poultry feed..... tons..	4,450	27,427
Lime..... do.....	1,026	1,448
Oysters:		
Eastern:		
Fresh-shucked..... gallons..	54,790,881	8,440,142
Canned..... standard cases	598,078	2,462,322
Soup, canned..... do.....	32,961	182,518
Japanese:		
Fresh-shucked..... gallons..	3,109,855	431,246
Canned..... standard cases	110,872	470,359
Western, fresh-shucked..... gallons..	233,179	209,182
Shell products:		
Poultry feed..... tons..	292,273	1,241,702
Lime and dust..... do.....	76,893	270,202
Lime, burned..... do.....	13,098	89,119

See footnotes at end of table.

Manufactured fishery products of the United States and Alaska, 1937—Continued

Item	Quantity	Value
Scallops, bay, fresh-shucked.....gallons.....	166, 872	\$466, 683
Scallops, sea, fresh-shucked.....do.....	720, 967	730, 648
Alligator hides ¹.....pounds.....	88, 366	7, 363
Terrapin products, canned.....standard cases.....	136	8, 716
Turtle products, canned.....do.....	5, 824	73, 737
Whale products:		
Meal (meat).....tons.....	770	25, 410
Meal (bone).....do.....	435	7, 395
Oil, whale.....gallons.....	9, 052, 202	4, 122, 669
Oil, sperm.....do.....	174, 087	47, 832
Unclassified products:		
Fillets, fresh.....pounds.....	\$ 76, 155	\$ 12, 753
Fillets, frozen.....do.....	7 205, 249	7 31, 747
Pan-dressed, fresh.....do.....	\$ 101, 400	\$ 6, 240
Miscellaneous, packaged, fresh and frozen.....do.....	\$ 1, 186, 455	\$ 88, 366
Salted.....do.....	10 876, 748	10 107, 065
Smoked.....do.....	11 84, 435	11 9, 665
Canned:		
Fish for cat and dog food.....standard cases.....	377, 041	840, 307
Fish cakes, balls, etc.....do.....	109, 285	754, 770
Fish chowder.....do.....	2, 099	12, 557
Fish flakes.....do.....	39, 830	353, 071
Fish paste.....do.....	3, 696	137, 624
Other.....do.....	12 16, 762	12 144, 948
Acid, dry, and green scrap.....tons.....	13 1, 537	13 35, 314
Meal:		
Ground fish (white fish).....do.....	14, 178	396, 995
Miscellaneous.....do.....	14 5, 548	14 237, 353
Oil:		
Fur seal.....gallons.....	29, 341	5, 397
Liver, miscellaneous.....do.....	13 72, 119	13 2, 036, 525
Miscellaneous.....do.....	16 99, 446	16 36, 966
Glue.....do.....	441, 912	908, 121
Other byproducts.....do.....		17 497, 132
Total, fresh and frozen packaged products.....pounds.....	201, 802, 529	27, 677, 899
Total, cured products.....do.....	104, 339, 340	16, 635, 280
Total, canned products.....do.....	742, 197, 065	105, 174, 935
Total, byproducts.....do.....		36, 804, 045
Grand total.....do.....		185, 292, 159

¹ All data are for 1937 except for a small quantity of salted and smoked fish produced in the Mississippi River section which are for 1931.

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.

³ Data are for 1937 and 1931.

⁴ Data are for 1931.

⁵ Includes the production of both edible and industrial salmon oils.

⁶ Includes fresh filets of carp, red drum, kingfish or "king mackerel," mullet, muttonfish, sea robin, snook or sergeantfish, striped bass, and suckers.

⁷ Includes frozen filets of bluefish, croaker, halibut, king whiting or "kingfish," lake trout, "lingcod," Spanish mackerel, spot, and squeteagues or "sea trout."

⁸ Includes fresh pan-dressed red drum, Spanish mackerel, and whiting.

⁹ Includes fresh steaks of cabio, cod, haddock, halibut, mackerel, pollock, and snook or sergeantfish; frozen steaks of cod, pollock, and wolfish; and fresh sticks of whiting.

¹⁰ Includes salted barracuda, haddock, lake trout, pilchard, black and white sea bass, tenpounder, tuna, yellowtail, filets of cod, hake, and Spanish mackerel, boneless cusk; king whiting or "kingfish" roe, and salmon bellies; spiced anchovies, chub, mackerel, and oyster and shrimp cocktail; pickled eels, and sea-herring roe.

¹¹ Includes smoked goldeye, hake, scup or porgy, miscellaneous fish, and filets of haddock, hake, sea herring, and pollock.

¹² Includes canned salted cod, pickled eels, finnan haddie, kippered sturgeon, tuna roe, fish bouillon, soft crabs, spiny lobster or "sea crawfish" soup, shrimp soup, hard-clam stew, razor-clam juice, soft-clam cakes, coquina clam broth, pickled sea mussels, squid, frog products, deep-sea roe, rat poison bait, and crab and shrimp gumbo.

¹³ Includes shark and miscellaneous dry scrap; alewife acid scrap; and sea herring and miscellaneous green scrap.

¹⁴ Includes salmon-egg, shark, soft-clam, starfish, cod-liver, and miscellaneous fish meals.

¹⁵ Includes burbot, halibut, sablefish, shark, swordfish, and tuna liver oils.

¹⁶ Includes blackfish, rosefish, and miscellaneous fish oils.

¹⁷ Includes isinglass, kelp products, pearl essence, clam-shell lime, miscellaneous novelties, and fresh-water mussel-shell novelties, stucco, and chips.

NOTE.—Some of the above products have been manufactured from raw 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 1937 was valued at \$141,978,980. Of this total, canned products comprised \$105,174,935, and byproducts, \$36,804,045—an increase of 11 percent in the value of canned products and 5 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 405 establishments in the United States and Alaska during 1937. The combined output of these canneries amounted to 19,530,809 standard cases. The net weight of the products canned amounted to 742,197,065 pounds.

Canned fishery products or byproducts were prepared in 26 States and in Alaska during 1937. Alaska ranked first in the value of the products, accounting for 34 percent of the total, and California ranked second, with 29 percent.

Canned fishery products and byproducts of the United States and Alaska, 1937

SUMMARY OF PRODUCTION: BY COMMODITIES

Product	Number of plants	Standard cases	Pounds	Value
Canned products:				
Salmon:				
United States.....	28	885,372	42,497,856	\$8,386,165
Alaska.....	113	6,669,665	320,143,920	44,547,769
Sardines:				
Maine.....	25	1,680,241	42,006,025	4,998,373
California.....	34	2,812,456	134,997,888	8,592,117
Tuna and tunalike fishes.....	19	3,144,501	75,468,024	18,995,779
Mackerel.....	28	840,832	40,359,936	2,673,608
Alewives.....	11	54,993	2,639,664	139,585
Alewife roe.....	32	51,272	2,461,056	304,922
Shad.....	9	9,210	442,512	30,554
Shad roe.....	8	1,891	90,768	49,868
Cat and dog food.....	9	377,041	18,097,968	840,307
Fish flakes.....	4	39,880	1,914,240	353,071
Fish cakes, balls, etc.....	8	109,285	5,245,680	754,770
Fish paste.....	4	3,696	177,408	137,624
Sturgeon caviar.....	4	3,053	146,544	435,370
Whitefish roe and caviar.....	5	1,332	63,936	49,395
Salmon roe and caviar (for food).....	4	1,534	73,632	35,001
Salmon eggs (for bait).....	10	5,349	256,752	85,398
Miscellaneous fish and roe.....	15	11,194	537,312	101,586
Clam products.....	54	1,773,448	19,576,725	3,013,446
Oysters.....	51	708,950	10,684,250	2,932,681
Oyster soup.....	3	32,961	1,582,128	182,518
Shrimp.....	61	1,286,406	21,523,417	7,130,747
Crabs.....	18	13,697	657,456	269,699
Terrapin products.....	4	136	6,528	8,715
Turtle products.....	3	5,824	279,552	73,737
Miscellaneous shellfish.....	9	6,581	315,888	51,130
Total.....	405	19,530,809	742,197,065	105,174,935
Byproducts:				
Oyster and marine clam-shell products.....			<i>Quantity</i> 382,718	1,612,847
Fresh-water mussel-shell products.....				4,791,205
Marine pearl-shell products.....				5,079,895
Scrap, meal, etc.....			tons 219,942	7,565,535
Marine-animal oils.....			gallons 35,634,669	16,355,752
Miscellaneous byproducts.....				1,398,811
Total.....				36,804,045
Grand total.....				141,978,980

¹ "Cut-out" or "drained" weights of can contents are included for whole or minced clams, and gross can contents for other clam products.

² Exclusive of duplication.

Canned fishery products and byproducts of the United States and Alaska, 1937—Con.

VALUE OF PRODUCTION: BY STATES

State	Canned products	Byproducts	Total
Maine.....	\$6,022,341	\$460,700	\$6,483,041
Massachusetts.....	1,135,187	2,129,298	3,264,134
Rhode Island.....		21,654	
Connecticut.....	702,709	1,195,087	1,195,087
New York.....		6,079,398	6,782,107
New Jersey.....	1,411,385	1,946,263	3,357,146
Pennsylvania.....		216,498	
Delaware.....		549,810	549,810
Maryland.....	621,448	1,216,002	1,837,450
Virginia.....	188,760	1,524,306	1,713,066
North Carolina.....	116,116	778,775	1,323,453
South Carolina.....	428,662		
Georgia.....	716,861	952,042	2,181,627
Florida.....	512,724		
Alabama.....	375,167	81,721	3,440,003
Mississippi.....	2,983,115	366,393	4,713,992
Louisiana.....	4,347,699	215,380	604,460
Texas, Illinois, Missouri, Wisconsin, and Minnesota.....	889,080	3,719,580	3,719,580
Iowa.....		1,646,841	6,923,769
Washington.....	5,276,928	4,566,658	4,620,334
Oregon.....	4,163,681	9,975,414	40,717,187
California.....	30,741,773	3,274,235	48,813,734
Alaska.....	45,041,499		
Total.....	105,174,935	36,804,045	141,978,980

PACK OF CANNED SALMON: STANDARD CASES

Product	Alaska							
	Southeastern		Central		Western		Total	
	Cases	Value	Cases	Value	Cases	Value	Cases	Value
Chinook or king:								
1-pound tall.....	24,981	\$212,802	17,443	\$149,468	5,336	\$42,453	47,760	\$404,723
1-pound flat.....	1,794	17,222	3,409	43,396	1,010	13,130	6,213	73,748
½-pound flat.....	3,918	52,109	10,792	148,655	786	11,304	15,495	212,068
Total.....	30,693	282,133	31,644	341,519	7,131	66,887	69,468	690,539
Blueback, red, or sockeye:								
1-pound tall.....	103,269	1,018,890	812,158	3,038,350	1,450,749	14,294,077	1,866,176	18,351,317
1-pound flat.....	8,694	95,634	78,046	855,594	914	10,064	67,664	861,282
½-pound flat.....	55,781	759,456	68,622	892,874	25,021	315,271	149,424	1,967,601
4-pound flat.....			3,415	33,638			3,415	53,638
Total.....	167,744	1,873,980	462,241	4,820,456	1,476,684	14,619,402	2,106,669	21,813,838
Silver or coho:								
1-pound tall.....	78,328	631,983	45,144	349,122	138	1,030	123,610	982,135
1-pound flat.....	1,008	9,060	196	1,568			1,204	10,628
½-pound flat.....	9,189	97,464	436	3,944			9,625	101,408
4-pound flat.....			2,878	23,744			2,878	23,744
Total.....	88,525	738,507	48,664	378,378	138	1,030	137,317	1,117,915
Humpback or pink:								
1-pound tall.....	2,111,246	10,544,503	1,475,658	7,261,028	1	5	3,586,905	17,795,633
1-pound flat.....	420	2,016	18	90			438	2,106
½-pound flat.....	31,502	216,669	1,836	12,155			33,338	228,824
4-pound flat.....			4,698	23,020			4,698	23,020
Total.....	2,143,168	10,763,188	1,482,210	7,286,290	1	5	3,625,379	18,049,483
Chum or keta:								
1-pound tall.....	501,093	2,303,746	187,266	866,211	35,456	165,033	723,815	3,334,990
1-pound flat.....	39	140					39	140
½-pound flat.....	2,634	16,491	3,249	19,993			5,883	36,484
4-pound flat.....			1,095	4,380			1,095	4,380
Total.....	503,766	2,320,377	191,610	890,584	35,456	165,033	730,832	3,375,994
Grand total.....	2,933,896	15,978,185	2,216,859	13,717,227	1,519,410	14,852,357	6,669,665	44,547,769

Canned fishery products and byproducts of the United States and Alaska, 1937—Con.

PACK OF CANNED SALMON: STANDARD CASES—Continued

Product	United States						Grand total, Alaska and United States	
	Washington		Oregon		Total			
Chinook or king:	<i>Cases</i>	<i>Value</i>	<i>Cases</i>	<i>Value</i>	<i>Cases</i>	<i>Value</i>	<i>Cases</i>	<i>Value</i>
1-pound tall.....	16,756	\$127,923	10,113	\$61,260	26,869	\$189,183	74,629	\$593,006
1-pound oval.....	23	529	645	14,835	668	15,364	668	15,364
1-pound flat.....	24,394	281,779	39,411	433,861	63,805	715,640	70,018	789,388
1/2-pound oval.....	4	104	474	12,324	478	12,428	478	12,428
1/2-pound flat.....	45,991	671,425	140,083	2,097,129	186,074	2,768,554	201,569	2,980,622
3/4-pound flat.....	154	1,720	22,964	380,261	23,118	381,981	23,118	381,981
Total.....	87,322	1,083,480	213,690	2,999,670	301,012	4,083,150	370,480	4,773,689
Blueback, red, or sockeye:								
1-pound tall.....	198	2,178			198	2,178	1,866	18,353
1-pound flat.....	5,913	82,782			5,913	82,782	93,567	1,044,064
1/2-pound flat.....	58,851	984,866	4,248	73,066	63,099	1,057,932	212,523	3,025,533
3/4-pound flat.....	222	4,085	823	15,143	1,045	19,228	1,045	19,228
4-pound flat.....							3,415	33,638
Total.....	65,184	1,073,911	5,071	88,209	70,255	1,162,120	2,176,924	22,475,058
Silver or coho:								
1-pound tall.....	3,745	31,360	3,390	27,120	7,135	58,480	130,745	1,040,615
1-pound flat.....	9,003	84,628	18,006	169,256	27,009	253,884	28,213	264,512
1/2-pound oval.....			294	4,116	294	4,116	294	4,116
1/2-pound flat.....	26,209	283,057	32,454	350,503	58,663	633,560	68,288	734,968
3/4-pound flat.....			9,528	125,770	9,528	125,770		125,770
4-pound flat.....							2,878	23,744
Total.....	38,957	399,045	63,672	676,765	102,629	1,075,810	239,946	2,193,725
Humpback or pink:								
1-pound tall.....	304,271	1,430,074			304,271	1,430,074	3,891,176	19,225,607
1-pound flat.....	4,669	25,212			4,669	25,212	5,107	27,318
1/2-pound flat.....	19,850	134,980			19,850	134,980	53,188	363,804
4-pound flat.....							4,698	23,020
Total.....	328,790	1,590,266			328,790	1,590,266	3,954,169	19,639,749
Chum or keta:								
1-pound tall.....	33,342	143,688	30,519	127,496	63,861	271,174	787,676	3,606,184
1-pound flat.....	85	182			35	182	74	322
1/2-pound flat.....	1,148	7,289	953	5,718	2,101	13,007	7,984	49,491
4-pound flat.....							1,095	4,380
Total.....	34,525	151,159	31,472	133,204	65,997	284,363	796,829	3,660,357
Steelhead:								
1-pound tall.....	842	5,894	617	4,319	1,459	10,213	1,459	10,213
1-pound flat.....	1,164	10,476	1,939	17,451	3,103	27,927	3,103	27,927
1/2-pound oval.....			1,516	23,043	1,516	23,043	1,516	23,043
1/2-pound flat.....	616	6,653	4,754	51,343	5,370	57,996	5,370	57,996
3/4-pound flat.....	901	12,253	4,340	59,024	5,241	71,277	5,241	71,277
Total.....	3,523	35,276	13,166	155,180	16,689	190,456	16,689	190,456
Grand total.....	558,301	4,333,137	327,071	4,053,028	885,372	8,386,165	7,555,037	52,933,934

NOTE.—"Standard cases" represents the various-sized cases converted to the equivalent of 48 1-pound cans to the case. Salmon were canned at 21 plants in Washington, 7 in Oregon, and 113 in Alaska.

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PACK OF CANNED SARDINES

Sardines (herring)	Maine		Sardines (pilchard)	California	
	Cases	Value		Cases	Value
Quarters, ¼-pound (100 cans):			1-pound:		
In olive oil.....	6, 778	\$36, 344	Oval:		
In cottonseed oil.....	1, 458, 086	4, 371, 322	In mustard (48 cans).....	256, 244	\$791, 496
In mustard.....	106, 166	334, 610	In tomato sauce (48 cans)...	1, 093, 991	3, 350, 525
In tomato sauce.....	20, 409	66, 052	In natural oil (48 cans)....	52, 567	158, 984
Three-quarters, ¾-pound (48 cans):			In other sauces or oils (48 cans).....	16, 061	54, 610
In mustard.....	61, 675	190, 045	Tall:		
			In tomato sauce (48 cans)...	14, 767	34, 799
			In natural oil (48 cans)....	857, 800	2, 169, 469
			½-pound:		
			Oval:		
			In natural oil (96 cans)....	18, 496	59, 167
			In other sauces or oils (48 cans).....	817	2, 379
			Square and oblong:		
			In various sauces and oils (48 cans).....	43, 279	132, 939
			Other:		
			In natural oil (96 cans) ..	277, 896	892, 214
			In other sauces or oils (48 cans).....	34, 441	96, 732
			6-ounce eastern oyster:		
			In tomato sauce (100 cans) ...	51, 986	167, 453
			In natural oil (100 cans).....	224, 189	644, 115
			Other sizes:		
			In various sauces or oils (standard cases).....	5, 585	37, 235
Total.....	1, 653, 104	4, 998, 373	Total.....	2, 948, 109	8, 592, 117
Total (standard cases).....	1, 680, 241	.....	Total (standard cases)...	2, 812, 456	.....

NOTE.—“Standard cases” represents the various-sized 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 (pilchard). Sardines were canned at 25 plants in Maine and 34 in California.

PACK OF CANNED TUNA AND TUNALIKE FISHES IN CALIFORNIA ³

Product and size	Albacore		Yellowfin		Bluefin		Striped	
	Cases	Value	Cases	Value	Cases	Value	Cases	Value
¼-pound (48 cans).....	213	\$931	187, 581	\$798, 198	23, 238	\$97, 659	41, 850	\$158, 776
½-pound (48 cans).....	79, 352	592, 520	1, 116, 820	6, 899, 728	149, 560	856, 695	591, 091	3, 338, 453
1-pound (48 cans).....	* 9, 625	* 130, 044	* 114, 056	* 1, 238, 189	15, 891	159, 224	30, 479	309, 092
Total (actual cases).....	89, 190	723, 495	1, 418, 457	8, 966, 115	188, 689	1, 113, 578	663, 420	3, 806, 321
Total (standard cases)...	98, 708	.....	1, 438, 722	.....	192, 961	.....	672, 974	.....
Flakes:								
¼-pound (48 cans).....	9, 983	54, 784	* 156, 907	* 819, 337	17, 516	91, 477	16, 097	83, 372
1-pound (48 cans).....	2, 885	28, 112	* 27, 073	* 253, 189	* 3, 387	* 31, 269	2, 908	27, 761
Total (actual cases).....	12, 868	82, 896	183, 980	1, 072, 526	20, 903	122, 746	19, 065	111, 133
Total (standard cases)...	16, 753	.....	211, 054	.....	24, 290	.....	22, 033	.....
Grand total (actual cases).....	102, 058	806, 391	1, 602, 437	10, 038, 641	209, 592	1, 236, 324	682, 485	3, 917, 454
Grand total (standard cases).....	114, 461	.....	1, 649, 776	.....	217, 251	.....	695, 007	.....

³ Includes the Washington, Oregon, and Massachusetts pack of albacore and bluefin tuna, amounting to 15,143 standard cases, valued at \$118,762.

* 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.

* 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.

* Includes the pack of creamed tuna in ¾-pound cans, 48 to the case, which has been converted to the equivalent of 1-pound cans, 48 to the case.

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PACK OF CANNED TUNA AND TUNALIKE FISHES IN CALIFORNIA—Continued

Product and size	"Tonno"		Bonito		Yellowtail		Total	
	Cases	Value	Cases (†)	Value (†)	Cases (†)	Value (†)	Cases	Value
¼-pound (48 cans).....	223, 353	\$1, 763, 812	(?)	(?)			223, 353	\$1, 055, 564
½-pound (100 cans).....	20, 218	151, 967	7 104, 966	7 \$550, 478	7 30, 946	7 \$159, 353	2, 092, 951	12, 549, 194
¾-pound (48 cans).....			23, 603	221, 020	16, 014	150, 339	209, 668	2, 237, 908
1-pound (48 cans).....								
Total (actual cases).....	243, 566	1, 915, 779	128, 572	771, 498	46, 960	309, 692	2, 778, 854	17, 606, 478
Total (standard cases).....	252, 857		152, 175		62, 974		2, 871, 371	
Flakes:								
¼-pound (48 cans).....							200, 503	1, 048, 970
1-pound (48 cans).....							36, 313	340, 331
Total (actual cases).....							236, 816	1, 389, 301
Total (standard cases).....							273, 130	
Grand total (actual cases).....	243, 566	1, 915, 779	128, 572	771, 498	46, 960	309, 692	3, 015, 670	18, 995, 779
Grand total (standard cases).....	252, 857		152, 175		62, 974		3, 144, 501	

† The pack in ¼-pound cans, 48 and 100 to the case, has been converted to the equivalent of ½-pound cans, 48 to the case.

NOTE.—"Standard cases" represents the various-sized cases converted to the equivalent of 48 ¼-pound cans to the case. Tuna and tunalike fishes were canned at 15 plants in California, 1 in Washington, 2 in Oregon, and 1 in Massachusetts.

PACK OF CANNED MACKEREL

Size	Cases	Value
8-ounce (48 cans).....	8, 724	\$29, 576
8-ounce (96 cans).....	13, 405	48, 850
16-ounce (48 cans).....	* 821, 621	* 2, 578, 137
Other sizes (standard cases).....	1, 444	17, 045
Total (actual cases).....	845, 194	2, 673, 608
Total (standard cases).....	840, 832	

* Includes a small amount of mackerel chowder.

NOTE.—"Standard cases" represents the various-sized cans converted to the equivalent of 48 1-pound cans to the case. Mackerel were canned at 2 plants in Massachusetts and 26 in California.

PACK OF CANNED ALEWIVES AND ALEWIFE ROE: STANDARD CASES

Product	Maine and North Carolina		Maryland		Virginia		Total	
	Cases	Value	Cases	Value	Cases	Value	Cases	Value
Alewives.....			35, 511	\$84, 527	19, 482	\$55, 058	54, 993	\$139, 585
Alewife roe.....	13, 012	\$37, 185	15, 030	86, 535	23, 230	131, 202	51, 272	304, 922
Total.....	13, 012	87, 185	50, 541	171, 062	42, 712	186, 260	106, 265	444, 507

PACK OF CANNED ALEWIVES AND ALEWIFE ROE: ACTUAL CASES

Product and size	Cases	Value
Alewives:		
14, 16, 17, and 19 ounces (24 cans).....	9 83, 178	9 \$89, 540
26 and 28 ounces (24 cans).....	10 20, 862	10 50, 045
Total.....		139, 585
Alewife roe:		
8 and 10 ounces (48 cans).....	11 47, 231	11 153, 032
16, 17, and 19 ounces (24 cans).....	12 51, 373	12 151, 890
Total.....		304, 922
Grand total.....		444, 507

9 Consist principally of 14- and 16-ounce cans. Includes 5,967 cases of 48 cans to the case.

10 Consist principally of 26-ounce cans.

11 Consist principally of 8-ounce cans.

12 Consist principally of 17-ounce cans.

NOTE.—"Standard cases" represents the various-sized cases converted to the equivalent of 48 1-pound cans to the case. Alewives or alewife roe were canned at 1 plant in Maine, 7 in Maryland, 19 in Virginia, and 5 in North Carolina.

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PACK OF CANNED OYSTERS: STANDARD CASES

State	Cases	Value
Maryland, North Carolina, and Georgia.....	14, 879	\$61, 190
South Carolina.....	98, 872	428, 582
Florida.....	14, 536	60, 890
Alabama.....	31, 561	132, 256
Mississippi.....	321, 964	1, 316, 664
Louisiana.....	116, 266	462, 760
Washington and Oregon.....	110, 872	470, 359
Total.....	708, 960	2, 932, 681

PACK OF CANNED OYSTERS: ACTUAL CASES

Size	Cases	Value
3½-ounce (48 cans).....	¹⁸ 20, 204	¹⁸ \$66, 911
4-ounce (48 cans).....	19, 931	74, 742
5-ounce (48 cans).....	545, 614	2, 238, 013
6-ounce (48 cans).....	349	1, 909
8-ounce (24 cans).....	9, 959	38, 459
8-ounce (48 cans).....	45, 955	298, 860
10-ounce (24 cans).....	51, 336	213, 787
Total.....		2, 932, 681

¹⁸ Includes the pack in 2-ounce cans, 100 to a case, which has been converted to the equivalent of 3½-ounce cans, 48 to the case.

NOTE.—“Standard cases” represents the various-sized cases converted to the equivalent of 48 5-ounce cans to the case. Oysters were canned at 1 plant in Maryland, 1 in North Carolina, 5 in South Carolina, 1 in Georgia, 4 in Florida, 3 in Alabama, 14 in Mississippi, 12 in Louisiana, 9 in Washington, and 1 in Oregon. The pack of oyster soup has not been included in the pack of oysters but has been shown under “Pack of miscellaneous canned fishery products.”

PACK OF CANNED CLAMS AND CLAM PRODUCTS: STANDARD CASES

Product and State	Whole		Minced		Chowder	
	Cases	Value	Cases	Value	Cases	Value
Soft clams:						
Maine, Massachusetts, New Jersey, and Illinois.....	¹⁸ 135, 197	¹⁸ \$489, 806			¹⁶ 76, 051	¹⁶ \$240, 109
Hard clams:						
New Jersey.....					176, 871	636, 607
Maryland.....					37, 613	84, 681
Washington.....	25, 339	108, 785	22, 397	\$106, 443	30	206
Alaska.....	411	2, 845	17	132		
Massachusetts, Rhode Island, New York, Pennsylvania, and Florida.....	¹⁸ 4, 269	¹⁸ 32, 382	¹⁸ 10, 363	¹⁸ 72, 260	205, 249	748, 346
Total.....	30, 019	144, 012	32, 777	178, 835	419, 763	1, 469, 840
Razor clams:						
Washington.....	1, 246	10, 466	14, 334	120, 767		
Oregon.....	117	936	1, 288	10, 718		
Alaska.....	166	1, 619	26, 637	235, 796		
Total.....	1, 529	13, 021	42, 269	367, 281		
Grand total.....	166, 745	646, 539	75, 036	546, 116	495, 814	1, 709, 949

¹⁸ Packed in Maine and New Jersey.

¹⁶ Packed in Maine, Massachusetts, and Illinois.

¹⁸ Packed in New York and Florida.

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PACK OF CANNED CLAMS AND CLAM PRODUCTS: STANDARD CASES—Continued

Product and State	Juice, broth, and cocktail ¹⁴		Total	
	Cases	Value	Cases	Value
Soft clams: Maine, Massachusetts, New Jersey, and Illinois	14, 116	\$25, 769	225, 364	\$755, 684
Hard clams:	(¹⁷)	(¹⁷)	176, 871	636, 607
New Jersey			37, 613	84, 681
Maryland	5, 305	11, 565	53, 071	226, 999
Washington			428	2, 977
Alaska				
Massachusetts, Rhode Island, New York, Pennsylvania, and Florida	¹⁷ 16, 331	¹⁷ 72, 804	236, 212	925, 792
Total	21, 636	84, 369	504, 195	1, 877, 056
Razor clams:				
Washington			15, 580	131, 233
Oregon	101	404	1, 506	12, 058
Alaska			26, 803	237, 415
Total	101	404	43, 889	380, 706
Grand total	35, 853	110, 542	773, 448	3, 013, 446

¹⁴ Consists of juice from soft clams in Maine; juice from hard clams in New York, Florida, and Washington; broth from hard clams in New York, New Jersey, and Florida; cocktail from hard clams in New York and Florida; juice from razor clams in Oregon; and broth from coquina clams in Florida. The latter item has been included with the New York, New Jersey, and Florida production of hard clam juice, broth, and cocktail.

¹⁷ A small pack of hard-clam broth in New Jersey has been included with the New York and Florida production.

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)	99, 669	\$354, 228			19, 485	\$70, 263
1-pound (24 cans)					11, 945	29, 887
1-pound (48 cans)	11, 849	75, 203				
No. 2 (24 cans)	15, 160	54, 569				
No. 2½ (24 cans)					26, 812	109, 490
No. 3 (24 cans)					1, 384	4, 735
Other sizes (standard cases)	1, 410	5, 806			8, 532	25, 734
Total		489, 806				240, 109
Hard clams:						
½-pound (48 cans)	577	3, 308	22, 301	\$83, 678		
No. 1 (48 cans)	1, 676	11, 984	3, 514	18, 670	221, 146	766, 680
1-pound (12 cans)					313, 199	528, 815
1-pound (24 cans)					30, 702	57, 081
1-pound (48 cans)	5, 765	41, 229	18	175		
No. 2 (24 cans)	6, 040	34, 901	1, 701	10, 152		
No. 3 (12 cans)					31, 781	42, 894
No. 10 (6 cans)	8, 988	45, 335	5, 879	53, 030	8, 806	38, 568
Other sizes (standard cases)	932	7, 255	2, 050	13, 130	11, 329	35, 802
Total		144, 012		178, 835		1, 469, 840
Razor clams:						
½-pound (48 cans)			34, 691	241, 611		
No. 1 (48 cans)	1, 458	12, 495	14, 020	122, 345		
1-pound (48 cans)	15	150	63	630		
No. 2 (24 cans)	47	376	385	2, 695		
Total		13, 021		367, 281		
Grand total		646, 839		546, 116		1, 709, 949

NOTE.—“Standard cases” represents the various-sized cases converted to the equivalent of 48 No. 1 cans. Soft-clam products were canned at 18 plants in Maine, 2 in Massachusetts, 1 in New Jersey, and 1 in Illinois; hard-clam products, at 1 plant in Massachusetts, 1 in Rhode Island, 1 in New York, 4 in New Jersey, 1 in Pennsylvania, 3 in Maryland, 1 in Florida, 4 in Washington, and 3 in Alaska; razor-clam products, at 5 plants in Washington, 3 in Oregon, and 5 in Alaska; and coquina-clam products, at 1 plant in Florida.

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PACK OF CANNED CLAMS AND CLAM PRODUCTS: ACTUAL CASES—Continued

Product and size	Juice, broth, and cocktail		Total	
	Cases	Value	Cases	Value
Soft clams:				
No. 1 (48 cans).....			119,154	\$424,491
1-pound (24 cans).....			11,945	29,887
1-pound (48 cans).....			11,849	75,203
No. 2 (24 cans).....	7,828	\$8,852	22,988	63,421
No. 2½ (24 cans).....			20,812	109,490
No. 3 (24 cans).....			1,394	4,735
No. 10 (6 cans).....	541	879	541	879
Other sizes (standard cases).....	5,598	16,038	15,540	47,578
Total.....		25,769		755,684
Hard clams:				
6-ounce (48 cans).....	3,427	12,732	3,427	12,732
½-pound (48 cans).....			22,878	86,986
½-pound (96 cans).....	171	1,460	171	1,460
No. 1 (48 cans).....	1,920	7,051	228,256	804,385
1-pound (12 cans).....			313,199	528,815
1-pound (24 cans).....			30,702	57,081
1-pound (48 cans).....		818	5,925	42,222
No. 2 (24 cans).....	3,349	10,188	11,000	35,241
No. 3 (12 cans).....			31,781	42,894
No. 10 (6 cans).....	6,226	25,593	29,899	162,436
Other sizes (standard cases).....	5,872	26,617	20,183	82,804
Total.....		84,369		1,877,056
Razor clams:				
½-pound (48 cans).....			34,691	241,611
No. 1 (48 cans).....	91	364	15,569	135,204
1-pound (48 cans).....			78	790
No. 2 (24 cans).....	10	40	442	3,111
Total.....		404		380,706
Grand total.....		110,542		3,013,446

NOTE.—“Standard cases” represents the various-sized cases converted to the equivalent of 48 No. 1 cans. Soft-clam products were canned at 18 plants in Maine, 2 in Massachusetts, 1 in New Jersey, and 1 in Illinois; hard-clam products, at 1 plant in Massachusetts, 1 in Rhode Island, 1 in New York, 4 in New Jersey, 1 in Pennsylvania, 3 in Maryland, 1 in Florida, 4 in Washington, and 3 in Alaska; razor-clam products, at 5 plants in Washington, 3 in Oregon, and 5 in Alaska; and coquina-clam products, at 1 plant in Florida.

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.....	17,630	\$97,747	86,021	\$467,102	14,849	\$139,640	118,500	\$704,489
Florida.....	6,904	35,534	27,838	149,945	12,697	117,305	47,439	302,784
Alabama.....	(1)	(1)	42,471	238,826			42,471	238,826
Mississippi.....	65,109	357,458	247,042	1,306,493			312,151	1,663,951
Louisiana.....	196,069	1,107,698	461,338	2,522,483	(2)	(2)	677,425	3,630,181
Texas.....	10,751	62,665	49,224	281,485	28,394	258,070	88,369	602,220
Alaska.....			51	296			51	296
Total.....	296,483	1,661,102	933,983	4,954,630	55,940	515,015	1,286,406	7,130,747

PACK OF CANNED SHRIMP: ACTUAL CASES

Size	Cases	Value	Size	Cases	Value
4-ounce (48 cans).....	8,105	\$34,787	2½-ounce (48 cans).....	26,537	\$124,114
5-ounce (48 cans).....	263,225	1,464,237	4-ounce (24 cans).....	8,876	31,697
8¼-ounce (24 cans).....	29,315	147,516	5¼-ounce (24 cans).....	39,115	173,384
Other sizes (standard cases)	2,589	14,562	6-ounce (24 cans).....	41,709	185,820
In tins, wet:					
5¼-ounce (48 cans).....	930,937	4,934,779	Total.....		7,130,747
9¼-ounce (24 cans).....	3,352	17,670			
Other sizes (standard cases)	205	2,181			

¹ The dry pack of shrimp for Alabama has been included with Texas.

² The pack of shrimp in glass for Louisiana has been included with Texas.

NOTE.—“Standard cases” represents the various-sized cases converted to the equivalent of 48 5-ounce cans to the case in the dry pack and 48 5¼-ounce cans to the case in the wet pack. Shrimp were canned at 6 plants in Georgia, 6 in Florida, 3 in Alabama, 15 in Mississippi, 27 in Louisiana, 3 in Texas, and 1 in Alaska.

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PACK OF MISCELLANEOUS CANNED FISHERY PRODUCTS: STANDARD CASES

Product	Atlantic and Gulf Coasts ¹¹		Pacific Coast (including Alaska)		Total	
	Cases	Value	Cases	Value	Cases	Value
Shad.....			9, 219	\$30, 554	9, 219	\$30, 554
Shad roe.....			1, 591	49, 868	1, 591	49, 868
Cat and dog food.....	187, 732	\$292, 221	189, 309	548, 086	377, 041	840, 307
Fish flakes ¹²	39, 880	353, 071			39, 880	353, 071
Fish cakes, balls, etc.....	109, 285	754, 770			109, 285	754, 770
Fish paste.....	¹³ 3, 696	¹⁴ 137, 624	(¹⁵)	(¹⁶)	3, 696	137, 624
Sturgeon caviar.....	3, 053	435, 370			3, 053	435, 370
Whitefish roe and caviar.....	1, 332	49, 395			1, 332	49, 395
Salmon roe and caviar (for food).....	1, 534	36, 001			1, 534	36, 001
Salmon eggs (for bait).....			5, 349	85, 398	5, 349	85, 398
Miscellaneous fish and roe ¹⁷	10, 319	92, 684	875	8, 902	11, 194	101, 586
Crabs.....	(¹⁸)	(¹⁹)	¹¹ 13, 697	¹² 269, 699	13, 697	269, 699
Oyster soup.....	32, 961	182, 518			32, 961	182, 518
Terrapin products.....	136	8, 715			136	8, 715
Turtle products.....	5, 824	73, 737			5, 824	73, 737
Miscellaneous shellfish, etc. ²⁰	¹⁷ 6, 581	¹⁷ 51, 130	(¹⁷)	(¹⁷)	6, 581	51, 130
Total.....	402, 333	2, 467, 236	220, 340	992, 507	622, 673	3, 459, 743

¹¹ Includes the production of whitefish caviar by 1 firm in Wisconsin.

¹² Tuna flakes are not included in this table, but are included in the table for canned tuna and tunalike fishes.

¹³ The production of 1 firm in Washington is included with the production for the Atlantic and Gulf coasts.

¹⁴ Includes salted cod, pickled eels, finnan haddie, fish bouillon, fish chowder, haddock chowder, fish prepared for poisoning rats, kippered salmon, kippered sturgeon, groundfish roe, and tuna roe.

¹⁵ The production of hard crabs by 1 firm in Virginia and of soft crabs by 1 firm in Louisiana is included with the production for the Pacific coast.

¹⁶ Includes clam cakes, crab and shrimp gumbo, fresh-water crayfish, frog and frog's legs, pickled mussels, shrimp soup, and squid.

¹⁷ The production of squid by 1 firm in California is included with the production for the Atlantic and Gulf coasts.

NOTE.—“Standard cases” represents the various-sized cases converted to the equivalent of 48 1-pound cans to the case. Shad were canned at 9 plants; shad roe, at 8 plants; cat and dog food, at 9 plants; fish flakes, at 4 plants; fish cakes, balls, etc., at 8 plants; fish paste, at 4 plants; sturgeon caviar, at 4 plants; whitefish roe and caviar, at 5 plants; salmon roe and caviar (for food), at 4 plants; salmon eggs (for bait), at 10 plants; miscellaneous fish and roe, at 15 plants; crabs, at 13 plants; oyster soup, at 3 plants; terrapin products, at 4 plants; turtle products, at 3 plants; and miscellaneous shellfish, etc., at 9 plants.

PRODUCTION OF OYSTER AND MARINE CLAM-SHELL PRODUCTS ¹⁸

State	Crushed shell for poultry feed		Shell lime		Total	
	Tons	Value	Tons	Value	Tons	Value
Rhode Island, Connecticut, New York, and Delaware.....	2, 133	\$20, 801	481	\$2, 045	2, 614	\$22, 846
New Jersey.....	4, 441	35, 174	1, 763	8, 359	6, 204	43, 533
Pennsylvania.....	4, 294	38, 969	1, 109	4, 533	5, 403	43, 502
Maryland.....	37, 621	171, 855	29, 180	52, 190	66, 801	224, 045
Virginia.....	19, 377	113, 395	¹⁹ 31, 441	²⁰ 201, 201	50, 818	314, 596
North Carolina, South Carolina, and Florida.....	47, 462	239, 642	5, 816	19, 710	53, 278	299, 352
Alabama, Louisiana, and Texas.....	138, 433	427, 481	11, 892	43, 297	150, 325	470, 778
Mississippi.....	17, 045	62, 397	2, 945	4, 274	19, 990	66, 671
Washington and Oregon.....	8, 115	73, 655	3, 263	20, 059	11, 378	93, 614
California.....	14, 402	67, 533	1, 605	6, 377	15, 907	73, 910
Total.....	293, 323	1, 250, 802	89, 395	362, 045	382, 718	1, 612, 847

¹⁸ The production in Washington includes both clam- and oyster-shell products.

¹⁹ Of this amount 13,098 tons, valued at \$89,119, were reported as “burned” lime.

NOTE.—The above crushed-shell products were prepared at 2 plants in Rhode Island, 1 in Connecticut, 1 in New York, 6 in New Jersey, 4 in Pennsylvania, 1 in Delaware, 4 in Maryland, 9 in Virginia, 3 in North Carolina, 1 in South Carolina, 2 in Florida, 1 in Alabama, 3 in Mississippi, 1 in Louisiana, 2 in Texas, 7 in Washington, 1 in Oregon, and 5 in California.

Canned fishery products and byproducts of the United States and Alaska, 1937—Con.

PRODUCTION OF FRESH-WATER MUSSEL-SHELL PRODUCTS

Item	Iowa, Missouri, and Wisconsin		New York		Total	
	Quantity	Value	Quantity	Value	Quantity	Value
Pearl buttons..... gross.....	12,960,342	\$3,751,879	4,185,307	\$981,039	17,145,649	\$4,732,918
Crushed shell for poultry feed..... tons.....	4,450	27,427	(*)	(*)	4,450	27,427
Lime..... do.....	1,026	\$1,448			1,026	1,448
Other products ¹¹		29,412				29,412
Total.....		3,810,166		981,039		4,791,205

¹⁰ A small amount of lime produced in New York has been combined with a production in Iowa.
¹¹ Includes mussel-shell chips and novelties produced in Iowa.

NOTE.—Mussel shells purchased during the year amounted to 63,988,000 pounds, valued at \$829,524. Shells were taken in 17 States in the Mississippi River Valley and Great Lakes region. The producing States in order of their importance, were Arkansas, which contributed 29 percent of the total quantity; Tennessee, 21 percent; Illinois, 13 percent; Kentucky, 12 percent; Indiana, 10 percent; Alabama, Iowa, Michigan, Mississippi, Texas, and Wisconsin, each 2 percent; Minnesota, Missouri, and Oklahoma, each 1 percent, and Louisiana, Ohio, and South Dakota each less than 1 percent.

PRODUCTION OF MARINE PEARL-SHELL PRODUCTS¹²

Item	Massachusetts, Rhode Island, and Connecticut		New York		New Jersey	
	Gross	Value	Gross	Value	Gross	Value
Pearl buttons.....	1,766,796	\$1,118,105	1,138,334	\$813,656	1,646,622	\$1,254,166
Novelties ¹³		181,623		113,500		91,922
Total.....		1,299,728		927,056		1,346,087

Item	Maine, Pennsylvania, Maryland, and Florida		Oregon and California		Total	
	Gross	Value	Gross	Value	Gross	Value
Pearl buttons.....	2,190,299	\$1,131,135			6,732,051	\$4,316,961
Novelties ¹³		275,000		\$100,889		762,834
Total.....		1,406,135		100,889		5,079,895

¹² Produced principally from imported shells.
¹³ Includes knife handles, handles for manure 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, 7 in Connecticut, 9 in New York, 19 in New Jersey, 1 in Pennsylvania, 1 in Maryland, 16 in Florida, 1 in Oregon, and 2 in California.

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
New York, New Jersey, Delaware, and Georgia.....	224,392,000	7,497	\$345,463 ¹⁴	12,236 ¹⁴	\$261,339 ¹⁴	1,548,028	\$583,611	\$1,180,413
Virginia.....	199,556,000	14,252	615,213	(*)	(*)	1,361,181	522,476	1,137,989
North Carolina.....	168,534,000	6,089	256,312	10,731	208,371	859,598	294,443	759,126
Florida.....	197,371,000	8,013	364,231	8,633	158,394	146,806	55,803	673,428
Total.....	¹⁵ 789,853,000	¹⁶ 35,801	¹⁷ 1,581,219	31,600	618,104	3,895,613	1,456,333	3,655,656

¹⁴ The production of 1 firm in Virginia is included with New York, New Jersey, Delaware, and Georgia.
¹⁵ 473,911,800 pounds.
¹⁶ Of this production 22,763 tons, valued at \$985,075, were reported as dry scrap, and 13,038 tons, valued at \$596,144, as fish meal.

NOTE.—The menhaden factories were located as follows: 1 in New York, 2 in New Jersey, 2 in Delaware, 11 in Virginia, 10 in North Carolina, 1 in Georgia, and 5 in Florida.

Canned fishery products and byproducts of the United States and Alaska, 1937—Con.

PRODUCTION OF MISCELLANEOUS BYPRODUCTS

Product	Atlantic and Gulf Coasts ¹⁷		Pacific Coast (including Alaska)		Total	
	Quantity	Value	Quantity	Value	Quantity	Value
Dried scrap:						
Alewife..... tons.....	750	\$31,327			750	\$31,327
Herring..... do.....	1,452	40,622			1,452	40,622
Blue crab..... do.....	1,303	26,629			1,303	26,629
King crab..... do.....	535	19,371			535	19,371
Miscellaneous ¹⁸ do.....	1,252	31,294			1,252	31,294
Meal:						
Groundfish, "white fish"..... tons.....	14,178	396,995			14,178	396,995
Herring (Alaska)..... do.....			18,816	\$629,269	18,816	629,269
Herring (Maine)..... do.....	1,644	51,113			1,644	51,113
Mackerel..... do.....			2,194	77,827	2,194	77,827
Pilchard..... do.....			89,422	3,325,282	89,422	3,325,282
Salmon..... do.....			1,608	49,356	1,608	49,356
Tuna..... do.....			10,872	378,531	10,872	378,531
King crab..... do.....	25	625			25	625
Shrimp..... do.....	1,334	30,573	118	3,220	1,452	33,793
Whale (meat)..... do.....			770	25,410	770	25,410
Whale (bone)..... do.....			435	7,395	435	7,395
Miscellaneous ¹⁹ do.....	3,681	169,457	1,867	67,896	5,548	237,353
Oil:						
Alewife..... gallons.....	12,450	3,073			12,450	3,073
Cod..... do.....	7,429	2,889			7,429	2,889
Cod-liver..... do.....	275,802	167,572			275,802	167,572
Fur-seal..... do.....			29,341	5,397	29,341	5,397
Herring (Alaska)..... do.....			5,569,192	2,105,341	5,569,192	2,105,341
Herring (Maine)..... do.....	53,853	9,207			53,853	9,207
Mackerel..... do.....			80,811	30,812	80,811	30,812
Pilchard..... do.....			15,993,216	6,203,616	15,993,216	6,203,616
Salmon ²⁰ do.....			167,265	94,122	167,265	94,122
Shark..... do.....			9,880	4,096	9,880	4,096
Tuna..... do.....			141,963	30,702	141,963	30,702
Whale:						
Sperm..... do.....	5,837	1,500	168,250	45,832	174,087	47,332
Other..... do.....	8,270,752	3,693,169	781,450	429,500	9,052,202	4,122,669
Liver (other than cod) ²¹ gallons.....	34,777	821,797	37,342	1,214,728	72,119	2,036,525
Miscellaneous ²² do.....	39,946	15,241	59,500	20,825	99,446	36,066
Liquid glue..... do.....	²³ 441,912	²³ 908,121	(²⁴)	(²⁴)	441,912	908,121
Shark fins..... pounds.....	30,263	13,388			30,263	13,388
Shark skins..... do.....	138,058	12,306			138,058	12,306
Miscellaneous byproducts ²⁴ do.....		192,953		276,063		469,016
Total.....		6,639,222		15,025,220		21,664,442

¹⁷ Includes the production of burbot-liver oil in Minnesota and Wisconsin.

¹⁸ Includes shark and miscellaneous dry scrap, as well as the production of miscellaneous acid scrap by 1 firm in Virginia.

¹⁹ Includes salmon-egg, shark, starfish, clam, and miscellaneous meals and cod-liver pressings.

²⁰ Includes a considerable quantity of salmon oil especially prepared for human consumption.

²¹ Includes burbot-, halibut-, sablefish-, shark-, swordfish-, and tuna-liver oils.

²² Includes blackfish, rosefish, and miscellaneous fish oils.

²³ A quantity of liquid glue produced by 1 firm in California is included with the production of liquid glue on the Atlantic and Gulf coasts.

²⁴ Includes herring and miscellaneous green scrap, isinglass, kelp products, pearl essence, and miscellaneous novelties.

NOTE.—The whale products shown for the Atlantic and Gulf coasts were produced on factory ships operating in the Southern Hemisphere.

FROZEN-FISH TRADE³

FISH, FROZEN

During 1937 the output of freezing plants which reported their activities to the Government amounted to 168,223,653 pounds of fishery products. At the time these products were held in cold-storage plants they were estimated to be valued at about \$13,500,000. Compared with the output in 1936, this is a decrease of 6 percent in volume. Five species or groups of species accounted for 60 percent of the total amount frozen. In the order of their importance, they were: Cod, haddock, hake, and pollock (including cod, haddock, and pollock filets), which accounted for 22 percent of the total; whiting, 11 percent; salmon, 10 percent; halibut, 9 percent; and rosefish, 8 percent. Other products frozen in considerable quantity during the year were mackerel, sablefish, and shellfish.

Production of frozen fishery products, 1937

BY SPECIES AND MONTHS

Species	Month ended the 15th of—						
	January	February	March	April	May	June	July
	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>
Bluefish (all trade sizes)	129,710	10,691	25,843	8,367	38,227	5,829	2,387
Butterfish (all trade sizes)	4,591	2,888	9,645	17,903	19,917	130,650	127,817
Catfish	41,261	12,406	15,894	53,284	95,122	47,791	38,510
Cisco (Lake Erie)	17,229	10,657		3,237	2,966	831	18,751
Cisco (lake herring) including bluefin, blackfin, and chub	424,485	44,682	30,818	48,242	24,149	20,598	90,424
Cisco (tullibees, Canadian lakes)	15,610	886	8,175	8,529			3,767
Cod, haddock, hake, and pollock (except filets of cod, haddock, and pollock)	242,404	131,176	153,559	57,963	229,050	302,382	184,142
Cod filets	423,122	90,848	125,495	210,355	490,351	781,764	1,357,228
Croaker	8,308	7,106	20,310	17,059	128,964	706,774	732,860
Flounders	123,227	30,631	9,496	8,919	156,332	350,295	102,748
Haddock filets	1,415,549	604,187	1,399,388	2,177,233	1,286,613	1,825,201	1,969,445
Halibut (all trade sizes)				1,670,981	2,037,228	3,461,509	2,933,571
Herring, sea (including alewives and bluebacks)	74,820	21,375	114,770	225,967	240,633	165,360	71,746
Lake trout	37,482	12,508	13,061	17,204	35,002	58,808	73,694
Mackerel (except Spanish)	82,036	48,023	18,602	82,567	173,358	1,312,787	472,976
Perch, yellow	3,912	21,254	2,189	4,050	4,618	3,322	15,699
Pike, blue and sauger	69,759	1,746	654	33,606	230,522	234,547	37,909
Pike, yellow or wall-eyed	17,471	8,296	32,966	100,879	13,653	66,065	2,184
Pike (including pickerel, jacks, and yellow jack)	58,354	466	2,873	11,910	19,467	5,959	6,579
Pollock filets	1,258,586	246,798	86,667	177,052	341,024	869,505	713,480
Rosefish	1,068,047	328,155	61,255	60,364	273,190	2,063,708	1,662,081
Sablefish (black cod)	40,336	1,792	15,840	7,065	15,493	30,377	93,613
Salmon, chinook or king	30,911	21,918	28,937	7,841	43,356	524,138	650,944
Salmon, silver or coho	75,128	30,094	48,505	51,695	8,959	159,526	258,993
Salmon, fall and pink	21,538	26,419	46,746	8,232	3,324	2,500	4,805
Salmon, steelhead trout	52,181	2,030	22,164	9,707	17,331	8,438	49,363
Scup (porgies)	3,823	3,023	50	1,471	13,068	99,062	147,269
Shad and shad roe	33,826	5,979	1,277	36,802	201,954	175,860	19,582
Shellfish	352,823	436,509	278,442	191,068	1,352,625	1,448,401	1,693,962
Smelts, eulachon, etc.	305,624	181,843	210,916	52,066	148,601	9,557	10,596
Squid	61,530	11,970	2,529	547	622,949	2,687,378	187,064
Sturgeon and spoonbill cat	2,218	2,283	17,547	7,217	23,232	20,279	16,319
Suckers	3,183			4,479	20,306	30,801	12,296
Swordfish	12,536	29,045	18,099	335,820	97,079	32,065	65,409
Weakfish (including southern "sea trout")	11,896	147	1,103	1,605	11,118	144,127	215,861
Whitefish	119,493	171,590	142,137	224,577	51,534	17,004	127,377
Whiting	74,905	65,364	68,439	34,137	259,042	4,113,707	5,253,170
Miscellaneous fish	1,373,267	967,907	1,159,787	1,547,260	1,614,064	2,258,681	1,645,702
Total	8,081,299	3,952,682	4,194,158	7,517,250	10,344,470	24,176,176	20,969,223

³ The statistics in this section have been furnished by the Bureau of Agricultural Economics, Department of Agriculture.

Production of frozen fishery products, 1937—Continued

BY SPECIES AND MONTHS

Species	Month ended the 15th of—					
	August	September	October	November	December	Total
	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>
Bluefish (all trade sizes)	40, 478	95, 975	139, 518	69, 746	192, 800	759, 661
Butterfish (all trade sizes)	271, 846	74, 247	142, 612	38, 572	68, 692	909, 080
Catfish	22, 598	27, 795	18, 416	41, 528	66, 493	481, 099
Cisco (Lake Erie)	24, 556	6, 724	7, 211	41, 288	123, 386	256, 836
Cisco (lake herring) including bluefin, blackfin, and chub	186, 072	136, 194	152, 579	886, 059	905, 338	2, 949, 640
Cisco (tullibees, Canadian lakes)	4, 219	907	673	4, 982		47, 748
Cod, haddock, hake, and pollock (except filets of cod, haddock, and pollock)	155, 603	201, 017	265, 369	219, 780	138, 110	2, 370, 564
Cod filets	849, 950	489, 905	545, 605	537, 809	519, 905	6, 422, 337
Croaker	385, 706	30, 563	2, 910	6, 051	2, 800	2, 029, 441
Flounders	50, 783	28, 532	98, 388	172, 428	109, 591	1, 241, 350
Haddock filets	2, 201, 569	2, 183, 846	2, 651, 580	701, 844	799, 641	19, 575, 996
Halibut (all trade sizes)	2, 642, 500	937, 834	857, 596	1, 183, 568		15, 724, 787
Herring, sea (including alewives and bluebacks)	150, 768	72, 793	1, 209, 608	1, 003, 345	342, 897	3, 664, 072
Lake trout	64, 909	48, 707	125, 310	145, 027	102, 430	732, 242
Mackerel (except Spanish)	866, 361	279, 026	491, 619	541, 806	1, 117, 264	5, 486, 445
Perch, yellow	26, 868	20, 380	24, 327	98, 978	21, 394	246, 971
Pike, blue and sauger	40, 156	3, 529	39, 590	85, 259	46, 893	824, 170
Pike, yellow or wall-eyed	16, 165	11, 994	27, 510	10, 621	19, 408	327, 212
Pike (including pickerel, jacks, and yellow jack)	7, 397	4, 058	14, 638	48, 664	21, 208	200, 583
Pollock filets	497, 535	248, 965	299, 955	1, 015, 891	2, 905, 778	8, 661, 236
Rosefish	1, 734, 696	1, 315, 507	1, 039, 604	1, 979, 754	1, 540, 725	13, 017, 086
Sablefish (black cod)	501, 321	980, 548	989, 691	1, 135, 517	196, 526	4, 008, 119
Salmon, chinook or king	724, 524	996, 946	1, 204, 093	421, 832	78, 096	4, 733, 536
Salmon, silver or coho	959, 621	2, 302, 266	1, 777, 241	878, 363	20, 551	6, 570, 942
Salmon, fall and pink	280, 757	201, 296	534, 274	3, 621, 504	404, 727	5, 156, 120
Salmon, steelhead trout	244, 935	217, 555	66, 507	32, 312	40, 649	763, 172
Scup (porgies)	35, 031	33, 783	11, 205	2, 051	1, 269	401, 125
Shad and shad roe	2, 707	1, 896	302	19, 540	55, 813	555, 938
Shellfish	901, 253	1, 374, 779	1, 230, 023	1, 950, 765	993, 993	12, 204, 643
Smelts, eulachon, etc.	18, 472	31, 155	49, 242	75, 637	149, 068	1, 242, 767
Squid	77, 449	116, 586	7, 841	8, 217	13, 763	3, 797, 823
Sturgeon and spoonbill cat	11, 425	10, 073	18, 963	16, 561	43, 815	189, 822
Suckers	8, 969	310	1, 168	10, 379	131, 845	223, 436
Swordfish	80, 778	115, 065	83, 931	164, 519	826, 259	1, 850, 503
Weakfish (including southern "sea trout")	163, 641	546, 968	626, 203	157, 328	53, 209	1, 933, 206
Whitefish	47, 495	24, 890	64, 246	47, 536	76, 698	1, 115, 175
Whiting	915, 505	740, 206	2, 627, 975	1, 632, 245	1, 934, 560	17, 719, 245
Miscellaneous fish	1, 653, 613	1, 666, 927	1, 731, 265	1, 931, 256	2, 250, 196	19, 799, 925
Total	16, 847, 409	15, 717, 748	19, 178, 788	20, 928, 572	16, 315, 878	168, 223, 653

BY GEOGRAPHICAL SECTIONS AND SPECIES¹

[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)	31	683	7	37		3		761
Butterfish (all trade sizes)	303	586	19		1	1		910
Catfish	158	2	49	74	160	38		481
Cisco (Lake Erie)	3	251	3					257
Cisco (lake herring) including bluefin, blackfin, and chub	11	523		1, 661	756			2, 951
Cisco (tullibees, Canadian lakes)	8	31		8				47
Cod, haddock, hake, and pollock (except filets of cod, haddock, and pollock)	987	145	2	123	6	781	326	2, 371
Cod filets	6, 221	8		106	50		37	6, 422

¹ New England includes the 6 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.

Production of frozen fishery products, 1937—Continued

BY GEOGRAPHICAL SECTIONS AND SPECIES—Continued

[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
Croaker		368	1,601	56		4		2,029
Flounders	333	685	2	1		2	218	1,241
Haddock fillets	19,263	65	22	205	5		26	19,576
Hallbut (all trade sizes)	225	307	3	188	28	12	14,960	15,723
Herring, sea (including alewives and bluebacks)	2,157	363	24	464	1	6	679	3,694
Lake trout	20	237	15	569	82	11	9	733
Mackerel (except Spanish)	3,766	1,327	83	85			236	5,487
Perch, yellow			18	168	53			247
Pike, blue and sauger		410		413	1			824
Pike, yellow or wall-eyed		202	66	37	23			328
Pike (including pickerel, jacks, and yellow jack)		16		51	133			200
Pollock fillets	8,907			51	2			8,660
Rosefish	12,953		2	62				13,017
Sablefish (black cod)		10		6	41		3,951	4,008
Salmon, chinook or king	68	390	2	41	4		4,230	4,735
Salmon, silver or coho	44	218		14	8	1	6,285	6,570
Salmon, fall and pink		52		16	42	3	5,042	5,155
Salmon, steelhead trout		34	41				688	763
Scup (porgies)	40	346	15					401
Shad and shad roe	44	376	1	14		2	119	555
Shellfish	1,228	4,108	335	1,182	526	2,263	2,578	12,207
Smelts, eulachon, etc.	33	898	11	204		2	96	1,242
Squid	1,976	1,799		3			20	3,798
Sturgeon and spoonbill cat.		150	2		22	6		190
Suckers		2	140	72	10			224
Swordfish	552	866	6	4			422	1,850
Weakfish (including southern "sea trout")		1,620	312					1,932
Whitefish	93	679	12	130	126	74	2	1,116
Whiting	14,556	2,229	18	136	186	595		17,720
Miscellaneous fish	6,102	2,866	2,483	2,472	846	880	4,180	19,799
Total	79,772	22,845	5,294	8,450	3,112	4,674	44,077	168,224

BY GEOGRAPHICAL SECTIONS AND MONTHS¹

[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	4,476	1,548	145	921	390	137	464	8,081
February	1,778	887	193	401	83	202	409	3,953
March	1,857	1,115	180	198	54	247	560	4,194
April	2,970	1,077	404	244	214	193	2,415	7,517
May	3,782	1,453	274	1,059	308	687	2,782	10,345
June	13,125	3,307	1,111	968	276	601	4,788	24,176
July	12,427	2,180	1,129	437	161	300	4,335	20,969
August	8,282	1,422	558	410	144	287	5,764	16,847
September	6,366	1,807	218	358	76	452	6,441	15,718
October	9,386	1,953	110	490	207	511	6,522	19,179
November	7,450	1,989	249	1,853	456	787	8,145	20,929
December	7,873	4,104	743	1,111	743	290	1,452	16,316
Total	79,772	22,845	5,294	8,450	3,112	4,674	44,077	168,224

¹ New England includes the 6 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.

HOLDINGS

During 1937 monthly holdings of frozen fish and shellfish averaged 63,810,000 pounds, which is an increase of 3 percent as compared with 1936. The holdings during January were the largest, amounting to 87,576,000 pounds. In only two other months did the holdings exceed 75,000,000 pounds. These were November and December. The holdings were the smallest during May, when only 40,589,000 pounds of fishery products were in storage.

Holdings of frozen fishery products, 1937

BY SPECIES AND MONTHS

Species	Month ended the 15th of—					
	January	February	March	April	May	June
	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>
Bluefish (all trade sizes)	810, 280	539, 787	342, 293	195, 858	181, 838	102, 542
Butterfish (all trade sizes)	545, 192	382, 537	263, 376	234, 160	198, 201	293, 526
Catfish	438, 615	390, 176	313, 252	222, 588	285, 035	281, 795
Cisco (Lake Erie)	52, 447	28, 582	13, 598	1, 618	3, 194	507
Cisco (lake herring) including bluefin, blackfin, and chub	2, 295, 104	1, 399, 151	1, 032, 215	741, 910	542, 227	422, 737
Cisco (tullibees, Canadian lakes)	58, 722	42, 798	20, 890	18, 330	13, 873	6, 960
Cod, haddock, hake, and pollock (except filets of cod, haddock and pollock)	1, 517, 789	1, 386, 136	1, 207, 778	1, 010, 675	1, 076, 465	1, 137, 679
Cod filets	1, 761, 024	1, 542, 593	1, 416, 366	1, 433, 564	1, 582, 340	1, 933, 948
Croaker	581, 183	202, 758	202, 234	90, 096	155, 734	853, 457
Flounders	500, 265	451, 340	339, 875	196, 651	293, 544	585, 516
Haddock filets	6, 451, 855	5, 305, 233	4, 202, 735	4, 761, 832	4, 012, 604	4, 178, 301
Halibut (all trade sizes)	7, 162, 435	3, 995, 348	1, 727, 970	2, 827, 455	4, 653, 031	8, 007, 777
Herring, sea (including alewives and bluebacks)	2, 182, 903	1, 368, 568	881, 700	777, 488	790, 393	731, 931
Lake trout	683, 614	473, 391	290, 180	194, 445	341, 448	208, 443
Mackerel (except Spanish)	4, 193, 907	2, 784, 937	1, 662, 424	762, 887	441, 465	1, 729, 468
Perch, yellow	144, 236	148, 180	111, 494	71, 793	69, 214	70, 640
Pike, blue and sauger	733, 081	703, 306	481, 563	543, 353	715, 963	849, 013
Pike, yellow or wall-eyed	302, 731	345, 565	284, 601	217, 270	226, 326	303, 657
Pike (including pickerel, jacks and yellow jack)	191, 014	265, 799	265, 529	246, 242	245, 952	213, 429
Pollock filets	6, 314, 471	5, 209, 655	4, 414, 102	3, 622, 482	2, 763, 090	1, 344, 440
Rosefish	4, 083, 486	4, 012, 141	2, 571, 281	1, 095, 830	406, 449	1, 433, 229
Sablefish (black cod)	1, 451, 216	885, 550	297, 691	276, 054	153, 016	78, 199
Salmon, chinook or king	3, 396, 881	2, 555, 271	1, 811, 020	1, 247, 883	938, 828	999, 425
Salmon, silver or coho	3, 017, 576	1, 983, 502	975, 508	322, 889	175, 935	288, 363
Salmon, fall and pink	2, 375, 664	1, 656, 469	902, 604	622, 057	402, 366	288, 969
Salmon, steelhead trout	648, 022	529, 576	411, 195	363, 120	199, 510	107, 144
Scup (porgies)	542, 023	396, 051	270, 817	159, 801	146, 219	149, 537
Shad and shad roe	451, 525	361, 945	255, 310	187, 754	364, 570	512, 922
Shellfish	3, 450, 334	2, 561, 445	1, 892, 351	1, 261, 455	2, 019, 117	2, 399, 640
Smelts, eulachon, etc.	1, 497, 328	1, 496, 831	1, 040, 522	1, 125, 545	1, 083, 661	1, 015, 825
Squid	556, 099	362, 009	155, 044	57, 302	627, 750	3, 211, 773
Sturgeon and spoonbill cat	154, 364	120, 589	91, 761	113, 197	121, 220	110, 730
Suckers	105, 069	84, 113	71, 724	84, 922	78, 957	657, 863
Swordfish	924, 685	1, 027, 883	971, 032	1, 328, 962	1, 053, 649	106, 690
Weakfish (including southern "sea trout")	537, 876	358, 334	204, 380	78, 612	41, 445	178, 747
Whitefish	796, 129	939, 363	1, 133, 660	1, 077, 267	878, 730	820, 062
Whiting	15, 743, 711	13, 616, 796	11, 127, 317	9, 045, 811	6, 984, 907	6, 128, 091
Miscellaneous fish	10, 953, 584	9, 618, 910	7, 327, 551	6, 360, 440	6, 322, 627	6, 436, 047
Total	87, 576, 140	69, 628, 623	51, 588, 013	42, 956, 628	40, 589, 493	48, 178, 012

Species	Month ended the 15th of—					
	July	August	September	October	November	December
	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>
Bluefish (all trade sizes)	47, 556	63, 440	131, 025	250, 854	246, 791	370, 873
Butterfish (all trade sizes)	378, 868	617, 823	630, 306	694, 834	659, 016	610, 224
Catfish	251, 674	202, 539	230, 111	231, 110	226, 461	305, 107
Cisco (Lake Erie)	19, 258	40, 178	44, 627	46, 532	80, 586	191, 250
Cisco (lake herring) including bluefin, blackfin, and chub	443, 535	548, 195	603, 400	637, 452	1, 321, 329	1, 878, 276
Cisco (tullibees, Canadian lakes)	10, 517	27, 103	26, 680	23, 863	16, 062	19, 953
Cod, haddock, hake, and pollock (except filets of cod, haddock and pollock)	1, 081, 167	1, 062, 614	1, 087, 493	1, 138, 169	1, 148, 212	1, 098, 207
Cod filets	2, 767, 458	2, 995, 020	2, 955, 158	2, 620, 176	2, 408, 785	2, 517, 811
Croaker	1, 867, 847	1, 897, 810	1, 722, 397	1, 390, 388	1, 030, 521	834, 338
Flounders	642, 478	577, 623	498, 910	528, 488	603, 446	597, 541
Haddock filets	5, 653, 334	6, 783, 907	7, 323, 162	8, 197, 626	7, 090, 766	6, 716, 962
Halibut (all trade sizes)	10, 789, 294	13, 130, 489	13, 187, 982	11, 007, 949	10, 144, 263	8, 329, 821
Herring, sea (including alewives and bluebacks)	656, 462	683, 688	512, 460	1, 322, 766	1, 879, 798	1, 978, 147
Lake trout	227, 797	243, 157	257, 141	345, 098	538, 818	506, 386
Mackerel (except Spanish)	1, 927, 864	2, 342, 935	1, 953, 702	2, 049, 734	2, 318, 949	3, 406, 190
Perch, yellow	69, 071	113, 244	113, 943	146, 182	248, 723	268, 701
Pike, blue and sauger	519, 750	304, 492	114, 035	127, 216	183, 675	163, 012
Pike, yellow or wall-eyed	295, 669	284, 896	267, 290	265, 744	211, 814	168, 451

Holdings of frozen fishery products, 1937—Continued
BY SPECIES AND MONTHS—Continued

Species	Month ended the 15th of—					
	July	August	September	October	November	December
Pike (including pickerel, jacks and yellow jack)	207, 195	173, 264	125, 522	134, 477	207, 730	161, 230
Pollock filets	1, 243, 381	1, 447, 204	1, 399, 367	880, 730	1, 171, 046	3, 514, 939
Rosefish	1, 929, 090	2, 387, 429	2, 243, 633	1, 277, 185	1, 923, 722	2, 501, 849
Sablefish (black cod)	168, 687	585, 166	1, 362, 832	2, 103, 128	2, 623, 682	2, 603, 741
Salmon, chinook or king	1, 324, 843	1, 812, 102	2, 505, 690	3, 422, 598	3, 626, 721	3, 297, 136
Salmon, silver or coho	416, 730	1, 285, 194	3, 425, 746	4, 603, 651	4, 902, 863	4, 216, 260
Salmon, fall and pink	256, 963	418, 761	561, 197	994, 721	4, 238, 583	4, 159, 631
Salmon, steelhead trout	116, 872	295, 815	442, 921	422, 343	381, 112	345, 544
Scup (porpies)	288, 387	316, 522	511, 566	462, 850	404, 042	306, 220
Shad and shad roe	499, 475	460, 433	461, 951	409, 307	422, 186	406, 243
Shellfish	3, 425, 101	3, 380, 792	4, 038, 639	4, 476, 255	5, 940, 926	5, 974, 142
Smelts, eulachon, etc	993, 860	952, 520	960, 680	889, 125	820, 592	743, 214
Squid	3, 098, 966	2, 939, 707	2, 713, 533	2, 488, 398	2, 380, 649	2, 043, 712
Sturgeon and spoonbill cat	106, 106	97, 291	132, 155	165, 338	155, 235	147, 233
Suckers	115, 493	119, 596	114, 202	107, 793	101, 008	202, 586
Swordfish	490, 452	576, 253	492, 903	598, 456	486, 810	1, 092, 329
Weakfish (including southern "sea trout")	356, 364	482, 500	967, 971	1, 513, 683	1, 571, 359	1, 309, 574
Whitefish	927, 883	969, 608	1, 062, 131	1, 072, 810	1, 008, 777	998, 420
Whiting	9, 186, 626	8, 610, 157	6, 856, 765	7, 415, 319	7, 083, 245	7, 562, 193
Miscellaneous fish	6, 807, 730	7, 016, 559	7, 282, 190	7, 487, 452	8, 263, 974	8, 354, 893
Total	59, 329, 501	66, 264, 026	69, 321, 346	72, 349, 600	78, 102, 277	79, 891, 398

BY GEOGRAPHICAL SECTIONS AND MONTHS¹

[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	34, 652	12, 684	2, 707	13, 701	7, 142	872	15, 818	87, 576
February	28, 707	11, 163	2, 187	11, 027	5, 782	640	10, 114	69, 626
March	22, 624	9, 250	1, 441	7, 867	4, 470	498	5, 538	51, 588
April	18, 758	7, 015	1, 096	6, 346	3, 520	396	5, 823	42, 957
May	15, 348	6, 994	971	6, 267	3, 369	642	6, 998	40, 589
June	17, 131	7, 605	2, 024	6, 908	3, 498	621	10, 391	48, 178
July	23, 034	8, 775	3, 031	6, 631	3, 873	502	13, 484	59, 330
August	24, 558	8, 914	3, 621	6, 400	4, 471	460	17, 771	66, 204
September	21, 468	10, 081	3, 429	6, 894	4, 379	578	22, 492	69, 321
October	21, 582	11, 225	3, 075	7, 078	4, 468	717	24, 225	72, 350
November	21, 519	12, 563	2, 714	8, 686	5, 146	1, 017	26, 467	78, 102
December	23, 719	14, 692	2, 934	8, 881	5, 714	915	23, 036	79, 891
Average	22, 748	10, 080	2, 436	8, 058	4, 653	656	15, 179	63, 810

¹ New England includes the 6 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 1937 monthly cold-storage holdings of cured herring and mild-cured salmon averaged 22,918,000 pounds, which is an increase of 7 percent as compared with the average monthly holdings in 1936. The holdings during January were the largest, amounting to 26,097,617 pounds, and the smallest were in December, amounting to 17,299,938 pounds.

Holdings of cured fish, 1937, by species and months

Month ended the 15th of—	Cured herring	Mild-cured salmon	Total
	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>
January	18,001,751	8,095,866	26,097,617
February	18,330,859	5,707,047	24,037,906
March	17,404,805	4,955,148	22,359,953
April	18,033,069	4,016,397	22,049,466
May	22,422,287	3,133,848	25,556,135
June	20,598,513	3,514,453	24,112,966
July	18,689,631	4,720,282	23,409,913
August	17,626,521	5,964,964	23,591,485
September	16,954,488	7,787,570	24,742,058
October	14,913,228	7,210,858	22,124,086
November	12,909,212	6,730,592	19,639,804
December	10,966,065	6,333,873	17,299,938

FOREIGN FISHERY TRADE

The foreign trade in fishery products of the United States in 1937 amounted to \$65,202,767, of which \$50,835,515 represents the value of these products imported for consumption, and \$14,567,252, the value of exports of domestic fishery products. Compared with the previous year, there was an increase of 18 percent in total trade, 21 percent in the value of the imports, and 10 percent in the value of exports.

Imports consisted of 364,668,145 pounds of edible products, valued at \$33,910,738, and nonedible products, valued at \$16,724,777. Fishery exports consisted of 119,067,718 pounds of edible products, valued at \$13,729,441, and nonedible products, valued at \$837,811.

Import duties levied on fishery products imported during 1937 totaled \$8,253,677.

Exports of domestic fishery products, 1937¹

Item	Quantity	Value
EDIBLE FISHERY PRODUCTS		
Fish, fresh, frozen, or packed in ice:		
Salmon.....pounds.....	3,394,435	\$487,286
Other.....do.....	1,216,599	130,348
Total.....do.....	4,611,034	587,634
Fish, salted, pickled, or dry-cured:		
Salmon.....do.....	2,232,563	386,974
Cod, haddock, hake, pollock, cusk.....do.....	1,714,987	118,563
Herring.....do.....	1,710,001	66,537
Other.....do.....	1,000,568	51,009
Total.....do.....	6,658,119	624,083
Fish, smoked or kippered.....do.....	301,355	41,317
Fish, canned:		
Salmon.....do.....	37,978,553	6,654,801
Sardines.....do.....	51,998,236	3,461,855
Mackerel.....do.....	689,739	43,569
Other.....do.....	418,041	70,120
Total.....do.....	91,064,569	10,236,245
Shellfish, not canned:		
Oysters, fresh, in the shell.....do.....	4,523,747	162,690
Oysters, fresh, shucked, frozen, or in ice.....do.....	1,732,035	261,261
Shrimp fresh, frozen, or in ice.....do.....	2,715,297	345,896

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

Exports of domestic fishery products, 1937—Continued

Item	Quantity	Value
EDIBLE FISHERY PRODUCTS—continued		
Shellfish, not canned—Continued.		
Shrimp, dried.....pounds..	1, 459, 643	\$275, 325
Other shellfish, fresh, frozen, or in ice, or dried.....do	229, 048	28, 501
Total.....do	10, 659, 770	1, 073, 643
Shellfish, canned:		
Shrimp.....do	4, 562, 962	911, 322
Other.....do	967, 288	169, 755
Total.....do	5, 530, 250	1, 081, 077
Other fish products.....do	242, 621	85, 342
Total edible products.....do	119, 067, 718	13, 729, 441
NONEDIBLE FISHERY PRODUCTS		
Marine-animal oils.....do	1, 949, 014	304, 298
Sponges.....do	54, 696	72, 603
Fish meal for feed.....tons	1, 061	42, 525
Furs, fur-seal, dressed.....number	2, 867	67, 529
Oyster shells.....tons	53, 320	350, 856
Total nonedible products.....do		837, 811
Grand total.....do		14, 567, 252

Imports of fishery products entered for consumption, 1937¹

Item	Pounds	Value
EDIBLE FISHERY PRODUCTS		
Fish, fresh or frozen:		
Whole or beheaded, or eviscerated, or both:		
Fresh-water fish, not elsewhere specified:		
Whitefish.....	12, 252, 325	\$1, 675, 535
Yellow pike.....	9, 034, 990	814, 369
Jacks or grass pike.....	3, 352, 137	172, 215
Lake trout.....	4, 754, 041	552, 830
Yellow perch.....	2, 037, 064	162, 374
Tullibees.....	690, 015	44, 355
Lake herring and ciscoes.....	1, 373, 017	171, 762
Chubs.....	1, 174, 251	157, 449
Mullet (<i>catostomus</i>).....	691, 250	35, 679
Saugers.....	8, 152, 080	427, 915
Fresh-water fish, not elsewhere specified.....	12, 189, 192	761, 981
Eels.....	817, 332	61, 358
Salmon.....	6, 618, 373	592, 394
Cod, haddock, hake, pollock, and cusk.....	1, 660, 963	77, 064
Halibut:		
Fresh.....	4, 249, 717	429, 241
Frozen.....	706, 235	68, 248
Mackerel.....	1, 881, 374	99, 067
Sturgeon.....	947, 206	190, 649
Swordfish:		
Fresh.....	1, 280, 305	273, 717
Frozen.....	5, 236, 408	419, 343
Fish, not specially provided for.....	8, 074, 890	377, 663
Whether or not whole:		
Smelts.....	6, 295, 625	594, 927
Tuna fish.....	14, 410, 832	866, 825
Sea herring:		
Fresh.....	24, 617, 177	153, 595
Frozen.....	2, 170, 145	83, 646
Filleted, skinned, boned, sliced, or divided, not specially provided for.....	10, 870, 250	1, 073, 333
Total.....do	145, 427, 194	10, 237, 567

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

Imports of fishery products entered for consumption, 1937—Continued

Item	Pounds	Value
EDIBLE FISHERY PRODUCTS—continued		
Fish, salted, dried, smoked, pickled, or preserved:		
Dried and unsalted:		
Cod, haddock, hake, pollock, and cusk	78,060	\$5,267
Other	3,421,380	418,946
In oil or in oil and other substances:		
Sardines	28,727,105	3,842,951
Anchovies	2,170,033	865,194
Tuna fish	11,053,349	2,033,958
Antipasto	271,020	103,993
Other	549,612	117,368
Not in oil or in oil and other substances:		
In airtight containers weighing, with contents, not over 15 pounds each:		
Anchovies	1,581,454	164,726
Salmon	6,712,731	411,471
Herring and sardines	11,792,040	907,787
Fish cakes, balls, and pudding	2,188,313	151,916
Other	1,899,189	243,175
Pickled or salted:		
Not in oil, etc., and not in airtight containers weighing, with contents, 15 pounds or less each:		
Salmon	124,031	11,612
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	2,695,239	150,081
Containing more than 43 percent moisture by weight	46,940,368	2,008,136
Cod, haddock, hake, pollock, and cusk, skinned or boned	2,089,597	208,711
Herring:		
In containers (not airtight), weighing, with contents, not more than 15 pounds each	209	47
In containers, containing not more than 10 pounds of herring	9,080,093	380,740
Other herring in bulk or containers	26,177,847	1,096,060
Mackerel, in bulk or in containers weighing, with contents, more than 15 pounds each	6,435,254	407,538
Alwives, in bulk or in containers weighing, with contents, more than 15 pounds each	26,250	852
Pickled or salted, not specially provided for:		
In bulk or in containers weighing, with contents, more than 15 pounds each	1,236,229	95,733
In containers (not airtight) weighing, with contents, not more than 15 pounds each	1,131	163
Smoked or kippered:		
Not in oil, and not in airtight containers weighing, with contents, 15 pounds or less each:		
Salmon	3,896	2,252
Herring:		
Whole or beheaded:		
Hard, dry-smoked	1,690,517	49,405
Other	319,520	23,950
Boned, whether or not skinned	51,325	4,431
Eviscerated, split, skinned, or divided, not boned	953,878	78,665
Cod, haddock, hake, pollock, and cusk:		
Whole, or beheaded, or eviscerated, or both	929,574	93,782
Filleted, skinned, boned, sliced, or divided	1,875,059	189,251
Prepared or preserved, not specially provided for:		
In containers weighing, with contents, not more than 15 pounds each	34,055	3,266
In bulk or in containers weighing, with contents, more than 15 pounds each	90,858	7,534
Fish paste and fish sauce	194,400	46,857
Total	171,393,616	14,125,818
Caviar and other fish roe:		
Not boiled:		
Sturgeon	225,845	320,753
Fish roe, not specially provided for	79,763	20,650
Boiled, packed in airtight containers		
	132,801	17,453
Total	437,409	358,856
Shellfish:		
Crab meat, crab sauce, and crab paste	11,156,566	3,675,665
Oysters, oyster juice, or either in combination with other substances, in airtight containers	229,313	52,664
Razor clams, canned	11,539	765
Clams (except razor clams) and clams in combination with other substances (except clam chowder)	739,765	136,740
Clam chowder, clam juice, and clam juice in combination with other substances	7,696	987
Lobsters (including spiny lobsters and crawfish):		
Not canned	14,711,594	3,332,344
Canned	834,416	417,822
Turtles	684,523	41,062

Imports of fishery products entered for consumption, 1937—Continued

Item	Pounds	Value
EDIBLE FISHERY PRODUCTS—continued		
Shellfish—Continued.		
Crabs:		
Fresh or frozen (not crab meat).....	13,910	\$865
Prepared or preserved, not specially provided for.....	3,322	705
Clams, quahaugs, not in airtight containers:		
Fresh or frozen.....	4,996,780	75,422
Prepared or preserved.....	28,000	3,092
Shrimp and prawns.....	2,400,075	199,326
Scallops:		
Fresh but not frozen.....	1,151,504	198,390
Other.....	1,233,964	164,596
Oysters, not in airtight containers:		
Fresh or frozen (except seed oysters).....	56,347	8,274
Other.....	2,552,101	102,720
Shellfish, not specially provided for.....	6,411,123	751,392
Lobster paste and sauce.....	28,263	8,168
Pastes and sauces of shellfish, not specially provided for.....	159,135	17,498
Total.....	47,409,926	9,188,497
Total edible fishery products.....	364,668,145	33,910,738
NONEDIBLE FISHERY PRODUCTS		
Marine-animal oils:	<i>Quantity</i>	<i>Value</i>
Cod oil..... gallons.....	2,954,156	1,188,824
Cod-liver oil..... do.....	5,915,964	3,866,971
Eulachon oil..... do.....	303	130
Herring oil..... do.....	4,904	1,183
Seal oil..... do.....	12,376	4,675
Sod oil..... do.....	49,545	16,406
Whale oil:		
Sperm, crude..... do.....	1,334,709	355,972
Sperm, refined or otherwise processed..... do.....	42,154	15,630
Whale oil, not specially provided for..... do.....	5,925,920	1,658,751
Marine-animal and fish oils, not specially provided for..... do.....	111,006	102,152
Total..... do.....	16,351,037	7,210,694
Pearls and imitation pearls:		
Pearls and parts, not strung or set:		
Natural.....		719,170
Cultured or cultivated.....		385,410
Imitation pearls, half pearls and hollow or filled.....		10,983
Imitation pearl beads:		
Hollow or filled.....		67,956
Other solid imitation pearl beads:		
Valued at not more than ¼ cent per inch..... inches.....	135,101,965	152,826
Valued at more than ¼, but not more than 1 cent per inch..... do.....	140,075	652
Valued at more than 1, but not more than 5 cents per inch..... do.....	12,044	170
Valued at more than 5 cents per inch..... do.....	1,330	221
Valued at not more than 10 cents per inch..... do.....	86,100	78
Total..... do.....		1,337,404
Shells and buttons of pearl or shell:		
Shells, unmanufactured:		
Green snail shell..... pounds.....	223,328	43,011
Mother-of-pearl..... do.....	10,142,840	2,230,966
Shells, not specially provided for, including tortoise shells..... do.....	10,419,756	29,294
Shells and mother-of-pearl, engraved, cut, ornamented, or manufactured.....		69,467
Shell pearl buttons:		
Ocean..... gross.....	286,069	94,228
Fresh-water..... do.....	228,805	52,908
Buttons (from Philippine Islands)..... do.....	836,260	283,839
Total..... do.....		2,803,713
Sponges:		
Sheepswool..... pounds.....	155,696	309,457
Yellow and grass..... do.....	306,139	100,253
Velvet..... do.....	52,956	67,811
Other..... do.....	66,057	109,409
Manufactures of sponges..... do.....	1,058	690
Total..... do.....	581,906	587,620
Agar agar..... do.....	704,288	418,383
Ambergris..... do.....	39	4,775
Cod-liver oil cake and cod-liver oil cake meal..... do.....	1,218,605	28,668
Cuttlefish bone..... do.....	535,590	39,428
Aquarium fish..... do.....		42,700
Goldfish, live..... number.....	444,178	8,411

Imports of fishery products entered for consumption, 1937—Continued

Item	Quantity	Value
NONEDIBLE FISHERY PRODUCTS—continued		
Fish for other than human consumption, not elsewhere specified		\$11, 105
Fish livers..... pounds..	2, 473, 982	421, 141
Fish sounds..... do	160, 808	32, 635
Fish scrap and fish meal..... tons	92, 772	3, 357, 254
Isinglass..... pounds..	85, 289	39, 137
Kelp..... do	1, 131, 063	17, 812
Skins, fish, raw or salted..... do	1, 335, 172	58, 665
Skins, seal, raw (not fur skins)..... do	1, 953, 833	291, 600
Spermaceti wax..... do	80, 339	14, 742
Whalebone, unmanufactured.....		1, 469
Whalebone, manufactures of.....		336
Total.....		4, 785, 286
Total, nonedible fishery products.....		16, 724, 777
Grand total.....		50, 635, 515

FISHERIES OF THE NEW ENGLAND STATES

(Area XXII)*

The yield of the commercial fisheries of the New England States (Maine, New Hampshire, Massachusetts, Rhode Island, and Connecticut) during 1937 amounted to 670,864,300 pounds, valued at \$19,937,288 to the fishermen, representing an increase of 2 percent in volume and 11 percent in value as compared with the catch in 1935, the most recent previous year for which catch statistics are available. These fisheries gave employment to 19,624 fishermen, as compared with 18,449 in 1935.

There were 400 fishery wholesale and manufacturing establishments in the 5 States in 1937, as compared with 380 in 1935 when the most recent survey of these establishments was made. In 1937 these establishments employed 12,122 persons, paid \$7,705,479 in salaries and wages, and produced manufactured products (canned, cured, packaged, and byproducts) valued at \$24,038,947. In 1935 the wholesale and manufacturing firms employed 10,561 persons, paid \$6,456,456 in salaries and wages, and produced manufactured products valued at \$22,838,942.

Fisheries of the New England States, 1937

SUMMARY OF CATCH

Product	Maine		New Hampshire		Massachusetts	
	Pounds	Value	Pounds	Value	Pounds	Value
Fish.....	83, 578, 600	\$897, 085	34, 000	\$2, 930	513, 858, 500	\$11, 995, 732
Shellfish, etc.....	17, 600, 700	1, 908, 922	629, 800	93, 111	20, 251, 900	2, 198, 727
Total.....	101, 179, 300	2, 806, 007	663, 800	96, 041	534, 110, 400	14, 197, 459

Product	Rhode Island		Connecticut		Total	
	Pounds	Value	Pounds	Value	Pounds	Value
Fish.....	9, 422, 300	\$299, 040	8, 273, 600	\$325, 981	615, 167, 000	\$13, 523, 768
Shellfish, etc.....	9, 425, 100	1, 098, 924	7, 789, 800	1, 113, 836	55, 697, 800	6, 413, 520
Total.....	18, 847, 400	1, 397, 964	16, 063, 400	1, 439, 817	670, 864, 300	19, 937, 288

* 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, 1937—Continued

OPERATING UNITS: BY STATES

Item	Maine	New Hampshire	Massachusetts	Rhode Island	Connecticut	Total
	Number	Number	Number	Number	Number	
Fishermen:						
On vessels.....	482		4,258	289	316	5,345
On boats and shore:						
Regular.....	2,606	119	3,614	429	295	7,063
Casual.....	3,211	53	2,609	768	575	7,216
Total.....	6,299	172	10,481	1,486	1,186	19,624
Vessels:						
Steam.....			29	6	4	39
Net tonnage.....			4,942	187	878	5,977
Motor.....	113		381	68	68	630
Net tonnage.....	1,115		15,160	788	1,267	18,330
Total vessels.....	113		410	74	72	669
Total net tonnage.....	1,115		20,102	945	2,145	24,307
Boats:						
Motor.....	2,083	45	1,754	357	230	4,469
Other.....	1,907	64	1,675	625	461	4,732
Accessory boats.....	178		457	62	15	712
Apparatus:						
Purse seines:						
Mackerel.....	14		77		1	92
Length, yards.....	5,300		36,002		120	41,422
Other.....	9		2			11
Length, yards.....	1,990		1,000			2,990
Haul seines.....	31		14	16	37	98
Length, yards.....	3,030		488	2,262	3,723	9,503
Stop seines.....	78					78
Length, yards.....	35,680					35,680
Gill nets:						
Anchor.....	785		1,475	4		2,264
Square yards.....	278,631		511,536	464		790,631
Drift.....	500		3,699	28	30	4,157
Square yards.....	112,373		1,085,581	30,480	58,450	1,286,884
Stake.....	163				24	187
Square yards.....	29,238				4,740	33,978
Lines:						
Hand.....	4,921	750	402	244	117	6,434
Hooks.....	5,520	750	1,061	434	147	7,912
Trawl.....	15,961	50	29,020	69		45,100
Hooks.....	858,990	2,500	1,583,818	28,643		2,473,951
Troll.....				117		117
Hooks.....				3	28	29
Trot with hooks.....				500	2,800	3,300
Hooks.....				36	18	128
Pound nets.....			87	36		108
Floating traps.....	22		50	36		220
Weirs.....	216		4			247
Fyke nets.....	27		18	105	97	488
Dip nets.....	60		203	10	215	12
Scap nets.....					12	155
Bag nets.....	124	31				117
Push nets.....			117			509
Otter trawls.....	54		346	49	60	14,368
Yards at mouth.....	1,288		10,899	1,143	1,538	11
Box traps.....	11					
Pots:						
Crab.....	160		3,470	30		3,072
Eel.....	120		1,105		989	306,130
Lobster.....	185,339	3,459	72,290	29,270	15,772	955
Pariwinkle and cockle.....			80	875		209
Harpoons.....	69		74	60	16	67
Spears.....	5		22	34	6	
Dredges:						
Clam.....			94	18		54
Yards at mouth.....			39	15		4
Muschel.....				4		4
Yards at mouth.....				4		150
Oyster.....			35	37	78	190
Yards at mouth.....			35	55	100	3,696
Scallop.....	134		2,857	705		3,223
Yards at mouth.....	194		2,455	574		
Tongs:						
Oyster.....			37	48	38	771
Other.....			138	572	61	
Rakes:						
Oyster.....				37	2	39
Other.....	3		823	103	63	478
Forks.....			463	15		
Hoes.....	2,104	105	1,782	56	85	4,082

Fisheries of the New England States, 1937—Continued

CATCH: BY STATES

Species	Maine		New Hampshire		Massachusetts		Rhode Island		Connecticut		Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
FISH												
Alewives.....	2,818,000	\$10,936			1,085,900	\$8,283	218,200	\$1,916	84,800	\$851	4,206,900	\$21,866
Anchovies.....					200	4	290				32,200	294
Bluefish.....					48,900	4,019	140,100	10,256	33,600	4,654	220,600	18,929
Bonito.....					4,600	315	43,000	3,733			47,600	4,048
Butterfish.....	9,900	620			2,250,400	87,407	570,400	19,031	39,100	2,529	2,869,800	109,587
Carp.....					1,000	40			39,500	3,055	40,500	3,095
Catfish and bullheads.....									300	2	300	2
Cod.....	7,049,500	146,981	1,000	\$30	126,327,600	2,472,225	1,067,100	31,498	159,400	6,127	134,604,600	2,656,861
Crevalle.....							2,000	20			2,000	20
Croaker.....					866,400	28,057					866,400	28,057
Cunner.....					27,800	894	14,100	175	1,000	20	42,900	1,089
Cusk.....	1,552,900	26,825	1,000	30	8,618,500	158,798					10,172,400	185,653
Drum, red.....					2,800	16					2,800	16
Eels:												
Common.....	59,300	5,326			92,700	8,184	177,400	14,330	74,700	7,060	404,100	34,900
Conger.....					45,600	669	15,900	439	1,400	74	62,900	1,182
Flounders:												
Gray sole.....	958,300	28,472			9,985,000	475,150					10,943,300	503,622
Lemon sole.....					3,268,700	226,766					3,293,500	228,750
Yellowtail and dab.....	295,200	4,257			16,607,800	377,242	544,600	10,908	24,800	1,984	20,064,500	465,933
Blackback.....	768,100	22,939			5,541,000	217,657	1,181,400	38,587	3,174,400	122,244	10,665,900	401,427
Fluke.....					1,960,400	167,092	91,300	4,551	407,200	33,376	2,458,900	205,019
Unclassified.....	28,100	1,648			747,700	23,348					775,800	24,996
Goosefish.....					16,600	178			20,000	150	36,600	328
Grayfish.....					27,600	528	4,000	50			31,600	578
Haddock.....	2,836,700	96,749	2,000	80	166,583,500	4,072,967	1,200	39	63,400	2,515	169,486,800	4,172,350
Hake.....	7,796,400	79,758	2,000	40	17,274,200	282,682	17,900	248	18,100	566	25,108,600	363,294
Halibut.....	23,000	3,320			2,415,700	253,146			700	77	2,439,400	256,543
Herring, sea.....	49,952,400	266,377			2,894,400	28,010	195,600	2,747			53,042,400	297,134
Herring smelt.....					10,200	167					10,200	167
Hickory shad.....							11,100	174	1,700	85	12,800	259
King whiting or "kingfish".....					11,600	315	2,900	118			14,500	433
Lamprey.....									2,800	300	2,800	300
Launce.....					268,500	3,383					268,500	3,383
Mackerel.....	1,543,800	48,603			21,165,700	886,092	594,300	19,832	77,000	4,702	23,380,800	959,229
Menhaden.....					39,000	357	129,000	856	126,000	1,175	294,000	2,388
Minnnows.....									2,100	700	2,100	700
Mummichog.....									1,000	200	1,000	200
Pollock.....	6,699,800	60,363			30,614,000	459,767	250,100	3,571	2,600	88	37,566,500	523,789
Rosefish.....	140,300	973			58,215,600	886,506					58,355,900	887,479
Salmon.....	24,200	6,002			4,400	287					28,600	6,289
Scup or porgy.....					8,234,500	175,942	1,678,400	32,984	149,900	4,389	10,061,900	213,315

Sea bass.....	900	46			2,345,900	125,714	146,500	10,020	60,100	5,160	2,553,400	140,940
Sea robin.....					55,700	829	102,600	694	22,400	448	180,700	1,971
Shad.....	9,300	378			48,400	2,286	4,800	467	382,900	24,164	445,400	27,295
Sharks.....	35,000	460			88,700	1,989	3,400	55			127,100	2,504
Silversides.....							400	4			400	4
Skates.....					41,100	566	302,100	1,499	56,000	588	399,200	2,653
Skipper or "billfish".....					600	68					600	68
Smelt.....	608,200	66,643	28,000	2,750	1,500	300			1,700	710	639,400	70,403
Spot.....					1,300	17					1,700	25
Squeteagues, or "sea trout," gray.....					128,200	5,843	64,200	4,634	8,500	899	200,900	11,376
Squirrel hake.....									3,600	90	3,600	90
Striped bass.....					120,600	9,771	317,100	24,785	12,800	1,864	450,500	36,420
Sturgeon.....	1,200	92			7,300	662			100	13	9,500	843
Suckers.....	30,500	762							108,900	4,263	139,400	5,025
Swordfish.....	72,300	11,379			1,413,200	229,273	333,500	43,603	49,000	6,685	1,868,000	290,940
Tautog.....	100	4			83,900	3,890	99,500	3,591	20,900	1,543	204,400	9,028
Thimble-eyed mackerel.....							4,700	94			4,700	94
Tilefish.....	21,000	840			15,600	631					36,600	1,471
Tomcod.....	8,200	144									8,200	144
Tuna.....	201,600	5,884			685,000	22,700	42,200	2,991			928,800	31,575
Turbot.....					100	3					100	3
White perch.....					2,200	29	1,000	180			3,200	209
Whiting.....	200	4			21,037,800	239,214	1,017,000	9,986	425,200	9,105	22,480,200	258,309
Wolfish.....	32,900	274			2,524,900	48,454					2,557,800	48,728
Yellow perch.....	300	26									300	26
Total.....	83,578,600	897,085	34,000	2,930	513,858,500	11,998,732	9,422,300	299,040	8,273,600	325,981	615,167,000	13,523,768
SHELLFISH, ETC.												
Crabs:												
Hard.....	609,700	16,723			1,565,700	40,283	332,400	9,973	6,600	424	2,514,400	67,403
Rock.....							1,600	80			1,600	80
Soft and peelers.....							400	150	200	67	600	217
Lobsters.....	7,348,500	1,387,436	155,800	37,511	2,134,900	560,291	773,800	178,083	522,900	140,712	10,935,900	2,304,033
Shrimp.....	200	3			6,800	475					7,000	478
Clams:												
Hard, public ¹	13,200	960			1,300,500	109,332	2,214,400	280,073	202,700	42,768	3,730,800	433,133
Hard, private ¹					10,000	726	66,900	8,205	800	150	77,700	9,081
Razor.....					725,500	18,898					725,500	18,888
Soft, public ²	8,415,000	364,700	474,000	55,600	5,514,100	491,327	170,400	11,693	51,200	6,754	14,624,700	930,074
Soft, private ²					52,500	4,375					52,500	4,375
Surf or skimmer.....					1,700	100	8,000	670			9,700	770
Conchs.....									19,200	815	19,200	815
Mussels, sea.....	10,800	275					5,000	479			15,800	754

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; 12 pounds in Rhode Island; and 12.12 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; 14.15 pounds in Massachusetts; and 20 pounds in Rhode Island and Connecticut.

Fisheries of the New England States, 1937—Continued

CATCH: BY STATES—Continued

Species	Maine		New Hampshire		Massachusetts		Rhode Island		Connecticut		Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
SHELLFISH, ETC—continued												
Oysters, market: †												
Public, spring.....					23,400	\$3,225	37,200	\$4,840	8,100	\$966	68,700	\$14,031
Public, fall.....							69,600	9,557	48,600	5,637	118,100	15,194
Private, spring.....					184,300	67,778	1,841,600	232,723	3,296,000	403,418	5,321,900	703,919
Private, fall.....							2,381,900	323,768	3,524,800	483,111	5,906,700	816,879
Periwinkles and cockles.....	2,400	\$200			9,500	582	60,400	1,632			72,300	2,414
Scallops:												
Bay.....	71,400	10,276			1,292,100	255,617	99,400	19,359	89,600	18,250	1,552,500	303,502
Sea.....	679,400	75,655			4,976,900	553,496	2,700	236			5,659,000	629,387
Squid.....	14,300	92			1,914,300	24,888	1,347,500	16,563	19,100	764	3,295,200	42,307
Sea urchins.....	82,400	440									82,400	440
Irish moss.....					182,400	16,193					182,400	16,193
Kelp.....					120,000	720					120,000	720
Bloodworms.....	236,800	35,701			27,400	6,571					264,000	42,272
Sandworms.....	116,800	16,461			209,900	38,860					326,700	55,321
Starfish.....							12,000	840			12,000	840
Total.....	17,600,700	1,906,922	629,800	\$93,111	20,251,900	\$2,196,727	9,425,100	1,098,924	7,789,800	1,113,836	55,697,300	6,413,520
Grand total.....	101,179,300	2,806,007	663,800	96,041	534,110,400	14,197,459	18,847,400	1,397,964	16,063,400	1,439,817	670,864,300	19,937,288

† Statistics on oysters used in this table are based on yields of 6.57 pounds of meats per bushel in Massachusetts; 7.05 pounds in Rhode Island; and 7.7 pounds in Connecticut.

NOTE.—The above includes the catch made by New England craft in the southern trawl fishery.

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

162187-40-7

Product	Maine		New Hampshire		Massachusetts		Rhode Island		Connecticut		Total	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Crabs:												
Hard.....number	2,024,204	\$16,723			6,262,800	\$40,283	997,200	\$9,973	18,480	\$424	9,302,684	\$67,403
Soft and peelers.....do							1,600	150	800	67	2,400	217
Rock.....do							16,000	80			16,000	80
Clams:												
Hard, public.....bushels	1,200	960			118,120	109,332	184,533	280,073	16,724	42,768	320,577	433,133
Hard, private.....do					908	726	5,575	8,205	66	150	6,549	9,081
Razor.....do					24,023	18,888					24,023	18,888
Soft, public.....do	561,000	364,700	31,600	\$55,690	389,689	491,327	8,520	11,693	2,560	6,754	993,369	930,074
Soft, private.....do					3,710	4,375					3,710	4,375
Surf or skimmer.....do					100	100	667	670			767	770
Conchs.....do									972	815	972	815
Mussels, sea.....do	900	275					385	479			1,285	754
Oysters, market:												
Public, spring.....do					3,562	8,225	5,277	4,840	1,952	966	9,891	14,031
Public, fall.....do							9,858	9,557	6,312	5,637	16,170	15,194
Private, spring.....do					28,052	67,778	261,220	232,723	428,052	403,418	717,324	703,919
Private, fall.....do							337,858	323,768	457,766	493,111	795,624	816,879
Periwinkles and cockles.....do	133	200			528	582	3,356	1,632			4,017	2,414
Scallops:												
Bay.....do	11,900	10,276			212,866	255,617	16,058	19,359	14,452	18,250	255,276	303,502
Sea.....do	113,233	75,655			829,483	553,496	450	233			943,166	629,387

Fisheries of the New England States, 1937—Continued

SEED OYSTER FISHERY

Item	Rhode Island		Connecticut		Total	
OPERATING UNITS						
	<i>Number</i>		<i>Number</i>		<i>Number</i>	
Fishermen:						
On vessels.....	4		186		189	
On boats and shore:						
Regular.....	2		160		162	
Casual.....	2		69		71	
Total.....	8		414		422	
Vessels:						
Steam.....			3		3	
Net tonnage.....			279		279	
Motor.....	1		19		20	
Net tonnage.....	19		442		461	
Sail.....			23		23	
Net tonnage.....			169		169	
Total vessels.....	1		45		46	
Total net tonnage.....	19		890		909	
Boats:						
Motor.....	2		1		3	
Other.....	2		109		111	
Apparatus:						
Dredges.....	2		191		193	
Yards at mouth.....	3		169		172	
Tongs.....	4		93		97	
Rakes.....			11		11	
CATCH						
Oyster, seed:	<i>Bushels</i>	<i>Value</i>	<i>Bushels</i>	<i>Value</i>	<i>Bushels</i>	<i>Value</i>
Public, spring.....	12,000	\$12,000	50,945	\$35,685	62,945	\$47,685
Public, fall.....	915	549	42,172	29,307	43,087	29,856
Private, spring.....			284,800	278,700	284,800	278,700
Private, fall.....			63,727	60,492	63,727	60,492
Total.....	12,915	12,549	441,644	404,184	454,559	416,733

NOTE.—Of the total number of person fishing for seed oysters 225 are duplicated among those fishing for market oysters or other species. Similarly the following craft and gear are duplicated: 8 vessels, 3 motor-boats, 55 other boats, 16 dredges, and 4 tongs.

Industries related to the fisheries of the New England States, 1937

OPERATING UNITS, SALARIES, AND WAGES

Item	Maine and New Hampshire	Massachusetts	Connecticut	Rhode Island	Total
Transporting:					
Persons engaged:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
On vessels.....	130	35	19	18	202
On boats.....	5	27			32
Total.....	135	62	19	18	234
Vessels, motor.....	65	8	9	5	87
Net tonnage.....	729	205	311	49	1,294
Boats.....	3	15			18
Wholesale and manufacturing:					
Establishments.....	146	193	34	27	400
Persons engaged:					
Proprietors.....	125	155	29	23	332
Salaried employees.....	177	554	40	31	802
Wage earners:					
Average for season.....	5,901	4,312	482	293	10,988
Average for year.....	2,425	3,750	186	198	6,559
Paid to salaried employees.....	\$269,336	\$1,428,009	\$115,921	\$68,779	\$1,882,045
Paid to wage earners.....	\$1,391,704	\$4,053,018	\$200,122	\$178,590	\$5,823,434
Total salaries and wages.....	\$1,661,040	\$5,481,027	\$316,043	\$247,369	\$7,705,479
Fishermen manufacturing.....	942	2,219	9	246	3,416

Industries related to the fisheries of the New England States, 1937—Continued

PRODUCTS MANUFACTURED

Item	Maine ¹		Massachusetts		Rhode Island		Connecticut	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
By manufacturing establishments:								
Alewives, salted, round..... pounds.	1,450,900	\$40,728						
Cod:								
Fresh fillets..... do.....	169,309	18,874	6,777,546	\$751,001				
Fresh sticks..... do.....	251,060	25,469						
Frozen fillets..... do.....	(²)	(²)	10,920,784	920,238				
Salted:								
Green ³ do.....	1,034,300	44,832						
Dry..... do.....	41,500	2,760	3,207,750	216,935				
Boneless, including absolutely boneless..... do.....	245,021	32,296	7,475,566	1,313,272				
Smoked fillets..... do.....	108,111	13,866	685,591	90,631				
Oil, cod..... gallons.....	4,089	1,553	(²)	(²)				
Oil, cod liver..... do.....	16,369	10,566	257,625	153,824				
Cusk:								
Fresh fillets..... pounds.....	68,928	7,875	850,340	96,897				
Fresh sticks..... do.....	487,319	54,670						
Frozen fillets..... do.....	(²)	(²)	100,434	13,645				
Salted, green ³ do.....	16,800	725	(²)	(²)				
Smoked fillets..... do.....	71,700	8,430	442,163	57,683				
Flounders:								
Fresh fillets..... do.....	50,152	6,648	1,841,986	262,889				
Frozen fillets..... do.....	50,130	6,015	1,339,714	221,996				
Haddock:								
Fresh fillets..... do.....	115,504	19,831	14,193,636	1,686,982				
Fresh sticks..... do.....	34,472	6,105						
Frozen fillets..... do.....	(²)	(²)	22,686,862	2,063,746				
Finnan haddie..... do.....	200,900	25,275	553,789	63,796				
Hake:								
Fresh fillets..... do.....	179,568	18,457	1,590,364	153,353				
Fresh sticks..... do.....	457,799	49,772						
Frozen fillets..... do.....	(²)	(²)	431,285	28,407				
Salted:								
Green ³ do.....	1,198,275	38,915						
Dry..... do.....			1,664,816	76,704				
Boneless..... do.....	202,800	15,266	(²)	(²)				

See footnotes at end of table.

Industries related to the fisheries of the New England States, 1937—Continued

PRODUCTS MANUFACTURED—Continued

Item	Maine		Massachusetts		Rhode Island		Connecticut	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
By manufacturing establishments—Continued.								
Herring, sea:								
Salted:								
Split.....	pounds	232,800						
Unclassified.....	do	97,600	1,005,042	\$61,972				
Pickled in vinegar.....	do	300,400	(?)	(?)				
Smoked:								
Bloaters:								
Hard.....	do	146,220		(?)	(?)			
Soft.....	do	21,768						
Boneless.....	do	2,095,372						
Lengthwise.....	do	84,845						
Medium scaled.....	do	262,612						
Kippered.....	do		80,972	12,289				
Canned "sardines".....	standard cases	1,680,241	4,998,373					
Dry scrap and meal.....	tons	3,006	91,735					
Oil.....	gallons	63,853	9,207					
Mackerel:								
Fresh fillets.....	pounds			227,640	20,386			
Frozen fillets.....	do			111,365	18,407			
Salted:								
Fillets.....	do			678,876	77,714			
Split.....	do			1,120,051	113,049			
Poilock:								
Fresh fillets.....	do	114,496	8,741	1,364,957	111,201			
Fresh sticks.....	do	68,520	6,081					
Frozen fillets.....	do	376,066	20,007	11,241,927	690,594			
Salted:								
Green.....	do	432,306	10,812					
Dry.....	do	71,000	2,405	(?)	(?)			
Rosefish:								
Fresh fillets.....	do	(?)	(?)	671,112	73,725			
Frozen fillets.....	do	(?)	(?)	14,792,908	1,415,418			
Whiting:								
Fresh fillets.....	do			458,828	32,188			
Frozen fillets.....	do			922,065	49,710			
Wolfish, frozen fillets.....	do			69,545	6,172			
Crab meat, packaged, fresh-cooked.....	do	116,350	49,158	182,078	68,571			
Lobster meat, packaged, fresh-cooked.....	do	(?)	(?)	147,065	158,040			
Clams, hard, fresh-shucked.....	gallons			(?)	(?)	3,710	\$5,857	
Clams, soft:								
Fresh-shucked.....	do	123,760	137,602	343,171	459,629	104,000	11,140	

Canned:									
Whole.....	standard cases	134,897	487,266						
Chowder.....	do	68,439	210,796	(9)	(9)				
Juice, bouillon, and cocktail.....	do	14,115	25,769						
Oysters, fresh-shucked.....	gallons					303,765	677,067	325,578	\$628,867
Unclassified products:									
Fillets, fresh and frozen.....	pounds	¹ 180,815	¹ 19,252	⁶ 59,420	⁶ 12,639				
Sticks and steaks, fresh and frozen.....	do			⁷ 1,227,140	⁷ 95,737				
Salted.....	do	(9)	(9)	⁸ 2,156,970	⁸ 186,289				
Smoked.....	do	¹⁰ 62,000	¹⁰ 4,770	¹¹ 1,177,987	¹¹ 222,980	(9)	(9)	(9)	(9)
Canned:									
Fish cakes, balls, etc.....	standard cases	12,476	70,421	89,684	650,149				
Fish flakes.....	do	(12)	(12)	13,691	130,202				
Cat and dog food.....	do			41,982	88,171				
Other.....	do	¹² 27,059	¹² 239,696	¹⁴ 27,164	¹⁴ 179,687	(9)	(9)		
Meal, groundfish.....	tons	(9)	(9)	13,928	388,245				
Oil, miscellaneous.....	gallons			¹⁵ 42,386	¹⁵ 16,397				
Oil, miscellaneous liver.....	do			¹⁶ 11,318	¹⁶ 460,195				
Miscellaneous.....			¹⁷ 357,712		¹⁷ 1,131,232		¹⁹ 116,508		¹⁸ 46,250
Total.....			7,443,271		15,109,987		810,572		675,117
By fishermen:									
Alewives, smoked.....	pounds	171,200	9,230	5,000	300				
Cod:									
Salted, green ¹	do	80,000	2,800	252,000	7,506				
Salted, dry.....	do	1,600	83						
Cusk, salted, green ²	do			400	8				
Hake, salted, green ³	do			6,400	113				
Herring, sea, smoked:									
Boneless.....	do	1,000	144						
Medium scaled.....	do	780	45						
Pollock:									
Salted, green ⁴	do			2,100	39				
Salted, dry.....	do	4,000	310						
Crab meat, packaged, fresh-cooked.....	do	2,730	956			2,000	800		
Clams, hard, fresh-shucked.....	gallons					1,500	2,000		
Clams, razor, fresh-shucked.....	do			87,467	15,107				
Clams, soft:									
Fresh shucked.....	do	⁴ 75,577	⁴ 57,971	25,252	27,536			15	23
Steamed.....	pounds	157,220	14,801						
Oysters, fresh-shucked.....	gallons			4,100	7,160			2,464	3,230

See footnotes at end of table.

Industries related to the fisheries of the New England States, 1937—Continued

PRODUCTS MANUFACTURED—Continued

Item	Maine		Massachusetts		Rhode Island		Connecticut	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
By fishermen—Continued.								
Scallops:								
Bay, fresh-shucked	gallons		131,708	\$391,396	8,600	\$27,584	42	\$147
Sea, fresh-shucked	do	33,218	487,321	468,160	20,400	17,340		
Total		129,444		917,325		48,724		3,600
Grand total		7,572,715		16,027,312		859,296		678,617

¹ A small quantity of manufactured products produced in New Hampshire have been included with those of Maine.

² This item has been included under "Unclassified products."

³ This item is usually an intermediate product, and although included in the total, may be shown in its final stage of processing in this or another State.

⁴ Includes the New Hampshire production.

⁵ Includes fresh fillets of rosefish, and frozen fillets of cod, cusk, haddock, hake, and rosefish.

⁶ Includes fresh fillets of halibut, red snapper, striped bass, and wolfish; and frozen fillets of halibut and salmon.

⁷ Includes fresh steaks of cod, haddock, mackerel, halibut, pollock, salmon, and swordfish; frozen steaks of cod, halibut, wolfish, pollock, salmon, and swordfish; and fresh whiting sticks.

⁸ The production of this item has been included under "Miscellaneous."

⁹ Includes salted fillets of cod and hake; green-salted cusk and haddock; dry-salted pollock and haddock, salted boneless hake; and pickled and spiced alewives.

¹⁰ Includes smoked fillets of hake, herring, and pollock.

¹¹ Includes smoked fillets of haddock and hake; smoked alewives, butterfish, carp, herring, and herring bloomers, lake trout, mackerel, salmon, shad, and whitefish.

¹² This item has been included under "Other canned products."

¹³ Includes canned finnan haddie, alewife roe, clam cakes, fish chowder, and fish flakes.

¹⁴ Includes canned tuna, mackerel, clam products, finnan haddie, haddock chowder, and miscellaneous canned groundfish products.

¹⁵ Includes rosefish, blackfish, and cod oils.

¹⁶ Includes tuna, halibut, sablefish, swordfish, and mixed liver oils.

¹⁷ Includes fresh-cooked lobster meat; salted boneless cusk; green-salted haddock; herring scrap and meal; groundfish, clam, and miscellaneous fish meals; marine-shell buttons; pearl essence; and kelp products.

¹⁸ Includes fresh-shucked clams and scallops; herring pickled in vinegar; miscellaneous scrap and meal; liver pressings; glue; isinglass; and marine-shell products.

¹⁹ Includes fresh-cooked crab and lobster meat; smoked finnan haddie; canned hard clam chowder; and marine-shell products.

²⁰ Includes smoked butterfish, carp, chub, cisco, salmon and spoonbill cat; and poultry feed from crushed marine-shells.

NOTE.—The total value of manufactured products for the New England States was as follows: By manufacturing establishments, \$24,038,947; and by fishermen, \$1,068,993. Some of the above products may have been manufactured from 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 in the preparation of fishermen's manufactured products, 3,371 have also been included as fishermen, and 16 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, 1937

OPERATING UNITS: BY GEAR

Item	Purse seines		Haul seines	Stop seines	Gill nets		
	Mack-erel	Other			Anchor	Drift	Stake
	Number	Number	Number	Number	Number	Number	Number
Fishermen:	61	8		120	87	7	4
On vessels.....							
On boats and shore:							
Regular.....	7	21	37	74	50	28	1
Casual.....			33	3	3	42	27
Total	68	29	70	197	140	77	32
Vessels, motor:							
5 to 10 tons.....	11	2		23	13	1	
11 to 20 tons.....	1			6	3	1	1
21 to 30 tons.....				1			
Total	12	2		30	16	2	1
Net tonnage.....	98	16		263	148	23	12
Boats:							
Motor.....	2	7	28	22	21	26	
Other.....	4	10	31	58		31	25
Total	18	2		97			
Accessory boats							
Number.....	14	9	31	78	785	500	163
Length, yards.....	5,300	1,990	3,030				
Square yards.....				35,680	278,631	112,373	29,238

Item	Lines		Float- ing traps	Weirs	Fyke nets	Dip nets	Bag nets	Otter trawls	Box traps
	Hand	Trawl							
	Number	Number	Number	Number	Number	Number	Number	Number	Number
Fishermen:	14	145						69	
On vessels.....									
On boats and shore:									
Regular.....	278	326	32	242	4	31	58	58	
Casual.....	872	58	3	78	5	57	54	2	17
Total	1,164	529	35	320	5	61	85	129	17
Vessels, motor:									
5 to 10 tons.....	5	15						14	
11 to 20 tons.....		8						7	
21 to 30 tons.....		1							
31 to 40 tons.....		1							
51 to 60 tons.....		1							
Total	5	26						21	
Net tonnage.....	30	340						208	
Boats:									
Motor.....	264	250	15	35				33	
Other.....	69		29	322	5		16		7
Total	333	250	44	677	5		16	33	7
Accessory boats		62							
Apparatus:									
Number.....	4,921	15,961	22	216	27	60	124	54	11
Yards at mouth.....								1,288	
Hooks, baits, or snoods.....	5,520	858,990							

Fisheries of Maine, 1937—Continued
OPERATING UNITS: BY GEAR—Continued

Item	Pots			Harpoons	Spears	Dredges, scallop	Rakes, other than for oysters	Hoes	By hand, other than for oysters	Total, exclusive of duplication
	Crab	Eel	Lobster							
	Number	Number	Number 20	Number 38	Number	Number 33	Number	Number	Number	Number
Fishermen:										482
On vessels.....										
On boats and shore:										
Regular.....	4	3	1,884	81		105	3	622	8	2,606
Casual.....		4	718	29	5	59		1,482	6	3,211
Total.....	4	7	2,622	148	5	197	3	2,104	14	6,299
Vessels, motor:										
5 to 10 tons.....			18	3		5				86
11 to 20 tons.....				2		1				22
21 to 30 tons.....										2
31 to 40 tons.....						1				2
41 to 60 tons.....				1						1
Total.....			18	6		7				113
Net tonnage.....			109	108		87				1,115
Boats:										
Motor.....	4		1,812	63		105				2,083
Other.....		6	643		5		3	862	10	1,907
Accessory boats.....				9						178
Apparatus:										
Number.....	160	120	185,339	69	5	134	3	2,104		
Yards at mouth.....						194				

CATCH: BY GEAR

Species	Purse seines				Haul seines		Stop seines	
	Mackerel		Other		Pounds	Value	Pounds	Value
	Pounds	Value	Pounds	Value				
Alewives.....	325,600	\$1,707	64,200	\$411	600	\$25		
Herring, sea.....	225,200	1,454	496,500	3,324			28,266,500	\$161,577
Mackerel.....	614,500	21,916	37,400	1,619				
Pollock.....	20,000	160	892,000	5,619				
Sharks.....	300	4						
Smelt.....					112,600	9,697		
Total.....	1,185,600	25,231	1,490,100	10,973	113,200	9,722	28,266,500	161,577

Species	Gill nets						Lines, hand	
	Anchor		Drift		Stake		Pounds	Value
	Pounds	Value	Pounds	Value	Pounds	Value		
Cod.....	2,532,600	\$69,639			94,400	\$2,693	794,200	\$12,052
Cusk.....	6,800	99					3,800	69
Flounders:								
Gray sole.....	1,100	12					100	2
Blackback.....	2,700	28					1,000	85
Yellowtail and dab.....	2,200	24					80,700	1,635
Unclassified.....							90,600	847
Haddock.....	409,200	13,285					2,900	413
Hake.....	1,116,100	15,258					3,800	104
Halibut.....	100	10					1,351,900	10,332
Mackerel.....	300	24	123,500	\$6,079				
Pollock.....	2,884,800	32,279			200,000	2,015		
Rosefish.....	6,900	39						
Salmon.....					400	80		
Sea bass.....	800	32						
Shad.....	3,300	166			1,000	112		
Sharks.....	33,400	442	100	2	900	9		
Smelt.....			18,500	1,980	45,500	5,290	231,700	28,197
Sturgeon.....	500	41						
Tautog.....	100	4						
Whiting.....	100	2	100	2				
Wolfish.....	1,000	8					700	6
Lobsters.....	100	24						
Total.....	7,001,600	131,416	142,200	8,063	342,200	10,199	2,531,400	53,742

Fisheries of Maine, 1937—Continued

CATCH: BY GEAR—Continued

Species	Lines, trawl		Floating traps		Weirs		Fyke nets	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives			9,800	\$613	509,500	\$2,280		
Butterfish								
Cod	3,273,200	\$56,080						
Cusk	1,539,800	28,610						
Eels, common							300	\$23
Flounders:								
Gray sole	1,000	28						
Blackback	600	5	10,300	71				
Yellowtail and dab	4,000	50						
Unclassified	7,000	590						
Haddock	1,297,500	43,871						
Hake	5,651,400	54,565						
Halibut	18,600	2,706						
Herring, sea			383,300	2,466	20,580,900	97,556		
Mackerel			690,600	16,933	73,700	1,928		
Pollock	1,225,900	9,056	22,500	149	84,500	640		
Rosefish	7,700	48						
Salmon			9,400	2,073	12,900	3,549		
Sea bass					100	14		
Shad					5,000	100		
Sharks	200	2						
Smolt					28,900	3,218		
Sturgeon	600	48	100	3				
Suckers							30,500	762
Tilfish	21,000	840					2,700	54
Tomcod							300	26
Wolfish	9,300	78						
Yellow perch			14,300	92				
Squid								
Total	13,057,800	194,577	1,140,300	22,400	21,295,500	109,265	33,800	865

Species	Dip nets		Bag nets		Otter trawls		Box traps	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives	1,918,100	\$8,533						
Butterfish					100	\$7		
Cod					355,100	6,517		
Cusk					3,000	47		
Eels, common							40,500	\$3,708
Flounders:								
Gray sole					956,200	28,432		
Yellowtail and dab					288,900	4,181		
Blackback					755,500	22,835		
Unclassified					20,100	973		
Haddock					1,079,300	37,958		
Hake					938,300	9,088		
Halibut					1,400	191		
Pollock					18,200	123		
Rosefish					125,700	886		
Salmon	1,500	300						
Sharks					100	1		
Smolt	22,800	2,356	148,200	\$15,905				
Tomcod	4,000	45	1,500	45				
Wolfish					21,900	182		
Shrimp					200	3		
Total	1,946,400	9,234	149,700	15,960	4,564,000	111,424	40,500	3,708

Species	Pots						Harpoons	
	Crab		Eel		Lobster		Pounds	Value
	Pounds	Value	Pounds	Value	Pounds	Value		
Eels, common			15,500	\$1,325			72,300	\$11,879
Swordfish							201,600	5,884
Tuna					516,400	\$14,623		
Crabs, hard	83,300	\$2,100			7,348,400	1,387,412		
Lobsters								
Total	83,300	2,100	15,500	1,325	7,864,800	1,402,035	273,900	17,263

Fisheries of Maine, 1937—Continued

CATCH: BY GEAR—Continued

Species	Spears		Dredges, scallop		Rakes		Hoes		By hand	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Eels, common.....	3,000	\$270								
Clams:										
Hard, public.....							13,200	\$960		
Soft, public.....							8,415,000	364,700		
Mussels, sea.....					7,200	\$175	3,600	100		
Periwinkles and cockles.....									2,400	\$200
Scallops:										
Bay.....			71,400	\$10,276						
Sea.....			679,400	75,655						
Sea urchins.....									82,400	440
Bloodworms.....							236,800	35,701		
Sandworms.....							116,800	16,461		
Total.....	3,000	270	750,800	85,931	7,200	175	8,785,200	417,922	84,800	640

OPERATING UNITS: BY COUNTIES

Item	Cum- berland	Han- cock	Kenne- bec	Knox	Lin- coln	Penob- scot	Saga- dahoc	Waldo	Wash- ington	York
Fishermen:										
On vessels.....	Number 239	Number 36	Number	Number 91	Number 67	Number	Number 6	Number	Number 28	Number 15
On boats and shore:										
Regular.....	407	605		431	312		73	42	569	167
Casual.....	314	953	2	325	440	12	262	61	743	99
Total.....	960	1,594	2	847	819	12	341	103	1,340	281
Vessels, motor:										
5 to 10 tons.....	26	11		26	12		2		6	3
11 to 20 tons.....	11	2		4	4				1	
21 to 30 tons.....	2									
31 to 40 tons.....	1			1						
51 to 60 tons.....	1									
Total.....	41	13		31	16		2		7	3
Net tonnage.....	515	110		259	138		15		55	23
Boats:										
Motor.....	330	489		450	268		55	9	309	173
Other.....	229	404	2	187	281	12	57	51	631	63
Accessory boats.....	96	8		24	24				19	3
Apparatus:										
Purse seines:										
Mackerel.....	1			2	8					3
Length, yards.....	360			610	3,520					820
Other.....		1		2	5				1	
Length, yards.....		250		280	1,360				100	
Haul seines.....	29	1		1						
Length, yards.....	2,900	30		100						
Stop seines.....	13	26		9	15		2		13	
Length, yards.....	11,650	6,060		2,900	7,130		1,100		6,820	
Gill nets:										
Anchor.....	460	28			287				10	
Square yards.....	206,004	15,232			54,060				1,335	
Drift.....	228	22		6					143	101
Square yards.....	64,128	1,465		1,080					18,180	27,520
Stake.....					36	50		9	68	
Square yards.....					14,158	3,840		540	10,700	
Lines:										
Hand.....	73	2,166		186	1,065		1,268		143	
Hooks.....	142	2,247		372	1,127		1,351		281	
Trawl.....	5,662	3,207		2,070	1,691		1,270		1,871	190
Hooks.....	299,000	204,620		103,500	86,960		66,750		85,670	9,500
Floating traps.....	5	1			4					
Weirs.....		83		19	3			16	95	
Fyke nets.....			18							
Dip nets.....		5		15	5		2		32	1

Fisheries of Maine, 1937—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Cum-berland	Han-cock	Kenne-bec	Knox	Lin-cola	Penob-scot	Saga-doboc	Waldo	Wash-ington	York
Apparatus—Con.	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number
Bag nets	12	12						55	57	
Otter trawls	13	22		11	7				1	
Yards at mouth	291	553		267	154				23	
Box traps		2		3					6	
Pots:										
Crab	160							60		10
Eel					60					
Lobster	25,387	42,339		40,597	29,234		4,602	470	29,117	13,593
Harpoons	43				10		16			
Spears				3	2					
Dredges, scallop	30	81		14					9	
Yards at mouth	44	104		32					14	
Rakes, other than for oysters	3									
Hoes	376	493		170	204		30	12	739	50

CATCH: BY COUNTIES

Species	Cumberland		Hancock		Kennebec	
	Pounds	Value	Pounds	Value	Pounds	Value
Alewives	10,600	\$132				
Butterfish	8,700	225				
Cod	3,217,400	86,194	1,101,600	14,216		
Cusk	1,031,600	20,334		38,500	513	
Eels, common				6,000	540	200
Flounders:						
Gray sole	325,000	10,498	134,000	3,621		
Yellowtail and dab	125,100	1,678				
Blackback	32,400	893	572,400	18,061		
Unclassified	2,800	138				
Haddock	1,016,000	37,692	732,800	22,623		
Hake	3,330,400	44,732	1,968,500	11,464		
Halibut	7,600	1,125		5,100	712	
Herring, sea	11,515,900	73,596	10,053,600	49,013		
Mackerel	386,200	14,064		7,800	270	
Pollock	3,212,500	35,067	972,000	7,092		
Rosefish	81,700	507				
Salmon	800	173	7,800	2,250		
Sea bass	800	32				
Shad	3,300	166				
Sharks	33,800	447				
Smelt	98,100	8,371	141,700	14,266		
turgeon	1,200	92				
uckers					20,000	800
Swordfish	72,300	11,379				
Tautog	100	4				
Tilfish	21,000	840				
Tomcod					2,200	44
Tuna	62,800	1,671				
Whiting	200	4				
Wolfish	25,300	204				
Yellow perch					200	16
Crabs, hard	426,700	11,960				
Lobsters	1,119,700	219,342	1,641,000	319,839		
Shrimp	200	3				
Clams:						
Hard, public	13,200	960				
Soft, public	1,708,400	105,702	927,800	39,439		
Mussels, sea	10,800	275				
Scallops:						
Bay			71,400	10,276		
Sea	35,400	5,404	171,800	25,824		
Squid	13,000	78				
Bloodworms	96,700	14,800				
Sandworms	500	90				
Total	28,044,200	708,872	19,097,000	541,890	22,600	578

Fisheries of Maine, 1937—Continued

CATCH: BY COUNTIES—Continued

Species	Knox		Lincoln		Penobscot	
	Pounds	Value	Pounds	Value	Pounds	Value
Alewives.....	480,800	\$1,533	689,400	\$3,219		
Cod.....	888,000	14,102	691,100	15,429		
Cusk.....	53,300	862	372,800	4,115		
Eels, common.....	3,200	288	8,000	720		
Flounders:						
Gray sole.....	393,600	12,546	104,700	2,807		
Yellowtail and dab.....	146,400	2,238	18,500	238		
Blackback.....	144,700	3,193	9,300	121		
Haddock.....	679,100	22,265	196,900	7,109		
Hake.....	1,067,200	9,743	1,045,600	10,310		
Halibut.....	4,600	674	1,100	178		
Herring, sea.....	7,368,400	39,755	5,261,000	30,983		
Mackerel.....	111,100	3,205	616,100	21,229		
Pollock.....	1,082,600	6,690	379,700	3,776		
Rosefish.....	15,500	158	43,100	308		
Salmon.....			4,500	900		
Shad.....			1,000	112		
Sharks.....	300	4	900	9		
Smelt.....	34,500	3,342	54,400	7,300	8,400	\$835
Tuna.....			5,000	150		
Wolfish.....	5,200	52	1,300	8		
Crabs, hard.....	28,000	620	128,300	3,650		
Lobsters.....	1,878,300	318,341	1,000,900	182,852		
Clams, soft, public.....	790,000	25,256	315,100	10,173		
Scallops, sea.....	463,600	42,784				
Sea urchins.....			82,400	440		
Bloodworms.....	25,500	3,821	114,400	17,080		
Sandworms.....	21,200	2,972	95,100	12,399		
Total.....	15,594,900	514,444	11,240,600	336,615	8,400	835

Species	Sagadahoc		Waldo		Washington		York	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives.....	104,000	\$600			790,000	\$2,056	225,000	\$1,125
Butterfish.....	6,200	395						
Cod.....	152,300	2,938			1,005,700	13,844	13,400	258
Cusk.....	18,300	342			33,500	557	4,900	102
Eels, common.....	100	5	8,000	\$560	32,300	2,970	1,500	225
Flounders:								
Yellowtail and dab.....					5,000	100	200	3
Blackback.....	10,300	71						
Unclassified.....					25,300	1,510		
Haddock.....	23,800	770			175,600	5,677	12,500	613
Hake.....	162,700	1,542			221,700	1,735	15,300	232
Halibut.....	800	103			3,800	514	100	14
Herring, sea.....	645,500	3,229	780,000	3,400	14,338,000	66,401		
Mackerel.....	335,100	7,812			6,000	208	81,500	1,815
Pollock.....	103,100	789			948,300	6,928	1,700	21
Salmon.....	2,400	580	5,600	1,469	3,100	630		
Sea bass.....					100	14		
Shad.....					5,000	100		
Smelt.....	68,500	10,005	87,200	8,770	114,800	13,654	800	100
Suckers.....	10,500	262						
Tomcod.....	500	10	1,500	45	4,000	45		
Tuna.....	133,800	4,063						
Wolfish.....	900	8			200	2		
Yellow perch.....	100	10						
Crabs, hard.....	26,700	493						
Lobsters.....	221,900	40,562	12,200	2,787	756,100	150,887	718,400	152,826
Clams, soft, public.....	189,000	8,640	63,000	8,200	4,075,700	143,000	376,000	24,290
Periwinkles and cockles.....					2,400	200		
Scallops, sea.....					8,600	1,643		
Squid.....	1,300	14						
Total.....	2,217,800	83,243	957,500	25,231	22,545,000	412,675	1,451,300	181,624

NEW HAMPSHIRE

Fisheries of New Hampshire, 1937¹

OPERATING UNITS: BY GEAR

Item	Lines		Bag nets	Pots, lobster	Hoes	Total, exclusive of duplication
	Hand	Trawl				
Fishermen, on boats and shore:	Number	Number	Number	Number	Number	Number
Regular.....	125	1	20	34	96	119
Casual.....		1		45	10	53
Total.....	125	2	20	79	106	172
Boats:		2		45		45
Motor.....				32	36	64
Other.....						
Apparatus:	750	50	31	3,459	105	
Number.....	750	2,500				
Hooks.....						

CATCH: BY GEAR

Species	Lines				Bag nets		Pots		Hoes	
	Hand		Trawl		Pounds	Value	Pounds	Value	Pounds	Value
	Pounds	Value	Pounds	Value						
Cod.....			1,000	\$30						
Cusk.....			1,000	30						
Haddock.....			2,000	80						
Hake.....			2,000	40						
Smelt.....	20,000	\$2,000			8,000	\$750				
Lobsters.....							155,800	\$37,511		
Clams, soft, public.....									474,000	\$55,600
Total.....	20,000	2,000	6,000	180	8,000	750	155,800	37,511	474,000	55,600

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

MASSACHUSETTS

Fisheries of Massachusetts, 1937

OPERATING UNITS: BY GEAR

Item	Purse seines		Haul seines	Gill nets		Lines		Pound nets
	Mack-erel	Other		Anchor	Drift	Hand	Trawl	
Fishermen:	Number	Number	Number	Number	Number	Number	Number	Number
On vessels.....	775	26		178	226	12	733	
On boats and shore:								
Regular.....	44		28	65	68	175	434	149
Casual.....			7	2	6	96	4	1
Total.....	822	26	35	245	300	283	1,171	150
Vessels, motor:								
5 to 10 tons.....	3			3	4	2		3
11 to 20 tons.....	22			8	17	2		21
21 to 30 tons.....	9			10	6			2
31 to 40 tons.....	8	1		1	1			2
41 to 50 tons.....	11	1		2	1			4
51 to 60 tons.....	7				1			8
61 to 70 tons.....	7							9
71 to 80 tons.....	1							7
91 to 100 tons.....								2
121 to 130 tons.....								1
Total.....	68	2		24	30	4	54	
Net tonnage.....	2,231	80		499	556	40	2,206	

Fisheries of Massachusetts, 1937—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Purse seines		Haul seines	Gill nets		Lines		Pound nets
	Mack-erel	Other		Anchor	Drift	Hand	Trawl	
Boats:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Motor.....	9		4	27	28	137	126	47
Other.....	9		10	4		55	31	59
Accessory boats.....	68	2					337	
Apparatus:								
Number.....	77	2	14	1,475	3,599	402	29,020	87
Length, yards.....	36,002	1,000	488					
Square yards.....				511,536	1,085,581			
Hooks, baits, or snoods.....						1,061	1,583,818	
Item	Float- ing traps	Weirs	Fyke nets	Dip nets	Push nets	Otter trawls	Pots	
							Crab	Eel
Fishermen:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
On vessels.....				22		2,865		
On boats and shore:								
Regular.....	104	5	7	164		105	89	25
Casual.....	6	2	9	108	117	3	14	12
Total.....	110	7	16	294	117	2,973	103	37
Vessels:								
Steam:								
91 to 100 tons.....						7		
111 to 120 tons.....						2		
131 to 140 tons.....						1		
161 to 170 tons.....						2		
171 to 180 tons.....						1		
181 to 190 tons.....						2		
201 to 210 tons.....						10		
211 to 220 tons.....						2		
241 to 250 tons.....						1		
261 to 270 tons.....						1		
Total.....						29		
Net tonnage.....						4,942		
Motor:								
5 to 10 tons.....						32		
11 to 20 tons.....				3		87		
21 to 30 tons.....						25		
31 to 40 tons.....				1		22		
41 to 50 tons.....						22		
51 to 60 tons.....						21		
61 to 70 tons.....						13		
71 to 80 tons.....						7		
81 to 90 tons.....						8		
91 to 100 tons.....						3		
101 to 110 tons.....						5		
111 to 120 tons.....						12		
121 to 130 tons.....						4		
141 to 150 tons.....						4		
151 to 160 tons.....						1		
161 to 170 tons.....						3		
171 to 180 tons.....						3		
181 to 190 tons.....						1		
Total.....				4		273		
Net tonnage.....				83		11,760		
Total vessels.....				4		302		
Total net tonnage.....				83		16,702		
Boats:								
Motor.....	33		2	68		44	75	16
Other.....	51		10	105	112		3	20
Apparatus:								
Number.....	50	4	18	203	117	346	3,470	1,105
Yards at mouth.....						10,399		

Fisheries of Massachusetts, 1937—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Pots—Continued		Harpoons	Spears	Dredges		
	Lobster	Periwinkle and cockle			Clam	Oyster	Scallop
Fishermen:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
On vessels.....	2		549		24	4	273
On boats and shore:							
Regular.....	1,036	4	44	10	91	35	840
Casual.....	61	1		12	9		825
Total	1,099	5	593	22	124	39	1,938
Vessels, motor:							
5 to 10 tons.....	1		7		2		4
11 to 20 tons.....			19		4	1	17
21 to 30 tons.....			6				7
31 to 40 tons.....			3				5
41 to 50 tons.....			7				1
51 to 60 tons.....			8				2
61 to 70 tons.....			6				
71 to 80 tons.....			6				
91 to 100 tons.....			1				
Total	1		63		6	1	36
Net tonnage	5		2,335		69	12	782
Boats:							
Motor.....	795	1	11		64	18	640
Other.....	86	4		14			196
Accessory boats			68				
Apparatus:							
Number	72,290	80	74	22	94	35	2,857
Yards at mouth					39	35	2,455

Item	Tongs		Rakes, other than for oysters	Forks	Hoes	By hand, other than for oysters	Total, exclusive of duplication
	Oyster	Other					
Fishermen:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
On vessels.....							4,258
On boats and shore:							
Regular.....	27	87	384	117	861	1	3,614
Casual.....	10	74	439	346	921	78	2,609
Total	37	1,61	823	463	1,782	79	10,481
Vessels:							
Steam:							
91 to 100 tons.....							7
111 to 120 tons.....							2
131 to 140 tons.....							1
161 to 170 tons.....							2
171 to 180 tons.....							1
181 to 190 tons.....							2
201 to 210 tons.....							10
211 to 220 tons.....							2
241 to 250 tons.....							1
261 to 270 tons.....							1
Total							29
Net tonnage							4,942
Motor:							
5 to 10 tons.....							42
11 to 20 tons.....							131
21 to 30 tons.....							41
31 to 40 tons.....							28
41 to 50 tons.....							28
51 to 60 tons.....							25
61 to 70 tons.....							25
71 to 80 tons.....							14
81 to 90 tons.....							8
91 to 100 tons.....							5
101 to 110 tons.....							5
111 to 120 tons.....							12
121 to 130 tons.....							5

Fisheries of Massachusetts, 1937—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Tongs		Rakes, other than for oysters	Forks	Hoes	By hand, other than for oysters	Total, exclusive of dupli- cation
	Oyster	Other					
Vessels—Continued.							
Motor—Continued.	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
141 to 150 tons.....							4
151 to 160 tons.....							1
161 to 170 tons.....							3
171 to 180 tons.....							3
181 to 190 tons.....							1
Total.....							381
Net tonnage.....							15,160
Total vessels.....							410
Total net tonnage.....							20,102
Boats:							
Motor.....	1	37	84		6		1,754
Other.....	31	87	618	97	415	2	1,675
Accessory boats.....							457
Apparatus, number.....	37	138	823	463	1,782		

CATCH: BY GEAR

Species	Purse seines				Haul seines	
	Mackerel		Other		Pounds	Value
	Pounds	Value	Pounds	Value		
Alewives.....	72,100	\$626			210,100	\$1,370
Bluefish.....					2,000	204
Butterfish.....	96,800	3,686				
Cod.....	100	3				
Flounders, blackback.....					100	5
Grayfish.....	800	8				
Herring, sea.....	300	4				
Lanuce.....					264,400	3,302
Mackerel.....	11,759,400	537,394				
Pollock.....	7,300	90				
Shad.....	6,400	264			2,000	37
Sharks.....	9,300	328				
Striped bass.....	7,000	556			3,000	265
Sturgeon.....	200	26				
Tuna.....	5,000	201	132,400	\$5,296		
Total.....	11,964,700	543,186	132,400	5,296	481,600	5,183

Species	Gill nets				Lines			
	Anchor		Drift		Hand		Trawl	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives.....			19,400	\$164			100	\$1
Bluefish.....	2,000	\$400	100	7	31,000	\$2,435	500	48
Butterfish.....			10,000	338			600	31
Cod.....	3,139,600	80,339			170,500	4,187	16,801,700	386,850
Cunners.....	27,400	880						
Cusk.....	51,000	948					8,173,800	150,849
Eels, conger.....							300	3
Flounders:								
Gray sole.....	200	2					24,800	1,059
Lemon sole.....							2,500	108
Yellowtail and dab.....	7,700	99			1,000	24	232,900	8,228
Blackback.....	1,700	43			1,100	61	129,300	6,230
Fluke.....	160,000	6,400					300	32
Unclassified.....	500	8						
Goosefish.....	10,300	108			100	1		
Haddock.....	453,700	15,206			1,400	36	17,010,000	509,050
Hake.....	1,134,300	14,512			1,700	14	9,196,600	160,620
Hallbut.....	600	83			200	30	1,882,600	203,281
Herring, sea.....	3,300	29	1,400	11				
Mackerel.....	2,100	69	1,624,900	84,264	9,600	434		
Pollock.....	8,605,800	115,258			208,800	1,898	1,294,400	21,853
Rosefish.....	600	14					1,700	22

Fisheries of Massachusetts, 1937—Continued

CATCH: BY GEAR—Continued

Species	Gill nets				Lines			
	Anchor		Drift		Hand		Trawl	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Scup or porgy.....					27,300	\$793	33,100	\$597
Sea bass.....					7,900	402	5,500	373
Shad.....	13,700	\$884	3,900	\$282				
Sharks.....	20,300	605	6,500	226				
Skates.....	100	1					2,700	23
Smelt.....					1,500	300		
Squeteagues or "sea trout," gray.....							100	9
Striped bass.....					35,000	2,750		
Sturgeon.....	1,000	88	200	19				
Tautog.....	500	16			58,900	2,856		
Tllefish.....							15,000	600
Tuna.....	4,600	151	1,600	57				
Whiting.....			400	5			32,500	377
Wolfish.....	400	3					335,700	7,943
Squid.....			100	1			600	17
Total.....	13,641,400	238,046	1,668,400	85,364	556,000	16,221	55,177,300	1,458,204

Species	Pound nets		Floating traps		Weirs		Fyke nets	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives.....	31,800	\$425	18,500	\$187	232,600	\$1,883	500	\$5
Anchovies.....	200	4						
Bluefish.....	7,100	582	1,200	65				
Bonito.....	4,100	287	500	28				
Butterfish.....	664,700	31,846	182,800	9,685				
Cod.....	14,500	382	46,100	958				
Eels, common.....	2,700	292	600	48			12,400	1,188
Flounders:								
Blackback.....	600	24					1,200	200
Fluke.....	10,700	519	200	15			800	18
Grayfish.....	19,700	355						
Herring, sea.....	726,700	7,020	405,700	3,443				
King whiting or "kingfish".....	100	11						
Launce.....	4,100	81						
Mackerel.....	5,964,800	207,429	1,748,700	53,184				
Menhaden.....	39,000	357						
Pollock.....	304,300	2,988	430,400	3,032				
Salmon.....			4,400	287				
Scup or porgy.....	98,700	910	2,800	52				
Sea bass.....	9,700	738	8,600	286				
Sea robin.....	12,900	145	400	7				
Shad.....	7,600	350	10,600	270				
Sharks.....	35,500	457	2,000	29				
Skates.....	1,600	21						
Skipper or "billfish".....	600	68						
Squeteagues or "sea trout," gray.....	10,600	669						
Striped bass.....	26,300	2,425	27,900	1,792				
Sturgeon.....	1,500	156	1,300	100				
Tautog.....	11,900	486	11,200	503				
Tuna.....	425,100	12,506	115,500	4,454				
Turbot.....	100	8						
White perch.....	1,600	16						
Whiting.....	10,212,600	93,924	3,421,600	27,231				
Squid.....	1,660,200	20,001	161,000	2,970				
Total.....	20,311,600	385,426	6,602,000	108,626	232,600	1,883	14,400	1,856

Fisheries of Massachusetts, 1937—Continued

CATCH: BY GEAR—Continued

Species	Dip nets		Push nets		Otter trawls		Pots, crab	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives	496,600	\$3,570			4,200	\$52		
Bluefish					3,000	278		
Butterfish					1,295,500	41,821		
Carp	1,000	40						
Cod					106,155,100	1,999,506		
Croaker					866,400	28,057		
Cunners					400	14		
Cusk					393,700	7,001		
Drum, red					2,800	18		
Eels:								
Common					1,300	130		
Conger					45,300	666		
Flounders:								
Gray sole					9,960,000	474,089		
Lemon sole					3,266,200	226,658		
Yellowtail and dab					16,366,200	368,891		
Blackback					5,407,000	211,094		
Fluke					1,788,900	160,113		
Unclassified					747,200	23,340		
Goosefish					6,200	69		
Grayfish					7,100	165		
Haddock					149,118,400	3,548,678		
Hake					6,941,600	107,536		
Halibut					532,300	49,752		
Herring, sea	1,754,300	17,448			2,700	55		
Herring smelt					10,200	187		
King whiting or "kingfish"					11,500	304		
Mackerel					56,200	3,528		
Pollock					19,763,000	314,648		
Rosefish					58,213,300	886,470		
Scup or porgy					8,072,600	173,590		
Sea bass					2,314,200	123,915		
Sea robin					42,400	677		
Shad					4,200	199		
Sharks					15,100	444		
Skates					36,700	521		
Spot					1,300	17		
Squeteagues or "sea trout,"								
gray					117,500	5,165		
Striped bass					21,400	1,983		
Sturgeon					3,100	273		
Tautog					1,400	79		
Tilefish					600	31		
Tuna					100	4		
White perch					600	13		
Whiting					7,370,700	117,677		
Wolfish					2,188,800	40,508		
Crabs, hard							968,400	\$23,776
Lobsters					4,400	368		
Shrimp					6,800	475		
Scallops:								
Bay	63,500	21,112	63,000	\$21,000	2,000	900		
Sea					7,100	994		
Squid					92,400	1,899		
Total	2,315,400	42,170	63,000	21,000	401,269,100	8,922,627	968,400	23,776

Species	Pots—Continued					
	Eel		Lobster		Periwinkle and cockle	
	Pounds	Value	Pounds	Value	Pounds	Value
Eels, common	69,900	\$6,109				
Crabs, hard			597,300	\$16,507		
Lobsters			2,130,500	559,923		
Periwinkles and cockles					8,600	\$507
Total	69,900	6,109	2,727,800	576,430	8,600	507

Fisheries of Massachusetts, 1937—Continued

CATCH: BY GEAR—Continued

Species	Harpoons		Spears		Dredges		Tongs	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Eels, common								
Swordfish	1, 413, 200	\$229, 273						
Tuna	800	32						
Clams:								
Hard, public					378, 200	\$37, 816	117, 900	\$9, 478
Hard, private							5, 000	363
Oysters, market:								
Public, spring					400	100	23, 000	8, 125
Private, spring					55, 000	18, 603	129, 300	49, 175
Periwinkles and cockles					900	75		
Scallops:								
Bay					1, 079, 000	185, 065		
Sea					4, 969, 800	552, 602		
Total	1, 414, 000	229, 305	5, 800	467	6, 483, 300	794, 161	275, 200	67, 141

Species	Rakes		Forks		Hoes		By hand	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Clams:								
Hard, public	778, 400	\$60, 243	19, 200	\$1, 309	6, 800	\$486		
Hard, private	5, 000	363						
Razor					725, 500	18, 888		
Soft, public			309, 400	28, 145	5, 204, 700	468, 182		
Soft, private					52, 500	4, 375		
Surt, or skimmer	1, 700	100						
Scallops, bay	84, 600	27, 540						
Irish moss							182, 400	\$16, 193
Kelp							120, 000	720
Bloodworms			24, 200	5, 800	3, 200	771		
Sandworms			174, 900	31, 520	35, 000	7, 340		
Total	869, 700	88, 246	527, 700	66, 774	6, 027, 700	495, 042	302, 400	16, 913

OPERATING UNITS: BY COUNTIES

Item	Barnstable	Bristol	Dukes	Essex	Nantucket	Norfolk	Plymouth	Suffolk
Fishermen:								
On vessels	Number 132	Number 358	Number 58	Number 1, 502	Number 58	Number	Number	Number 2, 150
On boats and shore:								
Regular	786	326	316	964	143	83	516	480
Casual	587	532	317	368	30	155	336	284
Total	1, 505	1, 216	691	2, 834	231	238	852	2, 914
Vessels:								
Steam:								
91 to 100 tons								7
111 to 120 tons								2
131 to 140 tons								1
161 to 170 tons								2
171 to 180 tons								1
181 to 190 tons					1			1
201 to 210 tons								10
211 to 220 tons								2
241 to 250 tons								1
261 to 270 tons								1
Total				1				28
Net tonnage				184				4, 758

Fisheries of Massachusetts, 1937—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Barnstable	Bristol	Dukes	Essex	Nantucket	Norfolk	Plymouth	Suffolk
Vessels—Continued.								
Motor:	Number	Number	Number	Number	Number	Number	Number	Number
5 to 10 tons.....	11	9	4	11	3			4
11 to 20 tons.....	12	18	3	33	8			57
21 to 30 tons.....	2	7	2	19				11
31 to 40 tons.....		6	2	12	1			7
41 to 50 tons.....		6		16				6
51 to 60 tons.....		2		14				9
61 to 70 tons.....	1	2		15				7
71 to 80 tons.....				9				5
81 to 90 tons.....				1				7
91 to 100 tons.....				2				3
101 to 110 tons.....				1				4
111 to 120 tons.....								12
121 to 130 tons.....								5
141 to 150 tons.....								4
151 to 160 tons.....								1
161 to 170 tons.....								3
171 to 180 tons.....								3
181 to 190 tons.....								1
Total.....	26	50	11	133	12			149
Net tonnage.....	370	1,228	201	4,963	174			8,224
Total vessels.....	26	50	11	134	12			177
Total net tonnage.....	370	1,228	201	5,147	174			12,982
Boats:								
Motor.....	416	814	165	391	92	36	230	110
Other.....	463	231	349	262	15	15	230	110
Accessory boats.....	17	21	4	260				155
Apparatus:								
Purse seines:								
Mackerel.....	4	1		47			1	24
Length, yards.....	1,720	520		22,442			300	11,020
Other.....				2				
Length, yards.....				1,000				
Haul seines.....	2		2	9			1	
Length, yards.....	60		8	395			25	
Gill nets:								
Anchor.....	140			1,291	12			82
Square yards.....	32,000			460,296	4,800			14,440
Drift.....	218	77		2,782			30	466
Square yards.....	73,720	22,176		833,391	10,200		8,300	132,794
Lines:								
Hand.....	57	185	32	94	28		2	4
Hooks.....	114	370	61	448	56		4	8
Trawl.....	1,800	40	30	13,231			220	13,699
Hooks.....	92,400	2,000	1,500	656,567			11,000	820,351
Pound nets.....	70	7	7	3				
Floating traps.....	11			39				
Weirs.....				1			3	
Fyke nets.....	16		2					
Dip nets.....	102		54	29			9	9
Push nets.....			117					
Otter trawls.....	41	47	10	80	17		2	149
Yards at mouth.....	1,120	1,365	271	2,548	439		48	4,608
Pots:								
Crab.....		68		698		882	350	1,522
Eel.....	59	181	415	140	860			
Lobster.....	3,880	2,730	6,595	26,172	567	3,870	20,847	8,129
Periwinkle and cockle.....		10		50	20			
Harpoons.....	2	16	8	34				15
Spears.....		6	10	6				
Dredges:								
Clam.....	33	40	7		13		1	
Yards at mouth.....	12	16	4		6		1	
Oyster.....	11						24	
Yards at mouth.....							24	
Scallop.....	780	888	624	10	311		239	5
Yards at mouth.....	656	914	509	35	124		200	17
Tongs:								
Oyster.....	31	6						
Other.....	5	91			2		40	
Rakes, other than for oysters.....	460	83	201		4		75	
Forks.....			10	113				340
Hoes.....	457	46	17	555	19	185	503	

Fisheries of Massachusetts, 1937—Continued

CATCH: BY COUNTIES

Species	Barnstable		Bristol		Dukes		Essex	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives	33, 100	\$336			61, 100	\$436	231, 900	\$2, 142
Anchovies	200	4						
Bluefish	10, 000	863	100	86	6, 300	449	2, 700	215
Bonito	1, 800	125	100	10	2, 300	157	400	23
Butterfish	700, 500	34, 141	178, 300	8, 453	36, 600	2, 323	328, 800	15, 162
Carp					1, 000	40		
Cod	2, 086, 600	49, 137	4, 798, 300	106, 791	29, 400	580	14, 735, 700	325, 442
Croaker			100	4	1, 500	36		
Cunners							27, 500	883
Cusk	211, 500	3, 611					5, 210, 300	96, 721
Drum, rod							2, 800	16
Eels:								
Common	19, 900	1, 688	22, 400	1, 182	40, 500	4, 603	6, 300	417
Conger			1, 700	36	1, 200	12	30, 900	462
Flounders:								
Gray sole	226, 600	14, 101	1, 644, 300	118, 024	5, 000	230	1, 650, 900	77, 254
Lemon sole	93, 100	8, 779	642, 900	54, 728	2, 000	200	262, 600	17, 306
Yellowtail and dab	1, 554, 800	35, 926	5, 216, 500	120, 064	1, 057, 000	25, 124	2, 511, 700	55, 106
Blackback	868, 500	32, 992	1, 225, 200	49, 491	235, 000	8, 600	446, 100	18, 915
Fluke	178, 100	7, 398	504, 200	49, 725	20, 400	2, 162	877, 500	74, 361
Unclassified			12, 200	386			72, 200	3, 200
Goosfish							16, 300	174
Grayfish	19, 700	355					6, 500	131
Haddock	1, 183, 000	35, 347	8, 036, 900	194, 983	81, 400	565	17, 879, 600	482, 010
Hake	148, 500	3, 464	135, 600	2, 036	2, 100	32	8, 217, 100	130, 769
Halibut	13, 700	1, 753	10, 100	819			1, 548, 700	166, 130
Herring, sea	876, 400	8, 276	500	6			1, 118, 400	12, 934
King whiting or "kingfish"	100	11			900	80	10, 600	274
Launce	4, 100	81					264, 400	3, 302
Mackerel	7, 263, 700	249, 522	106, 800	5, 188	102, 300	2, 089	10, 490, 400	467, 668
Menhaden	39, 000	357						
Pollock	443, 600	5, 104	73, 000	846			13, 450, 300	186, 099
Rosefish	1, 100	13					19, 390, 000	281, 802
Salmon							4, 400	287
Scup or porgy	43, 700	487	214, 200	4, 682	68, 900	783	5, 379, 500	112, 395
Sea bass	7, 400	640	35, 000	1, 682	9, 300	465	1, 562, 300	78, 057
Sea robin	13, 300	152					36, 100	578
Shad	8, 400	360	400	17	100	11	38, 700	1, 882
Sharks	14, 800	272			23, 100	223	39, 500	1, 067
Skates			1, 700	23			26, 600	362
Skipper or "billfish"	600	68						
Smelt							1, 500	300
Spot							1, 300	17
Squeteagues or "sea trout,"								
Gray	4, 200	324	2, 100	90	5, 300	318	110, 400	4, 580
Striped bass	28, 700	2, 636	1, 200	104	30, 000	2, 400	27, 300	1, 742
Sturgeon	1, 400	156					4, 000	368
Swordfish	6, 000	772	150, 500	22, 789	104, 500	16, 377	1, 027, 000	170, 422
Tautog	11, 300	436	54, 800	2, 553	6, 100	362	10, 700	455
Tilfish			15, 000	600				
Tuna	535, 800	16, 746			100	5	149, 100	5, 949
Turbot	100	3						
White perch			1, 600	16			600	13
Whiting	11, 811, 500	108, 917	199, 900	2, 064			3, 264, 700	36, 284
Wolfish	68, 900	1, 019	7, 400	188			225, 600	5, 492
Crabs, hard			1, 000	70			347, 600	9, 512
Lobsters	87, 200	30, 383	58, 200	14, 431	163, 900	40, 719	811, 900	204, 663
Clams:								
Hard, public	616, 700	48, 687	346, 900	27, 998	83, 900	6, 378		
Razor	630, 600	14, 488						
Soft, public	852, 100	74, 404	49, 900	5, 198	32, 800	2, 840	3, 181, 100	284, 566
Surf or skimmer					1, 700	100		
Oysters, market:								
Public, spring	20, 100	7, 600	3, 300	625				
Private, spring	163, 900	62, 350						
Periwinkles and cockles			200	27			1, 200	180
Scallops:								
Bay	837, 500	105, 708	135, 400	43, 400	230, 400	76, 921		
Sea	18, 500	2, 142	3, 411, 700	381, 816	525, 100	57, 885	683, 900	72, 536
Squid	1, 637, 400	19, 566	86, 700	1, 314	23, 600	272	159, 900	3, 555
Irish moss							5, 400	293
Kelp							120, 000	720
Bloodworms							5, 100	1, 221
Sandworms							44, 300	8, 540
Total	33, 398, 700	991, 697	27, 386, 300	1, 222, 433	2, 944, 700	252, 697	116, 790, 200	3, 449, 250

Fisheries of Massachusetts, 1937—Continued

CATCH: BY COUNTIES—Continued

Species	Nantucket		Norfolk		Plymouth		Suffolk	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives					430,400	\$2,721	329,400	\$2,649
Bluefish	27,100	\$2,407					700	79
Butterfish	300	10					1,005,900	27,318
Cod	1,384,200	47,206			105,300	4,500	103,188,100	1,938,569
Croaker							111,900	4,346
Cunners							300	11
Cusk							3,196,700	58,466
Eels:								
Common	3,600	324						
Conger	100	1					11,700	158
Flounders:								
Gray sole	281,500	19,204					6,176,700	246,337
Lemon sole	54,400	5,836					2,223,700	139,917
Yellowtail and dab	771,400	18,499			40,000	600	5,455,400	121,923
Blackback	1,651,500	84,044			40,000	1,800	1,074,700	41,815
Fluke	78,800	8,400					301,400	25,046
Unclassified							663,300	19,762
Goosefish							300	4
Grayfish							1,400	42
Haddock	449,000	9,555			34,200	1,200	138,969,400	3,349,307
Hake	10,600	220					8,760,300	146,161
Halibut	1,000	137					842,200	84,307
Herring, sea					900,000	6,750	2,100	44
Herring smelt							10,200	167
Mackerel	12,100	233			12,000	480	3,178,400	160,912
Pollock	1,200	21					16,645,900	267,697
Rosefish							38,834,500	604,691
Scup or porgy	100	1			500	10	2,527,600	57,614
Sea bass					1,000	50	730,900	44,220
Sea robin							6,300	104
Shad							800	16
Sharks							11,300	397
Skates							12,800	181
Squeteagues or "sea trout," gray							6,200	531
Striped bass	5,100	353					28,300	2,536
Sturgeon	200	22					1,700	116
Swordfish							125,200	19,913
Tautog					900	77	100	7
Tilefish							600	31
Whiting					3,000	27	5,758,700	91,922
Wolfish	100	1					2,222,900	41,756
Crabs, hard			13,600	\$379	186,500	5,819	1,017,000	24,503
Lobsters	15,600	4,655	140,000	38,990	526,400	136,299	331,800	90,151
Shrimp							6,800	475
Clams:								
Hard, public	218,000	23,826	2,700	109	32,300	2,334		
Hard, private					10,000	726		
Razor					94,900	4,400		
Soft, public	10,700	2,235	64,500	7,347	1,295,700	112,088	27,300	2,649
Soft, private					52,500	4,375		
Oysters, market, private, spring								
Periwinkles and cockles	7,200	300			20,400	5,428		
Scallops:					900	75		
Bay	57,900	19,290			30,900	10,300		
Sea	400	59					337,300	39,058
Squid							6,700	181
Irish moss					177,000	15,900		
Bloodworms			4,200	1,000	3,100	750	15,000	3,600
Sandworms			50,000	9,000	8,300	2,000	107,300	19,320
Total	5,042,100	226,839	275,000	56,825	4,006,200	318,709	344,267,200	7,679,009

Fisheries of Rhode Island, 1937—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Dredges			Tonga		Rakes		Forks	Hoes	By hand, other than for oysters	Total, exclusive of duplication
	Mus-sel	Oys-ter	Scal-lop	Oys-ter	Other	Oys-ter	Other				
	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number
Fishermen:											289
On vessels		90									
On boats and shore:											
Regular	6		146	27	163	15	32	8	13		429
Casual			128	21	410	22	71	18	43	17	768
Total	6	90	277	48	572	37	103	26	56	17	1,486
Vessels:											
Steam:											
5 to 10 tons											2
11 to 20 tons											1
21 to 30 tons		1									1
41 to 50 tons		1									1
51 to 60 tons		1									1
Total		3									6
Net tonnage		126									167
Motor:											
5 to 10 tons		3									46
11 to 20 tons		8	1								16
21 to 30 tons		2									3
31 to 40 tons		1									1
51 to 60 tons		2									2
Total		16	1								68
Net tonnage		358	11								788
Total vessels		19	1								74
Total net tonnage		484	11								945
Boats:											
Motor	3		137	20	114	7	19				357
Other			5	27	428	30	55	6	4		625
Accessory boats											62
Apparatus:											
Number	4	37	705	48	572	37	103	15	56		
Yards at mouth	4	55	574								

CATCH: BY GEAR

Species	Haul seines		Gill nets				Hand lines	
			Anchor		Drift			
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives	137,400	\$1,374						
Bluefish	17,200	1,880			2,500	\$200	862,700	\$25,856
Cod							14,400	1,575
Eels, common	49,400	3,698						
Flounders:								
Blackback	1,000	30						
Yellowtail and dab	400	20						
Fluke	800	80						
Herring, sea	16,000	80						
Mackerel					10,500	850		
Pollock					139,000	1,738	28,500	341
Scup or porgy	200	2						
Silversides	400	4						
Squeteagues or "sea trout,"								
gray	16,500	1,440			1,600	100		
Striped bass	77,300	4,516	500	\$80			2,000	120
Tautog	700	29					25,800	1,016
White perch			1,000	180				
Whiting	400	8						
Squid	2,000	40						
Total	319,700	12,701	1,500	260	153,600	2,388	933,500	28,908

Fisheries of Rhode Island, 1937—Continued

CATCH: BY GEAR—Continued

Species	Lines						Pound nets	
	Trawl		Troll		Trot with hooks			
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives.....							80,800	\$542
Bluefish.....			73,200	\$6,336			900	75
Butterfish.....							114,000	3,888
Cod.....	165,400	\$4,615						
Eels, common.....					2,600	\$210	27,900	1,977
Flourishers:								
Yellowtail and dab.....							700	31
Blackback.....							21,400	704
Fluke.....							11,900	436
Grayfish.....	2,000	30						
Herring, sea.....							13,900	139
Mackerel.....			157,100	4,601			18,400	777
Menhaden.....							88,000	697
Scup or porgy.....							13,200	254
Sea robin.....							10,000	50
Shad.....							4,200	405
Skates.....	100	3						
Squeteagues or "sea trout,"								
gray.....	100	8	200	15			12,600	864
Striped bass.....			30,200	1,872			600	50
Tautog.....							43,700	1,758
Tuna.....			300	15				
Whiting.....							23,600	331
Squid.....							119,800	2,018
Total.....	167,600	4,656	261,000	12,839	2,600	210	605,500	14,996

Species	Floating traps		Fyke nets		Dip nets		Otter trawls	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Anchovies.....	32,000	\$290						
Bluefish.....	46,300	2,265						
Bonito.....	43,000	3,733						
Butterfish.....	456,400	15,143						
Cod.....	20,400	494					18,600	\$533
Crevalle.....	2,000	20						
Cunners.....	4,700	81					9,400	94
Eels:								
Common.....			12,000	\$600				
Conger.....	15,900	439						
Flourishers:								
Yellowtail and dab.....	34,600	831					608,000	10,026
Blackback.....	112,700	4,508					1,046,300	33,345
Fluke.....	46,000	2,677					32,600	1,358
Grayfish.....	2,000	20						
Haddock.....							1,200	39
Hake.....	6,600	120					11,300	128
Herring, sea.....	76,700	908					90,000	1,620
Hickory shad.....	11,100	174						
King whiting or "kingfish".....	2,900	118						
Mackerel.....	408,300	14,104						
Menhaden.....	41,000	159						
Pollock.....	40,800	815					41,700	677
Scup or porgy.....	1,665,000	32,728						
Sea bass.....	914,600	10,020						
Sea robin.....	60,400	422					32,200	222
Shad.....	600	62						
Sharks.....	3,300	52					100	3
Skates.....	39,600	268					262,400	1,228
Spot.....	400	8						
Squeteagues or "sea trout,"								
gray.....	33,200	2,207						
Striped bass.....	208,600	18,147						
Sturgeon.....	900	76						
Tautog.....	25,300	660	3,200	96			800	32
Thimble-eyed mackerel.....	4,700	94						
Tuna.....	41,900	2,976						
Whiting.....	682,300	6,217					310,700	3,430
Crabs:								
Hard.....	1,600	44			1,200	\$150	3,600	105
Soft and peelers.....					400	150		
Lobsters.....							100	23
Oysters, market, public, fall.....					100	10		
Scallops:								
Bay.....					1,600	236		
Sea.....							2,700	236
Squid.....	1,214,900	14,289					10,800	216
Total.....	5,629,600	135,169	15,200	696	3,300	546	2,383,300	53,315

Fisheries of Rhode Island, 1937—Continued

CATCH: BY GEAR—Continued

Species	Pots							
	Crab		Eel		Lobster		Periwinkle and cockle	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Eels, common.....			57,200	\$4,936				
Crabs:								
Hard.....					326,200	\$9,674		
Rock.....	1,500	\$75	100	5				
Lobsters.....					773,700	178,060		
Periwinkles and cockles.....					300	15	60,100	\$1,617
Total.....	1,500	75	57,300	4,941	1,100,200	187,749	60,100	1,617

Species	Harpoons		Spears		Dredges		Tongs	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Eels, common.....			13,900	\$1,334				
Swordfish.....	333,500	\$43,603						
Clams:								
Hard, public.....					131,100	\$14,444	1,817,400	\$232,165
Hard, private.....					65,100	7,943	1,800	262
Mussels, sea.....					5,000	479		
Oysters, market:								
Public, spring.....							1,200	333
Public, fall.....					12,300	2,556	15,700	1,906
Private, spring.....					1,839,400	232,242	2,200	481
Private, fall.....					2,379,700	323,287	2,200	481
Scallops, bay.....					97,800	19,123		
Starfish.....					12,000	840		
Total.....	333,500	43,603	13,900	1,334	4,542,400	600,914	1,840,500	235,628

Species	Rakes		Forks		Hoes		By hand	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Clams:								
Hard, public.....	265,900	\$33,464						
Soft, public.....			73,800	\$4,960	79,500	\$5,662	17,100	\$1,071
Surf or skimmer.....					8,000	670		
Oysters, market:								
Public, spring.....	36,000	4,507						
Public, fall.....	41,400	5,035						
Total.....	343,300	43,036	73,800	4,960	87,500	6,332	17,100	1,071

OPERATING UNITS: BY COUNTIES

Item	Bristol	Kent	Newport	Providence	Washington
	Number	Number	Number	Number	Number
Fishermen:					
On vessels.....	53	3	179	23	31
On boats and shore:					
Regular.....	47	112	144	10	116
Casual.....	108	240	204	43	173
Total.....	208	355	627	76	320
Vessels:					
Steam:					
5 to 10 tons.....			2		
11 to 20 tons.....			1		
21 to 30 tons.....	1				
41 to 50 tons.....	1				
51 to 60 tons.....	1				
Total.....	3		3		
Net tonnage.....	126		31		

Fisheries of Rhode Island, 1937—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Bristol	Kent	Newport	Provi- dence	Washing- ton
Vessels—Continued.					
Motor:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
5 to 10 tons.....	3		34	1	8
11 to 20 tons.....	3	1	8	1	3
21 to 30 tons.....	1		1	1	
31 to 40 tons.....	1				
51 to 60 tons.....				2	
Total.....	8	1	43	5	11
Net tonnage.....	147	11	370	162	98
Total vessels.....	11	1	46	5	11
Total net tonnage.....	273	11	401	162	98
Boats:					
Motor.....	32	96	149	10	70
Other.....	107	254	84	40	140
Accessory boats.....			51	1	10
Apparatus:					
Haul seines.....	3			2	11
Length, yards.....	135			160	1,977
Gill nets:					
Anchor.....					4
Square yards.....					404
Drift.....			26		2
Square yards.....			26,260		4,200
Lines:					
Hand.....	4	20	152	4	34
Hooks.....	8	20	340	4	82
Trawl.....	2		33		34
Hooks.....	2,000		12,925		13,718
Troll.....			68		49
Hooks.....			68		49
Trot with hooks.....				1	2
Hooks.....				200	300
Pound nets.....	2	3	26		5
Floating traps.....			24		12
Fyke nets.....		5	100		
Dip nets.....					10
Otter trawls.....			30		19
Yards at mouth.....			736		407
Pots:					
Crab.....					30
Eel.....	50	187	50	130	441
Lobster.....	1,845	820	18,489		8,116
Periwinkle and cockle.....	170		265		440
Harpoons.....			41	1	8
Spears.....	1	20		7	6
Dredges:					
Clam.....			16	1	1
Yards at mouth.....			13	1	1
Muscel.....	2	2			
Yards at mouth.....	2	2			
Oyster.....	22	2	1	8	4
Yards at mouth.....	33	3	1	12	6
Scallops.....	68	289	209	24	115
Yards at mouth.....	53	244	164	19	94
Tongs:					
Oyster.....		36	1		11
Other.....	126	268	52	43	61
Rakes:					
Oyster.....		12	1		24
Other.....		48	35		20
Forks:					
.....		4		2	9
Hoes:					
.....	18	6	15	4	13

Fisheries of Rhode Island, 1937—Continued

CATCH: BY COUNTIES

Species	Bristol		Kent		Newport		Providence		Washington	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives	22,500	\$200			58,300	\$342			137,400	\$1,374
Anchovies					32,000	290				
Bluefish					60,000	4,393			80,100	5,883
Bonito					39,600	3,643			3,400	90
Butterfish			2,500	\$125	471,800	16,162			96,100	2,744
Cod	100	4			946,300	28,539			120,700	2,955
Crevalle					2,000	20				
Cunners					13,100	165			1,000	10
Eels:										
Common	2,700	167	29,700	2,869	40,800	2,554	26,400	\$2,824	77,800	5,916
Conger					8,300	287			7,600	152
Flounders:										
Yellowtail and dab	500	27			302,700	5,837			241,400	5,044
Blackback					869,400	28,165			312,000	10,422
Fluke					77,600	3,323			13,800	1,228
Grayfish	2,000	30							2,000	20
Haddock					1,200	39				
Hake					11,600	195			6,400	53
Herring, sea					112,800	1,976			82,800	771
Hickory shad					11,000	173			100	1
King whiting or "kingfish"					900	58			2,000	60
Mackerel					494,300	15,626			100,000	4,206
Menhaden					12,000	57			117,000	799
Pollock					242,000	3,429			8,100	142
Soup or porgy					1,621,200	32,177			57,200	807
Sea bass					146,400	10,014			100	6
Sea robin					55,700	367			46,900	327
Shad	4,200	405			300	30			300	32
Sharks					500	6			2,900	49
Silversides	400	4								
Skates	100	3			221,300	1,175			80,700	821
Spot									400	8
Squeteagues or "sea trout," gray	100	8	300	21	20,800	1,447			43,000	3,158
Striped bass					179,900	16,405			137,200	8,380
Sturgeon					200	20			700	56
Swordfish					308,800	40,117	1,400	185	23,300	3,301
Tautog	4,000	157	6,200	246	50,800	1,972			38,500	1,216
Thimble-eyed mackerel					4,700	94				
Tuna					42,200	2,991				
White perch									1,000	180
Whiting	400	8			923,000	9,420			93,600	558
Crabs:										
Hard	241,300	7,240	26,700	800	41,900	1,258			22,500	675
Soft and peelers									400	150
Rock									1,600	80
Lobsters	20,800	5,200	23,100	5,770	493,700	116,377			226,200	50,736
Clams:										
Hard, public	734,300	91,538	985,400	131,408	188,500	21,670	116,300	14,594	189,900	20,863
Hard, private	58,700	7,343	6,400	600			1,800	282		
Soft, public	25,900	1,621	43,500	3,266	6,400	510	33,000	2,082	61,600	4,234
Surf or skimmers					8,000	670				
Mussels, sea	1,900	187	3,100	292						
Oysters, market:										
Public, spring									87,200	4,840
Public, fall			19,200	2,063	400	60			49,900	7,434
Private, spring	870,200	99,469	63,000	9,000			834,200	114,172	74,200	10,082
Private, fall	1,298,500	175,916	63,000	9,000			874,200	119,172	146,200	19,680
Periwinkles and cockles	9,000	500			13,000	677			38,400	455
Scallops:										
Bay	9,600	1,199	38,000	7,912	20,700	4,300	2,900	360	28,200	5,588
Sea									2,700	236
Squid	2,000	40			783,900	10,711			561,600	5,812
Starfish					12,000	840				
Total	3,309,200	391,266	1,310,100	173,372	8,951,800	388,581	1,890,200	253,631	3,386,100	191,114

Fisheries of Rhode Island, 1937—Continued

SEED OYSTER FISHERY: BY GEAR

Item	Dredges		Tongs		Total, exclusive of duplication	
OPERATING UNITS						
Fishermen:	<i>Number</i>		<i>Number</i>		<i>Number</i>	
On vessels.....	4				4	
On boats and shore:						
Regular.....			2		2	
Casual.....			2		2	
Total.....	4		4		8	
Vessels, motor.....	1				1	
Net tonnage.....	19				19	
Boats:						
Motor.....			2		2	
Other.....			2		2	
Apparatus:						
Dredges.....	2				2	
Yards at mouth.....	3				3	
Tongs.....			4		4	
CATCH						
Oysters, seed:	<i>Bushels</i>	<i>Value</i>	<i>Bushels</i>	<i>Value</i>	<i>Bushels</i>	<i>Value</i>
Public, spring.....	12,000	\$12,000	915	\$549	12,000	\$12,000
Public, fall.....					915	549
Total.....	12,000	12,000	915	549	12,915	12,549

NOTE.—All of the persons, craft, and gear engaged in the seed-oyster fishery 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, 1937

OPERATING UNITS: BY GEAR

Item	Purse seines, mackerel	Haul seines	Gill nets		Lines		Pound nets
			Drift	Stake	Hand	Trot with hooks	
Fishermen:							
On vessels.....					85		
On boats and shore:							
Regular.....	3	17	14		67	3	12
Casual.....		97	46	12	12	4	4
Total.....	3	114	60	12	114	7	16
Vessels, motor:							
5 to 10 tons.....					6		
11 to 20 tons.....					6		
21 to 30 tons.....					1		
Total.....					13		
Net tonnage.....					145		
Boats:							
Motor.....	1	5	25	1	43	4	7
Other.....		30	5	5	4	3	5
Accessory boats.....	1						
Apparatus:							
Number.....	1	37	30	24	117	26	15
Length, yards.....	120	3,723					
Square yards.....			58,450	4,740			
Hooks, baits, or noods.....					147	2,800	

Fisheries of Connecticut, 1937—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Fyke nets	Dip nets	Scap nets	Otter trawls	Pots		Harpoons	Spears
					Eel	Lobster		
Fishermen:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
On vessels.....				88	10	40		
On boats and shore:								
Regular.....	11	20		39	23	169	8	6
Casual.....	15	197	12	4	23	64	2	1
Total.....	26	217	12	131	46	243	50	7
Vessels, motor:								
5 to 10 tons.....				18	5	6		
11 to 20 tons.....				14		5		
21 to 30 tons.....				3		1		
Total.....				35	5	12		
Net tonnage.....				416	38	143		
Boats:								
Motor.....	6	1		25	10	166	4	
Other.....	12	212			31	21		6
Accessory boats.....							14	
Apparatus:								
Number.....	97	215	12	60	989	15,772	16	6
Yards at mouth.....				1,538				

Item	Dredges, oyster	Tongs		Rakes		Hoes	By hand, other than for oysters	Total, exclusive of duplication
		Oyster	Other	Oyster	Other			
Fishermen:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
On vessels.....	218							316
On boats and shore:								
Regular.....	11	31	18		20	27		295
Casual.....		7	43	2	43	8	50	575
Total.....	229	38	61	2	63	35	50	1,186
Vessels:								
Steam:								
51 to 60 tons.....	1							1
131 to 140 tons.....	1							1
291 to 300 tons.....	1							1
391 to 400 tons.....	1							1
Total.....	4							4
Net tonnage.....	878							878
Motor:								
5 to 10 tons.....	8							29
11 to 20 tons.....	9							24
21 to 30 tons.....	7							10
61 to 70 tons.....	3							3
111 to 120 tons.....	1							1
141 to 150 tons.....	1							1
Total.....	29							68
Net tonnage.....	815							1,267
Total vessels.....	33							72
Total net tonnage.....	1,693							2,145
Boats:								
Motor.....	5							230
Other.....		35	61	1	63	4		461
Accessory boats.....								15
Apparatus:								
Number.....	78	38	61	2	63	35		
Yards at mouth.....	100							

Fisheries of Connecticut, 1937—Continued

CATCH: BY GEAR

Species	Purse seines		Haul seines		Gill nets			
	Pounds	Value	Pounds	Value	Drift		Stake	
					Pounds	Value	Pounds	Value
Carp.....			32,300	\$2,545			4,000	\$270
Mackerel.....	2,200	\$132						
Minnows.....			2,100	700				
Mummichog.....			1,000	200				
Shad.....			125,200	7,297	240,200	\$15,965	2,800	152
Smelt.....			1,500	680				
Squeteagues or "sea trout," gray.....			700	70				
Striped bass.....			900	135				
Suckers.....			48,800	2,283				
Total.....	2,200	132	212,500	13,910	240,200	15,965	6,800	422

Species	Lines				Pound nets		Fyke nets	
	Hand		Trot with hooks		Pounds	Value	Pounds	Value
	Pounds	Value	Pounds	Value				
Alewives.....					80,000	\$800	4,800	\$51
Bluefish.....	33,400	\$4,630			200	24		
Butterfish.....					26,700	1,758		
Carp.....							3,200	240
Catfish and bullheads.....							300	2
Cod.....	2,100	105						
Eels: Common.....	2,700	280	11,300	\$1,085			3,400	634
Conger.....					400	24		
Flounders, blackback.....	700	33			3,100	291	200	18
Hickory shad.....					1,700	85		
Lamprey.....							2,800	300
Mackerel.....	74,100	4,500			700	70		
Menhaden.....					126,000	1,175		
Pollock.....	2,500	85						
Soup or porgy.....	2,800	90			500	25		
Sea bass.....	1,200	72						
Shad.....					6,800	355		
Skates.....					500	8		
Squeteagues or "sea trout," gray.....					7,800	829		
Striped bass.....	600	42			11,300	1,687		
Suckers.....					3,000	120	87,100	1,800
Tautog.....	15,900	1,156			4,700	369		
Whiting.....					400	16		
Crabs, hard.....	2,400	150						
Squid.....					5,900	236		
Total.....	138,400	11,113	11,300	1,085	279,700	7,872	71,800	3,105

Fisheries of Connecticut, 1937—Continued

CATCH: BY GEAR—Continued

Species	Dip nets		Scap nets		Otter trawls		Pots, eel	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Butterfish					12,400	\$771		
Cod					167,300	6,022		
Cunners					1,000	20		
Eels:								
Common					1,000	60	53,500	\$4,727
Conger								
Flounders:								
Lemon sole					24,800	1,984		
Yellowtail and dab					2,616,900	73,525		
Blackback					3,170,400	121,902		
Fluke					407,200	33,376		
Goosefish					20,000	150		
Haddock					63,400	2,515		
Hake					18,100	566		
Halibut					700	77		
Pollock					100	3		
Scup or porgy					145,700	4,274		
Sea bass					58,900	5,088		
Sea robin					22,400	448		
Shad			7,900	\$395				
Skates					55,500	580		
Smelt	200	\$30						
Squirrel hake					3,600	90		
Sturgeon					100	13		
Tautog					300	18		
Whiting					424,800	9,089		
Crabs:								
Hard	4,200	274						
Soft and peelers	200	67						
Scallops, bay	89,600	18,250						
Squid					13,200	528		
Total	94,200	18,621	7,900	395	7,217,800	261,090	53,500	4,727

Species	Pots, lobster		Harpoons		Spears		Dredges	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Eels, common					3,900	\$364		
Swordfish			49,000	\$6,685				
Lobsters	522,900	\$140,712						
Clams, hard, private							800	\$150
Conchs	19,200	815						
Oysters, market:								
Private, spring							3,292,000	402,281
Private, fall							3,514,200	490,661
Total	542,100	141,527	49,000	6,685	3,800	364	6,807,600	893,092

Species	Tongs		Rakes		Hoes		By hand	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Clams:								
Hard, public	84,100	\$16,913	103,600	\$22,855			15,000	\$3,000
Soft, public					51,200	\$6,754		
Oysters, market:								
Public, spring	8,100	960						
Public, fall	48,600	5,637						
Private, spring	3,000	1,000	400	137				
Private, fall	10,200	2,312	400	138				
Total	154,000	26,828	104,400	23,130	51,200	6,754	15,000	3,000

Fisheries of Connecticut, 1937—Continued

OPERATING UNITS: BY COUNTIES

Item	Fairfield	Hartford	Middlesex	New Haven	New London
	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Fishermen:					
On vessels.....	82		5	152	77
On boats and shore:					
Regular.....	44	6	45	55	145
Casual.....	119	71	91	35	259
Total.....	245	77	141	242	481
Vessels:					
Steam:					
51 to 60 tons.....	1				
131 to 140 tons.....				1	
291 to 300 tons.....				1	
391 to 400 tons.....				1	
Total.....	1			3	
Net tonnage.....	51			827	
Motor:					
5 to 10 tons.....	9		1	7	12
11 to 20 tons.....	4		1	6	13
21 to 30 tons.....	5			2	3
61 to 70 tons.....	1			2	
111 to 120 tons.....				1	
141 to 150 tons.....				1	
Total.....	19		2	19	28
Net tonnage.....	314		22	576	355
Total vessels.....	20		2	22	28
Total net tonnage.....	365		22	1,403	355
Boats:					
Motor.....	28	5	52	44	101
Other.....	120	14	47	37	243
Accessory boats.....	1		2	1	11
Apparatus:					
Purse seines, mackerel.....					1
Length, yards.....					120
Haul seines.....	1	13	12	8	3
Length, yards.....	83	1,891	1,340	142	267
Gill nets:					
Drift.....	1	1	21		7
Square yards.....	2,200	300	36,050		19,900
Stake.....		5	19		
Square yards.....		1,100	3,640		
Lines:					
Hand.....	4		20	13	80
Hooks.....	4		32	15	96
Trot with hooks.....	2			24	
Hooks.....	400			2,400	
Pound nets.....			3	2	10
Fyke nets.....		31	31		35
Dip nets.....	3		3	1	208
Scap nets.....		12			
Otter trawls.....	4		4	6	46
Yards at mouth.....	96		85	148	1,209
Pots:					
Eel.....	6	61	176	101	645
Lobster.....	3,439		1,710	3,806	6,817
Harpoons.....	1		2		12
Spears.....	1			4	1
Dredges, oyster.....	32			44	2
Yards at mouth.....	39			59	2
Tongs.....			19	12	3
Oyster.....	4				
Other.....	57			4	
Rakes:					
Oyster.....	2				
Other.....	60			3	
Hoos.....	16		2	9	8

Fisheries of Connecticut, 1937—Continued

CATCH: BY COUNTIES

Species	Fairfield		Hartford		Middlesex		New Haven		New London	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives			4,800	\$61					80,000	\$800
Bluefish	800	\$76			7,400	\$1,220	700	\$72	24,700	3,286
Butterfish							5,300	219	33,800	2,310
Carp			17,500	1,415	17,800	1,330			4,200	310
Catfish and bullheads									300	2
Cod							500	25	158,900	6,102
Cunners									1,000	20
Eels:										
Common	2,600	221	3,200	320	9,300	805	24,200	2,340	35,400	3,374
Conger									1,400	74
Flounders:										
Lemon sole									24,800	1,984
Yellowtail and dab					48,000	1,440	7,400	222	2,561,500	71,854
Blackback	86,000	3,100			15,300	689	107,000	4,618	2,966,100	113,937
Fluke					5,200	443	8,000	640	394,000	32,293
Goosefish									20,000	150
Haddock									63,400	2,515
Hake									18,100	566
Hallbut									700	77
Hickory shad			2,800	300					1,700	85
Lamprey					2,000	100	4,000	200	71,000	4,402
Mackerel							26,000	260	100,000	915
Menhaden							2,100	700		
Minnows							1,000	200		
Mummichog					1,600	45			1,100	43
Pollock									148,500	4,374
Scup or porgy							500	15	60,100	5,160
Sea bass									22,400	448
Sea robin									82,300	5,400
Shad	8,000	440	78,800	4,349	213,400	13,941	400	34	54,700	575
Skates	1,300	13							400	60
Smelt	1,300	650								
Squeteagues or "sea trout," gray							800	45	7,700	854
Squirrel hake									3,600	90
Striped bass									12,800	1,864
Sturgeon									100	13
Suckers			37,900	1,066	65,900	2,954			5,100	243
Swordfish	5,000	700			13,000	1,700	5,700	700	25,800	3,585
Tautog					5,600	500	1,300	105	14,000	938
Whiting							5,800	108	419,900	8,999
Crabs:										
Hard	2,300	121							2,500	160
Soft and peelers									1,800	143
Lobsters	47,400	14,994			60,700	16,940	145,800	43,313	269,000	65,465
Clams:										
Hard, public	195,700	41,176					7,000	1,592		
Hard, private	800	100								
Soft, public	15,200	2,380			1,100	169	5,400	1,180	29,500	3,025
Conchs					2,200	115	17,000	700		
Oysters, market:										
Public, spring					6,700	766			1,400	200
Public, fall					12,100	1,650	35,000	3,787	1,500	200
Private, spring	1,329,500	253,126					1,950,700	146,592	15,800	3,700
Private, fall	1,616,300	318,185			400	55	1,696,300	171,964	11,800	2,907
Scallops, bay					3,900	800			85,700	17,450
Squid									19,100	764
Total	3,312,200	635,332	145,000	7,501	491,500	45,662	4,259,900	379,689	7,854,800	371,633

Fisheries of Connecticut, 1937—Continued

SEED OYSTER FISHERY: BY GEAR

Item	Dredges	Tongs	Rakes	By hand	Total, exclusive of duplication					
OPERATING UNITS										
Fishermen:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>					
On vessels.....	182	3			185					
On boats and shore:										
Regular.....	11	69	1	87	160					
Casual.....	13	21	10	34	69					
Total.....	206	93	11	121	414					
Vessels:										
Steam.....	3				3					
Net tonnage.....	279				279					
Motor.....	18	1			19					
Net tonnage.....	434	8			442					
Sail.....	23				23					
Net tonnage.....	169				169					
Total vessels.....	44	1			45					
Total net tonnage.....	882	8			890					
Boats:										
Motor.....		1			1					
Other.....	9	91	11		109					
Apparatus:										
Number.....	191	93	11							
Yards at mouth.....	169									
CATCH										
Oysters, seed:	<i>Bushels</i>	<i>Value</i>	<i>Bushels</i>	<i>Value</i>	<i>Bushels</i>	<i>Value</i>	<i>Bushels</i>	<i>Value</i>	<i>Bushels</i>	<i>Value</i>
Public, spring.....	36,411	\$26,585	9,034	\$5,550			5,500	\$3,550	50,945	\$35,685
Public, fall.....	17,122	13,925	12,100	8,200	4,900	\$2,150	8,050	5,032	42,172	29,317
Private, spring.....	284,800	278,700							284,800	278,700
Private, fall.....	63,727	60,492							63,727	60,492
Total.....	402,060	379,702	21,134	13,750	4,900	2,150	13,550	8,582	441,644	404,194

SEED OYSTER FISHERY: BY COUNTIES

Item	Fairfield		New Haven	
OPERATING UNITS				
Fishermen:	<i>Number</i>		<i>Number</i>	
On vessels.....	99		86	
On boats and shore:				
Regular.....	152		8	
Casual.....	67		2	
Total.....	318		96	
Vessels:				
Steam.....	2		1	
Net tonnage.....	174		105	
Motor.....	4		15	
Net tonnage.....	127		315	
Sail.....	19		4	
Net tonnage.....	143		26	
Total vessels.....	26		20	
Total net tonnage.....	444		446	
Boats:				
Motor.....	1			
Other.....	100		9	
Apparatus:				
Dredges.....	143		48	
Yards at mouth.....	110		59	
Tongs.....	86		7	
Rakes.....	8		3	
CATCH				
Oysters, seed:	<i>Bushels</i>	<i>Value</i>	<i>Bushels</i>	<i>Value</i>
Public, spring.....	38,164	\$26,090	12,751	\$9,595
Public, fall.....	28,701	20,140	13,471	9,167
Private, spring.....	108,600	104,000	176,200	174,700
Private, fall.....	2,000	1,600	61,727	58,892
Total.....	177,465	151,830	264,179	252,354

NOTE.—Of the total number of persons fishing for seed oysters, 217 are duplicated among those fishing for market oysters or other species. Similarly the following craft and gear are duplicated: 7 vessels, 1 motor-boat, 33 other boats, and 14 dredges.

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 section:

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 1937, amounted to 387,960,010 pounds as landed, valued at \$9,789,879. This is a decrease of 6 percent in the quantity of the catch as compared with 1936, and also a decrease of 12 percent in the value of the catch. The landings at Boston accounted for 324,599,527 pounds valued at \$8,467,985, or 84 percent of the total volume; the landings at Gloucester amounted to 46,238,971 pounds valued at \$918,008, or 12 percent of the total; and the landings at Portland amounted to 17,121,512 pounds, valued at \$403,886, or 4 percent of the total.

Among the landings of fresh fish, haddock far outranked other species in volume landed. Landings of all sizes of haddock in 1937 amounted to 137,175,269 pounds, or 35 percent of the total fresh fish.

Landings by fishing vessels at the three principal New England ports, 1937

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, 078, 625	\$74, 444	3, 753, 695	\$100, 045	4, 650, 095	\$112, 843	3, 245, 820	\$70, 514	2, 719, 245	\$56, 945	2, 225, 550	\$53, 018	1, 870, 720	\$41, 580
Market	2, 457, 890	72, 255	2, 394, 435	65, 032	3, 286, 925	77, 182	4, 202, 740	72, 509	5, 395, 710	87, 661	6, 575, 873	91, 200	7, 113, 300	95, 826
Scrod	178, 965	4, 318	139, 975	2, 903	115, 650	2, 243	123, 400	1, 799	390, 450	4, 918	469, 380	5, 023	225, 900	2, 395
Haddock, fresh:														
Large	7, 097, 310	263, 129	11, 569, 745	313, 908	14, 932, 970	360, 836	12, 467, 910	272, 152	7, 441, 430	201, 364	7, 952, 385	210, 422	6, 928, 980	186, 253
Scrod	1, 152, 147	33, 149	1, 794, 240	42, 360	2, 970, 435	60, 977	2, 104, 925	39, 805	1, 842, 691	39, 504	3, 270, 740	62, 807	3, 487, 280	69, 069
Hake, fresh:														
Large	578, 350	19, 607	404, 980	16, 389	421, 660	14, 822	508, 405	12, 823	608, 880	10, 712	652, 750	9, 701	625, 260	8, 531
Small	41, 500	1, 419	22, 925	834	10, 900	314	28, 350	752	83, 500	2, 137	123, 450	2, 474	238, 860	4, 192
Pollock, fresh	1, 383, 950	30, 151	1, 930, 915	34, 662	1, 205, 315	23, 617	1, 185, 385	18, 833	435, 800	7, 692	527, 990	9, 526	496, 620	9, 338
Cusk, fresh	510, 590	14, 921	497, 500	12, 263	501, 645	10, 988	658, 397	9, 650	312, 390	5, 190	166, 110	2, 993	199, 185	2, 560
Halibut, fresh	40, 963	6, 963	183, 967	26, 191	239, 573	33, 979	286, 889	28, 046	225, 234	22, 550	259, 929	25, 559	237, 246	27, 270
Mackerel, fresh							93, 915	8, 298	2, 653, 040	77, 507	1, 150, 880	41, 876	829, 260	40, 117
Flounders, fresh:														
Gray sole	1, 350, 930	34, 797	654, 604	29, 662	1, 084, 745	38, 357	440, 610	20, 935	524, 140	20, 553	359, 730	13, 551	414, 115	16, 042
Lemon sole	277, 070	18, 819	100, 513	9, 307	94, 335	9, 000	182, 390	14, 408	440, 115	11, 629	286, 655	11, 107	190, 114	12, 809
Yellowtail	278, 585	6, 637	67, 482	2, 546	137, 980	5, 062	257, 515	7, 540	483, 013	7, 497	298, 235	4, 751	332, 390	7, 935
Blackback	100, 875	4, 524	29, 695	1, 877	19, 205	1, 282	55, 810	2, 674	98, 735	1, 975	75, 595	1, 664	69, 870	2, 512
Dab	180, 355	2, 843	76, 595	2, 700	112, 395	3, 211	190, 315	4, 800	374, 350	4, 939	375, 225	6, 224	128, 095	2, 424
Other	86, 110	2, 052	63, 990	2, 683	182, 320	5, 527	68, 490	2, 837	148, 265	2, 318	48, 995	876	31, 090	822
Swordfish, fresh											75, 438	22, 803	455, 134	82, 362
Whiting, fresh	27, 125	686	3, 475	148	6, 190	151	57, 410	1, 875	183, 930	2, 164	1, 440, 650	18, 491	1, 287, 900	12, 650
Wolfish, fresh	91, 570	2, 588	138, 670	4, 040	295, 255	7, 839	516, 585	8, 214	337, 015	5, 897	163, 815	3, 485	63, 680	2, 071
Rosefish, fresh	3, 276, 501	36, 655	545, 016	4, 979	253, 735	3, 492	190, 850	3, 653	3, 987, 231	50, 453	3, 486, 735	41, 989	3, 462, 712	46, 772
Other, fresh	5, 351	187	3, 025	41	3, 437	91	155	3	1, 860	89	8, 875	256	16, 025	452
Total	21, 194, 272	630, 144	24, 425, 442	672, 570	30, 523, 765	771, 813	26, 866, 266	602, 120	28, 687, 024	623, 694	29, 994, 985	639, 796	28, 703, 736	673, 982
Landed in 1936, fresh	17, 326, 312	690, 979	18, 552, 406	837, 084	34, 482, 578	1, 074, 111	32, 238, 796	767, 108	31, 214, 833	672, 344	32, 564, 840	770, 355	32, 227, 231	838, 795

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, 2½ to 10 pounds; and scrod cod, 1 to 2½ 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. Prior to Jan. 1, 1937, statistics were not collected separately on the individual species of flounders.

Landings by fishing vessels at the three principal New England ports, 1937—Continued

BOSTON: BY MONTHS—Continued

Species	August		September		October		November		December		Total, 1937		Total, 1936	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Cod, fresh:														
Large	1,146,955	\$42,763	1,066,345	\$44,331	2,005,830	\$73,670	2,602,425	\$72,626	1,971,780	\$58,356	29,337,065	\$901,135	29,516,328	\$911,858
Market	5,147,326	90,165	3,802,445	92,063	5,049,965	135,003	5,064,485	119,757	3,105,110	79,595	53,595,693	1,078,298	35,923,029	955,794
Scrod	149,365	1,983	181,400	3,053	211,350	4,130	418,650	7,308	340,205	6,440	2,944,710	46,513	4,415,985	90,523
Cod, salted:														
Large					6,000	255					6,000	255	1,020	33
Market					400	14					400	14	135	3
Haddock, fresh:														
Large	6,939,455	201,265	6,758,540	226,563	5,513,735	229,531	4,646,960	211,308	4,568,890	212,367	96,813,320	2,889,068	97,592,853	3,306,586
Scrod	4,583,265	98,115	5,603,085	133,999	4,024,680	107,964	1,461,967	45,934	807,650	28,481	33,103,115	762,164	38,171,456	937,613
Hake, fresh:														
Large	605,000	10,970	645,925	12,978	954,770	20,635	1,207,390	24,118	897,675	23,528	8,111,045	184,814	7,997,861	229,838
Small	181,250	4,328	176,200	3,826	383,350	8,260	236,000	5,178	88,100	2,066	1,614,385	35,800	794,610	24,157
Hake, salted, large													75	1
Pollock, fresh	653,690	12,699	550,535	11,855	1,275,240	24,472	4,539,895	92,646	2,621,975	45,027	16,857,310	310,518	14,159,809	335,788
Cusk, fresh	509,720	7,579	595,445	11,760	594,030	13,931	510,280	11,931	500,490	11,159	5,555,782	114,915	5,800,667	132,083
Halibut, fresh	209,587	28,297	132,248	17,926	82,271	11,917	25,814	4,838	14,917	3,148	1,937,638	236,684	2,059,883	218,067
Mackerel, fresh	319,785	23,553	347,678	23,043	626,050	46,569	960,040	78,769	504,570	37,519	7,485,218	377,251	21,012,706	595,073
Mackerel, salted													865	24
Flounders, fresh:														
Gray sole	365,605	19,063	267,605	15,794	305,255	23,533	406,875	20,195	297,825	15,775	6,561,939	268,277	13,880,564	554,429
Lemon sole	96,745	8,007	193,233	14,516	272,739	16,344	177,015	14,023	125,475	10,999	2,436,399	150,968	13,880,564	554,429
Yellowtail	359,990	10,228	358,205	8,223	244,370	6,168	559,400	9,618	475,015	10,497	3,852,180	86,702	13,880,564	554,429
Blackback	71,855	3,066	180,938	6,723	53,590	2,322	167,027	5,757	109,095	3,563	1,032,290	37,959	13,880,564	554,429
Dab	103,440	3,399	136,700	3,703	158,435	4,954	169,805	3,459	75,425	1,745	2,081,135	44,401	13,880,564	554,429
Other	7,605	367	21,129	1,066	16,935	806	25,790	1,249	14,920	615	715,639	21,220	13,880,564	554,429
Swordfish, fresh	395,133	81,326	164,913	39,078							1,090,618	225,569	1,195,520	251,655
Whiting, fresh	555,925	6,278	954,780	17,208	1,352,119	31,415	320,110	8,620	23,450	506	6,213,064	100,192	14,902,353	253,385
Wolffish, fresh	64,581	2,348	24,490	897	46,345	1,968	37,820	1,506	59,060	1,898	1,838,906	42,751	1,920,061	46,755
Rosefish, fresh	4,062,434	63,703	4,262,094	64,032	4,968,292	102,549	5,779,297	114,691	6,270,355	108,043	41,175,252	641,011	49,419,014	720,231
Herring, fresh		1,400		18								1,400		6
Other, fresh	65,752	4,021	48,928	2,069	56,105	2,893	18,205	967	6,266	399	234,004	11,488	398,275	19,351
Total, fresh	27,224,462	723,563	26,474,171	754,754	28,285,456	869,036	29,335,270	844,496	22,878,278	661,746	324,593,127	8,467,716	339,161,394	9,583,172
Total, salted					6,400	269					6,400	269	2,065	61
Grand total	27,224,462	723,563	26,474,171	754,754	28,291,856	869,305	29,335,270	844,496	22,878,278	661,746	324,599,527	8,467,985	339,163,459	9,583,233
Landed in 1936:														
Fresh	29,942,393	811,528	31,138,927	872,835	28,010,116	813,778	26,718,676	763,955	24,744,286	670,300			339,161,394	9,583,172
Salted	865	24			1,230	37							2,065	61
Total	29,943,258	811,552	31,138,927	872,835	28,011,346	813,815	26,718,676	763,955	24,744,286	670,300			339,163,489	9,583,233

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	73, 185	\$3, 230	73, 750	\$2, 853	92, 890	\$3, 364	620, 675	\$14, 027	602, 795	\$15, 035	323, 235	\$8, 679	239, 590	\$5, 062
Market	113, 960	3, 093	80, 505	2, 241	123, 225	3, 027	620, 325	10, 566	434, 393	7, 222	337, 060	4, 828	443, 015	6, 993
Scrod	9, 350	171	9, 830	171	8, 660	164	41, 810	722	21, 040	240	10, 780	102	8, 915	93
Cod, salted:														
Large	73, 123	2, 925			15, 235	502	30, 720	922	10, 025	301	32, 100	970	317, 745	10, 373
Market	101, 231	3, 037			62, 520	1, 867	3, 135	63	3, 000	59	12, 535	257	7, 440	160
Scrod	28, 000	700			628	13								
Haddock, fresh:														
Large	64, 600	2, 459	43, 465	1, 690	183, 820	4, 646	379, 367	7, 164	186, 996	3, 861	439, 300	10, 017	307, 230	7, 665
Scrod	6, 015	120	10, 290	174	22, 130	500	43, 075	753	58, 185	1, 221	257, 335	5, 020	82, 490	1, 497
Hake, fresh:														
Large	56, 930	1, 568	29, 535	874	12, 340	252	7, 260	120	126, 995	1, 194	78, 860	858	224, 570	2, 340
Small	25, 180	567	5, 230	85	3, 095	49			1, 470	19	5, 910	82	5, 470	49
Hake, salted, large					1, 973	30							2, 560	51
Pollock:														
Fresh	418, 665	8, 099	15, 275	259	20, 150	433	90, 995	1, 191	32, 060	483	53, 589	829	598, 675	8, 286
Salted	1, 330	27									130	2	470	7
Cusk, fresh	8, 465	230	6, 620	163	2, 325	45	58, 025	730	16, 600	197	24, 958	300	99, 435	1, 338
Halibut, fresh	696	176	90	15	8	1	1, 837	139	1, 864	152	25, 098	1, 278	1, 089	71
Mackerel, fresh									58, 930	1, 264	47, 754	1, 869	269, 425	9, 215
Flounders, fresh:														
Gray sole	100, 605	3, 932	104, 150	5, 524	93, 445	3, 356	15, 570	693	29, 575	769	50, 943	1, 364	81, 145	2, 249
Lemon sole	710	28			100	2					10, 540	251	655	14
Yellowtail	6, 260	171	6, 850	208	3, 455	10	890	22	11, 060	276	765	14	255	5
Blackback	9, 920	351	5, 675	303	3, 615	161	580	21	520	14	170	6		
Dab	20, 985	351	21, 640	640	17, 040	357	20, 080	361	15, 735	196	14, 149	138	20, 130	215
Other							215	2	355	6				
Swordfish, fresh											1, 355	451	3, 870	657
Whiting, fresh	6, 845	199	795	27	420	17	605	12	8, 419	78	9, 335	86	5, 346	59
Wolfish, fresh	2, 170	55	2, 535	69	7, 815	178	48, 805	697	15, 835	230	9, 690	147	6, 045	99
Rosefish, fresh	300, 375	4, 064	286, 795	2, 884	126, 100	1, 349	8, 290	133	1, 860, 375	22, 133	2, 914, 540	31, 750	2, 227, 185	28, 748
Other, fresh	5, 230	84	3, 710	60	1, 990	34	540	10	1, 709	72	4, 626	112	48, 496	2, 098
Total, fresh	1, 280, 136	28, 978	716, 790	18, 440	719, 623	17, 925	1, 928, 924	37, 363	3, 484, 931	54, 662	4, 622, 952	68, 180	4, 673, 021	75, 753
Total, salted	203, 684	6, 689			80, 356	2, 412	33, 855	965	13, 025	360	44, 765	1, 229	328, 215	10, 591
Grand total	1, 483, 820	35, 667	716, 790	18, 440	799, 979	20, 337	1, 962, 779	38, 348	3, 497, 956	55, 022	4, 667, 717	69, 409	5, 001, 236	86, 344
Landed in 1936:														
Fresh	969, 795	32, 185	279, 499	11, 994	2, 200, 560	60, 509	3, 154, 800	69, 798	4, 848, 209	86, 340	4, 827, 771	85, 760	4, 406, 325	75, 520
Frozen					276, 690	5, 534								
Salted	247, 104	7, 624			182, 505	5, 666	46, 195	1, 226	185, 535	5, 320	116, 355	2, 624	552, 526	18, 192
Total	1, 216, 899	39, 809	279, 499	11, 994	2, 659, 755	71, 709	3, 200, 995	71, 024	5, 033, 744	91, 660	4, 944, 126	88, 384	4, 958, 851	93, 712

Landings by fishing vessels at the three principal New England ports, 1937—Continued

GLOUCESTER: BY MONTHS—Continued

Species	August		September		October		November		December		Total, 1937		Total, 1936	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Cod, fresh:														
Large	158,615	\$5,464	221,301	\$9,856	218,040	\$9,011	680,942	\$16,949	325,545	\$9,449	3,615,563	\$102,979	4,870,209	\$137,250
Market	268,545	4,302	264,135	5,519	460,821	11,141	829,640	18,204	434,662	9,457	4,410,286	85,593	1,683,419	33,682
Scrod	10,495	132	390	5	1,775	25	21,230	382	40,670	724	184,945	2,931	245,052	5,306
Cod, salted:														
Large	352,040	11,394	84,320	2,517	5,950	164				1,835	923,093	30,155	907,151	30,498
Market	6,005	131	4,990	125	126,285	4,035				160	327,301	9,739	443,757	12,710
Scrod											28,628	713	84,598	1,693
Haddock, fresh:														
Large	374,353	9,860	197,783	6,053	331,925	13,057	271,360	9,290	371,902	6,632	3,157,101	82,594	3,128,911	89,363
Scrod	125,570	2,613	98,085	2,290	251,520	6,217	65,780	1,362	29,150	792	1,049,615	22,559	845,602	19,642
Haddock, salted, large													2,510	50
Hake, fresh:														
Large	164,285	2,192	290,530	4,398	394,133	6,486	224,688	4,049	122,912	2,594	1,733,028	26,915	701,062	15,425
Small	1,655	16	7,475	81	21,405	225	8,670	102	22,462	369	111,022	1,644	49,415	916
Hake, salted, large			1,200	18	680	14					6,413	113	2,720	48
Pollock, fresh	859,705	13,567	650,824	11,112	1,055,548	16,547	3,092,629	55,570	2,136,834	28,719	9,614,949	145,095	17,145,965	280,339
Pollock, salted	40	1	160	2							2,130	39	860	10
Cusk, fresh	39,470	479	11,135	198	2,300	36	5,450	99	25,695	458	300,478	4,273	151,341	2,824
Cusk, salted			400	8							400	8	5,000	88
Halibut, fresh	463	61	235	26	193	34	2,039	236	6,821	1,165	40,433	3,354	26,751	2,116
Halibut, salted													15,895	892
Mackerel, fresh	94,670	6,440	78,695	4,758	59,468	5,008	420,878	27,341	232,343	15,866	1,262,183	71,761	7,103,273	174,353
Mackerel, salted	67,600	4,500	119,800	7,188	63,770	3,825					251,170	15,513	289,622	9,381
Flounders, fresh:														
Gray sole	63,565	2,163	62,250	2,608	55,750	2,844	125,480	4,532	65,275	2,462	847,753	32,476		
Lemon sole			11,475	772	4,560	178	210	9	940	38	29,190	1,292		
Yellowtail	8,560	160	81,970	1,551	5,965	118	82,495	1,369	31,610	467	237,135	4,371	837,065	29,657
Blackback	165	6	1,575	42	7,255	223	1,840	47	1,425	41	32,740	1,214		
Dab	17,210	243	21,295	266	32,645	619	65,500	931	34,359	502	300,768	4,819		
Other			6,165	495	1,525	148	50	5			8,310	656		
Swordfish, fresh	5,501	849	459	103							11,185	2,060	1,486	439
Whiting, fresh	17,221	224	9,295	136	228,321	5,389	37,006	893	2,045	54	325,653	7,174	2,619,800	41,893
Wolfish, fresh	3,680	62	495	10	1,520	27	1,805	42	2,000	47	102,415	1,663	68,405	1,385
Rosefish, fresh	2,307,086	29,676	1,254,777	18,698	1,134,813	23,303	2,530,794	47,962	2,011,620	35,002	17,022,740	245,732	17,093,898	242,636
Herring, fresh			3,475	33	1,400	12					4,875	45	1,750	16
Herring, frozen													276,690	5,534
Herring, salted													321,804	9,873
Other, fresh	109,489	4,380	48,778	899	46,717	1,728	23,602	926	2,602	125	297,489	10,528	291,102	5,429
Total, fresh	4,630,303	82,889	3,322,597	69,899	4,317,599	102,376	9,072,088	190,300	5,900,872	114,963	44,699,836	861,728	56,864,506	1,087,662
Total, frozen													276,690	5,534

Total, salted.....	425, 685	16, 026	210, 870	9, 858	196, 685	8, 038	-----	-----	1, 995	92	1, 539, 135	56, 280	2, 073, 917	65, 048
Grand total.....	5, 055, 988	98, 915	3, 533, 467	79, 757	4, 514, 284	110, 414	9, 072, 088	190, 300	5, 902, 867	115, 055	46, 238, 971	918, 008	59, 215, 113	1, 158, 244
Landed in 1936:														
Fresh.....	6, 285, 312	110, 355	5, 818, 793	120, 525	7, 887, 260	156, 589	9, 757, 427	161, 237	6, 428, 755	116, 850	-----	-----	56, 864, 506	1, 087, 662
Frozen.....	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	276, 690	5, 534
Salted.....	252, 418	8, 563	240, 407	8, 240	244, 872	7, 593	-----	-----	-----	-----	-----	-----	2, 073, 917	65, 048
Total.....	6, 537, 730	118, 918	6, 065, 200	128, 765	8, 132, 132	164, 182	9, 757, 427	161, 237	6, 428, 755	116, 850	-----	-----	59, 215, 113	1, 158, 244

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.....	79, 195	\$3, 189	67, 960	\$2, 204	77, 450	\$2, 475	573, 762	\$12, 146	572, 541	\$11, 816	287, 290	\$8, 470	343, 877	\$10, 208
Market.....	74, 975	2, 237	83, 818	2, 120	106, 069	2, 367	980, 218	17, 856	1, 355, 294	24, 710	65, 186	1, 062	10, 908	165
Scrod.....	2, 085	22	3, 865	71	1, 723	27	2, 195	23	1, 225	11	1, 420	11	890	10
Haddock, fresh:														
Large.....	196, 221	9, 825	163, 893	6, 299	159, 279	5, 938	1, 159, 294	23, 034	604, 953	12, 729	80, 914	3, 030	48, 720	2, 304
Scrod.....	4, 645	106	8, 120	167	2, 370	35	45, 265	825	15, 205	263	4, 830	52	1, 540	28
Hake, fresh:														
Large.....	178, 708	6, 265	133, 383	4, 970	108, 273	3, 549	113, 035	2, 760	303, 586	4, 162	291, 270	3, 962	205, 153	2, 879
Small.....	2, 705	65	80	1	300	7	3, 975	66	10, 340	93	28, 760	290	27, 820	259
Pollock, fresh.....	108, 590	1, 821	37, 036	550	67, 044	998	324, 225	3, 452	210, 799	2, 134	141, 036	1, 524	80, 090	828
Cusk, fresh.....	295, 505	8, 382	379, 770	9, 702	374, 583	8, 192	282, 444	4, 862	107, 636	2, 328	57, 926	1, 133	80, 270	1, 546
Halibut, fresh.....	1, 570	294	4, 142	759	4, 303	699	9, 328	786	3, 879	446	1, 062	168	168	26
Mackerel, fresh.....														
Mackerel, fresh.....														
Flounders, fresh:														
Gray sole.....	4, 875	204	25, 585	1, 028	21, 240	686	61, 045	1, 909	56, 210	1, 742	107, 613	2, 785	105, 953	3, 003
Lemon sole.....	300	15	-----	-----	-----	-----	20	1	-----	-----	-----	-----	-----	-----
Yellowtail.....	11, 510	235	-----	-----	-----	-----	4, 000	40	17, 550	99	4, 210	51	2, 845	57
Blackback.....	1, 715	67	-----	-----	12, 325	378	7, 280	211	5, 387	115	4, 849	43	2, 952	51
Dab.....	1, 015	18	2, 460	53	11, 100	189	56, 525	740	82, 304	639	13, 232	110	7, 295	127
Other.....	-----	-----	-----	-----	-----	-----	55	10	-----	-----	-----	-----	-----	-----
Wolfish, fresh.....	300	3	721	6	2, 625	27	38, 073	395	9, 997	94	5, 972	42	2, 892	26
Rosefish, fresh.....	4, 368	50	27, 955	159	39, 255	192	4, 390	18	13, 990	80	22, 535	112	1, 511	13
Herring, fresh.....	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	237	2	-----	-----
Other, fresh.....	1, 457	29	473	38	7, 118	493	1, 153	53	3, 315	88	4, 915	117	6, 526	134
Total.....	969, 739	32, 827	939, 261	28, 127	995, 057	26, 252	3, 656, 284	69, 177	3, 374, 261	61, 549	1, 196, 702	25, 615	1, 037, 424	25, 445
Landed in 1936, fresh.....	436, 421	16, 574	630, 700	25, 146	759, 190	21, 775	2, 145, 191	42, 455	3, 122, 037	56, 888	2, 429, 226	60, 965	1, 150, 712	28, 893

Landings by fishing vessels at the three principal New England ports, 1937—Continued

PORTLAND: BY MONTHS—Continued

Species	August		September		October		November		December		Total, 1937		Total, 1936	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Cod, fresh:														
Large	304, 145	\$14, 178	238, 558	\$10, 894	134, 627	\$6, 032	98, 275	\$3, 754	43, 435	\$1, 596	2, 821, 115	\$86, 962	2, 149, 330	\$60, 884
Market	32, 225	614	55, 755	1, 090	110, 910	2, 440	88, 135	1, 907	35, 637	888	2, 999, 130	57, 456	1, 130, 639	23, 359
Scrod	1, 931	32	200	2	900	10	2, 430	24	2, 335	42	21, 199	285	4, 585	56
Cod, salted, large													5, 180	168
Haddock, fresh:														
Large	84, 284	3, 803	71, 331	3, 486	113, 414	5, 837	171, 530	8, 595	79, 915	4, 235	2, 933, 748	89, 115	3, 636, 769	98, 100
Scrod	2, 635	48	1, 225	21	5, 160	106	13, 130	223	9, 245	231	113, 370	2, 106	503, 159	9, 369
Hake, fresh:														
Large	195, 991	3, 263	262, 573	4, 977	324, 232	7, 078	214, 695	4, 604	68, 012	1, 663	2, 398, 911	50, 132	2, 314, 592	53, 181
Small	20, 910	203	20, 945	349	43, 625	746	20, 730	488	42, 845	1, 225	223, 035	3, 792	74, 469	1, 023
Hake, salted, large													2, 030	20
Pollock, fresh	110, 965	1, 189	267, 569	2, 900	308, 540	3, 661	304, 535	4, 290	237, 672	3, 319	2, 198, 101	26, 544	3, 100, 022	49, 262
Cusk:														
Fresh	90, 040	1, 662	48, 008	998	238, 561	5, 215	154, 572	3, 665	60, 650	1, 495	2, 170, 017	49, 180	1, 308, 530	33, 414
Salted													4, 500	72
Halibut, fresh	859	115	363	57	2, 078	280	2, 601	530	1, 939	361	32, 292	4, 521	95, 103	8, 558
Mackerel, fresh	27, 315	1, 642	7, 318	377	78	10					216, 160	8, 466	263, 942	10, 816
Flounder, fresh:														
Gray sole	30, 771	1, 321	18, 274	965	2, 335	99	6, 020	295	6, 172	342	436, 093	14, 379		
Lemon sole									15	2	335	18		
Yellowtail	860	25	475	14			9, 965	152	2, 955	72	54, 370	745		
Blackback	3, 731	97	995	30	180	2	1, 310	23	670	23	41, 394	1, 040	804, 816	18, 278
Dab	5, 190	96	4, 080	82	1, 115	28	1, 405	35	4, 645	89	190, 366	2, 206		
Other									2, 765	138	2, 830	138		
Swordfish, fresh	21, 760	3, 665	857	168							22, 617	3, 833	45, 704	8, 450
Whiting, fresh	10								75	2	85	2	144, 780	2, 157
Wolfish, fresh	2, 111	27	65		583	5	625	9	115	1	64, 079	635	57, 130	610
Rosefish, fresh	1, 240	10	1, 313	13	325	5	8, 585	121	3, 760	49	129, 227	822	78, 647	775
Herring, fresh											237	2	73, 340	374
Other, fresh	3, 844	94	15, 454	210	6, 157	170	1, 860	71	529	12	52, 801	1, 509	116, 318	1, 613
Total, fresh	940, 817	32, 063	1, 015, 358	26, 533	1, 292, 820	31, 724	1, 100, 403	28, 786	603, 386	15, 785	17, 121, 512	403, 886	15, 901, 875	380, 479
Total, salted													11, 710	260
Grand total	940, 817	32, 063	1, 015, 358	26, 533	1, 292, 820	31, 724	1, 100, 403	28, 786	603, 386	15, 785	17, 121, 512	403, 886	15, 913, 585	380, 739
Landed in 1936:														
Fresh	1, 275, 154	33, 478	1, 456, 933	35, 165	1, 242, 169	30, 514	604, 718	18, 543	649, 424	20, 083			15, 901, 875	380, 479
Salted	11, 710	260											11, 710	260
Total	1, 286, 864	33, 738	1, 456, 933	35, 165	1, 242, 169	30, 514	604, 718	18, 543	649, 424	20, 083			15, 913, 585	380, 739

SUMMARY: BY PORTS

Species	Boston		Gloucester		Portland		Total, 1937		Total, 1936	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Cod, fresh:										
Large	29,337,085	\$801,135	3,615,563	\$102,979	2,821,115	\$84,962	35,773,763	\$901,076	36,535,867	\$1,109,992
Market	53,595,693	1,078,298	4,410,286	85,593	2,909,130	57,456	61,005,109	1,221,347	38,737,087	1,017,835
Scrod	2,944,710	46,513	184,945	2,931	21,199	285	3,150,854	49,729	4,665,622	95,885
Cod, salted:										
Large	6,000	255	923,093	30,155			929,093	30,410	913,351	30,699
Market	400	14	327,301	9,739			327,701	9,753	443,892	12,713
Scrod			28,628	713			28,628	713	84,596	1,993
Haddock, fresh:										
Large	96,818,320	2,889,068	3,157,101	82,594	2,933,748	89,115	102,909,169	3,060,777	104,358,533	3,494,049
Scrod	33,103,115	762,164	1,049,615	22,539	113,370	2,106	34,266,100	786,828	39,520,217	966,624
Haddock, salted, large									2,510	50
Hake, fresh:										
Large	8,111,045	184,814	1,733,028	26,915	2,398,911	50,132	12,242,984	261,861	11,013,515	298,444
Small	1,614,385	35,900	111,022	1,644	223,035	3,792	1,948,442	41,236	918,494	26,096
Hake, salted, large									6,413	89
Pollock, fresh	16,857,310	310,518	9,614,949	145,095	2,198,101	26,544	28,670,360	482,157	34,406,796	665,369
Pollock, salted									2,130	860
Cusk, fresh	5,555,782	114,915	300,478	4,273	2,170,017	49,180	8,026,277	168,368	7,200,538	168,321
Cusk, salted									400	160
Halibut, fresh	1,937,638	236,684	40,433	3,354	32,292	4,521	2,010,363	244,559	2,181,737	228,741
Halibut, salted									15,895	892
Mackerel, fresh	7,485,218	377,251	1,262,163	71,761	216,160	8,466	8,963,541	457,478	28,379,921	780,242
Mackerel, salted			251,170	15,513			251,170	15,513	290,487	9,405
Flounders, fresh:										
Gray sole	6,561,939	268,277	847,753	32,476	436,093	14,379	7,845,785	315,132		
Lemon sole	2,436,399	150,968	29,190	1,292	335	18	2,465,924	152,278		
Yellowtail	3,852,180	86,702	237,135	4,371	54,370	745	4,143,685	91,818		
Blackback	1,032,290	37,939	32,740	1,214	41,394	1,040	1,106,424	40,213	15,522,445	602,364
Dab	2,061,135	44,401	300,798	4,819	190,366	2,205	2,572,269	51,425		
Other	715,639	21,220	8,310	656	2,830	138	726,779	22,014		
Swordfish, fresh	1,090,618	225,569	11,186	2,060	22,617	3,833	1,124,420	231,462	1,242,710	260,544
Whiting, fresh	6,213,064	100,192	325,653	7,174	85	2	6,538,902	107,368	17,666,933	297,435
Wolfish, fresh	1,838,906	42,751	102,415	1,663	64,079	635	2,005,400	45,049	2,045,616	49,750
Rosefish, fresh	41,175,252	641,011	17,022,740	245,732	129,227	822	58,327,219	887,565	66,591,559	963,642
Herring, fresh	1,400	18	4,875	45	237	2	6,512	65	75,490	596
Herring, frozen									276,000	5,534

Landings by fishing vessels at the three principal New England ports, 1937—Continued

SUMMARY: BY PORTS—Continued

Species	Boston		Gloucester		Portland		Total, 1937		1936	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Herring, salted.....									321,804	\$9,678
Other, fresh.....	234,004	\$11,488	297,489	\$10,528	52,801	\$1,509	584,294	\$23,525	805,695	\$26,384
Total, fresh.....	324,593,127	8,467,716	44,699,836	861,728	17,121,512	403,886	386,414,415	9,733,330	411,927,775	11,051,313
Total, frozen.....									276,690	5,534
Total, salted.....	6,400	289	1,539,135	56,280			1,545,535	56,549	2,087,722	65,369
Grand total.....	324,599,527	8,467,985	46,238,971	918,008	17,121,512	403,886	387,960,010	9,789,879	414,292,187	11,122,216
Landed in 1936:										
Fresh.....	339,161,394	9,583,172	56,864,506	1,067,662	15,901,875	380,479			411,927,775	11,051,313
Frozen.....			276,690	5,534					276,690	5,534
Salted.....	2,095	61	2,073,917	65,048	11,710	260			2,087,722	65,369
Total.....	339,163,489	9,643,233	59,215,113	1,158,244	15,913,585	380,739			414,292,187	11,122,216

¹ The items under "Other, fresh" include albacore, 35 pounds, value \$2; alewives, 109,415 pounds, value \$1,120; butterfish, 122,831 pounds, value \$6,904; cunner (perch) 320 pounds, value \$11; eels, 1,790 pounds, value \$45; gooselish, 16,525 pounds, value, \$178; herring smelt, 10,645 pounds, value \$191; salmon, 83 pounds, value \$19; seup or porgy, 15,030 pounds, value \$314; sea bass, 640 pounds, value \$25; shad, 30,409 pounds, value \$1,769; sharks, 65,356 pounds, value \$1,865; skates, 34,822 pounds, value \$160; striped bass, 28,185 pounds, value \$2,536; sturgeon, 3,633 pounds, value \$350; tautog, 700 pounds, value \$27; tuna, 119,619 pounds, value \$5,872; mixed fish, 8,106 pounds, value \$127; lobsters, 251 pounds, value \$90; scallops, 8,752 pounds, value \$1,147; shrimp, 7,072 pounds, value \$502; and squid, 75 pounds, value \$1. The total for "Other, fresh" for 1937 does not represent the aggregate of "Other fresh" as recorded in the monthly bulletins throughout the year, since no livers, spawn, or tongues are included in the above table. These commodities were included in the monthly bulletins prior to May.

² Does not include the landings of livers, sounds, spawn, and tongues previously reported in this item.

NOTE.—In addition to the above the following also were landed during 1937: Livers, 2,920,873 pounds, value \$65,669; spawn, 167,688 pounds, value \$6,466; and tongues, 30 pounds, value \$1.

BIOLOGICAL ASPECT

In 1937 the fishing fleet landing fares at Boston and Gloucester, Mass., and Portland, Maine, and operating on the fishing banks of the North Atlantic, numbered 373 steam, motor, and sail vessels of 5 net tons capacity or greater, as measured by the United States Customs Service. The catch of edible fish landed at the three ports amounted to 389,-228,243 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 316,631,906 pounds, or 81 percent of the total landings. Line trawls were next in importance, accounting for 44,006,603 pounds, or 11 percent of the total landings.

The catch taken off New England and landed at the three ports amounted to 237,283,835 pounds, or 61 percent of the total; that off Nova Scotia 146,965,720 pounds, or 38 percent; off the east coast of Newfoundland 3,818,780 pounds, or 1 percent; and that off the Middle Atlantic States 1,159,908 pounds, or less than one-half of 1 percent.

Landings by fishing vessels at the three principal New England ports, 1937

BY GEAR AND FISHING AREAS

Gear and fishing areas	Vessels fishing	Trips	Days absent	Cod			Haddock		Hake		Pollock	Cusk	Halibut
				Large	Market	Scrod	Large	Scrod	Large	Small			
	Number	Number	Number	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
Line trawls:													
Treaty Coast	2	2	207	138,934	314,787	56,683					2,527		
Magdalen Islands	1	3	136	1,126,700	242,500								
Magdalen Island (occasional)				95,000									
Gulf of St. Lawrence, unclassified	5	7	140	39,779	25,751		6,700		149,075			11,255	104,181
Grand Bank	2	6	158	98,496	11,650				7,564				298,320
Green Bank	1	2	48	5,113	233				3,470			2,496	97,696
St. Pierre Bank	2	4	86	2,726	1,900								208,527
Northeast Cape Breton	2	4	55	7,521	3,776		20,255	165			855	35,300	55,609
Banquereau	4	10	229	126,698	26,954				84,002		3,800	14,449	242,948
Middle Ground	1	1	10	28,900	15,200		59,700				500		2,541
Northeast Sable Island Bank	3	3	21	21,783	6,471		3,720	420		24,740		370	30,052
Southeast Sable Island Bank	1	2	5	10,730	16,960			800		3,990		510	571
Horseshoe Ground	4	4	31	21,493	13,936		34,010	2,510		14,466		3,850	16,719
Southwest Sable Island Bank	5	5	32	47,720	48,130	1,700	101,060	5,910		6,930		10,165	1,200
Eastern Nova Scotia	2	2	20	28,060	24,530	3,100	31,055	180		39,640		725	16,750
Emerald Bank	7	12	109	81,810	87,260		385,420	28,390		97,630		15,465	143,385
Central Nova Scotia	2	2	17	12,650	5,000		380			36,380		802	23,680
La Have Bank (including Sambro Bank)	20	42	429	437,742	490,910	18,200	448,950	32,875		367,768		23,883	420,815
Southern Nova Scotia	17	46	380	307,825	425,385	28,240	841,095	86,845		215,028	525	100,846	347,417
Browns Bank	25	163	1,511	1,604,112	1,385,511	20,145	4,133,548	222,235		615,748	830	195,007	991,242
Western Nova Scotia	23	49	449	284,384	368,815	11,630	783,900	90,750		535,180		86,870	297,650
Southern Bay of Fundy	1	3	24	11,250	8,695		70,455	2,020		12,990		895	14,405
Nova Scotia, unclassified	8	12	159	134,560	90,930		118,570	5,240		147,440		9,955	134,080
Eastern Maine	2	4	48	8,450	6,580	480	23,295	1,260		7,050		4,540	6,220
Central Maine	18	160	1,214	150,033	120,540	4,425	116,184	3,180		1,248,890		48,955	78,083
Western Maine	14	162	209	34,545	17,560	1,915	54,430	1,710		102,936		19,290	10,160
Eastern Massachusetts	34	694	1,418	376,345	465,030	57,705	339,255	2,135		40,430		305,855	122,160
Eastern Massachusetts (occasional)				550	500	45				175		1,800	180
Inner Grounds	54	437	2,050	560,402	571,620	21,200	1,906,447	72,985		2,016,094		242,380	276,719
Western Side South Channel	16	66	411	414,395	443,620	2,060	1,678,250	72,220		248,465		127,995	146,590
Eastern Side South Channel	17	53	325	220,420	156,955	375	759,580	25,155		532,160	350	40,590	408,435
Northern Edge of Georges	8	17	96	254,647	170,175		235,235	4,240		76,855		25,175	60,355
Northeast Peak of Georges	4	5	38	119,380	50,160		62,900	2,600		29,880		5,894	18,450
Lightship Grounds	1	1	7	19,000	18,500		71,300	1,900		2,800		1,000	460
Nantucket Shoals	1	1	7	10,430	5,360		28,700	2,900				1,150	1,632
Off No Mans Land	3	3	21	8,400	9,750	200	27,900	4,800		5,500		3,200	22,575
Southern New England, unclassified	2	4	21	59,170	16,780		54,900	500				5,000	24,780
Total	190	1,991	10,121	6,910,153	5,668,394	228,103	12,397,194	673,925		6,713,351	625,085	1,161,141	7,626,568
													1,551,206

Hand lines:												
Central Maine (occasional)				215	365				30		700	125
Western Maine	2	3	4	425	810				65		35	
Eastern Massachusetts	7	7	20	3,706	4,035	25	25		50		815	30
Eastern Massachusetts (occasional)					690							
Western Side South Channel	1	1	7	7,500	4,800						1,300	
Total	10	11	31	11,845	10,700	25	25		145		2,850	155
Harpoons:												
Northeast Cape Breton	15	15	288									
Banquereau	1	1	28									
Northeast Sable Island Bank	1	1	12									
Horseshoe Ground	1	1	4									
La Have Bank (including Sambro Bank)	1	1	5									
Browns Bank	30	50	703									
Nova Scotia, unclassified	2	2	31									
Western Maine	1	5	5									
Eastern Massachusetts	1	1	1									
Western Side South Channel	1	1	12									
Eastern Side South Channel	1	1	8									
Northern Edge of Georges	11	14	155									
Northeast Peak of Georges	20	23	191									
Southeast Georges	9	11	145									
Southwest Georges	15	18	278									
Lightship Grounds	9	12	145									
Off No Mans Land	3	3	31									
Southern New England, unclassified	9	10	124									
South	6	6	73									
Total	136	176	2,239									
Otter trawls, large:												
Newfoundland Banks, unclassified	3	4	32	62,600	103,700	9,400	220,300	18,080	760		2,560	20
Misaine Bank	1	1	12	6,500	22,500	2,700	81,000	500	100		100	
Banquereau	48	140	1,441	2,872,209	12,088,018	1,017,816	3,881,991	774,350	22,075		196,230	777
Middle Ground	37	76	625	948,675	2,221,141	176,815	2,940,770	166,605	68,535		152,215	8,335
Northeast Sable Island Bank	37	80	616	1,156,115	2,650,520	82,535	2,994,375	296,095	19,820		226,957	8,463
Southeast Sable Island Bank	14	15	117	518,625	833,915	11,600	351,165	15,340	11,340		57,668	2,815
Horseshoe Ground	59	183	1,511	3,321,778	2,207,747	93,881	8,638,823	307,405	242,445		1,428,851	33,994
Southwest Sable Island Bank	40	87	592	1,462,557	1,624,430	59,235	3,490,393	304,710	42,437	190	372,990	4,433
Eastern Nova Scotia	6	6	18	9,690	26,450	1,300	114,310	11,920	5,620		5,190	190
Emerald Bank	48	118	846	1,268,836	1,212,455	72,443	5,564,202	406,904	169,230		682,815	20,785
Central Nova Scotia	2	2	7	1,520	11,800		33,960	22,820	3,690		820	520
La Have Bank (including Sambro Bank)	6	8	31	34,305	39,745	2,300	78,060	27,638	4,595		23,050	100
Southern Nova Scotia	22	85	543	345,271	223,215	2,620	204,060	74,430	59,270		166,330	295
Browns Bank	52	253	1,567	1,306,208	2,134,821	105,355	6,970,155	1,844,828	161,531	760	1,512,993	31,355
Western Nova Scotia	5	9	87	365,662	507,570	11,160	185,090	20,315	10,555		236,115	427

See footnotes at end of table.

Landings by fishing vessels at the three principal New England ports, 1937—Continued

BY GEAR AND FISHING AREAS—Continued

Gear and fishing areas	Vessels fishing	Trips	Days absent	Cod			Haddock		Hake		Pollock	Cusk	Halibut
				Large	Market	Scrod	Large	Scrod	Large	Small			
	Number	Number	Number	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
Otter trawls, large—Continued.	22	32	335	416,505	684,730	75,700	1,029,010	150,005	39,660	191,265	4,370	10,031	
Nova Scotia, unclassified	1	1	1							11,830			48
Eastern Massachusetts	3	4	18	2,300	1,980		5,280		320	3,060	220		
Inner Grounds	44	199	1,263	612,383	952,160	36,065	3,769,765	1,704,265	345,240	838,322	28,831		7,476
Western Side South Channel	52	190	1,054	623,349	840,645	22,670	3,467,117	1,217,444	372,648	1,277,735	23,229		15,664
Eastern Side South Channel	58	420	2,620	2,447,834	9,086,219	404,895	11,301,360	7,201,024	305,823	1,452,995	31,751		61,024
Northern Edge of Georges	62	541	4,080	5,593,405	10,973,735	524,455	18,656,239	11,134,229	285,343	3,048,361	69,937		81,009
Northeast Peak of Georges	34	75	404	338,750	786,515	25,300	1,657,070	1,057,494	26,860	133,785	5,016		9,974
Central Georges	34	74	503	818,285	789,190	18,050	2,283,535	1,754,087	86,133	275,730	4,722		12,538
Southeast Georges	6	7	22	17,970	32,850	940	71,670	47,920	6,490	11,640			296
Southwest Georges	3	3	7	2,505	17,135		14,020	12,495	185		15		9
Lightship Grounds	4	4	31	22,360	101,830	1,700	147,450	100,900	4,300	8,110	600		120
Nantucket Shoals	17	21	163	119,785	277,925	28,600	547,060	315,785	19,700	92,228	3,950		3,393
Southern New England, unclassified													
Total	170	2,638	18,546	24,686,082	51,452,933	2,787,635	78,668,270	28,986,988	2,314,695	950	12,411,025	285,170	428,747
Otter trawls, medium:													
Southeast Sable Island Bank	2	2	5	1,200	250		900	125	3,190		350		
Southern Nova Scotia	27	106	840	163,648	111,042	7,985	98,828	34,800	64,358	6,505	34,094	3,965	153
Browns Bank	25	97	744	211,017	179,036	1,565	541,799	152,875	52,346	3,470	65,537	4,473	881
Western Nova Scotia	19	36	319	47,125	38,307	1,620	79,893	9,920	29,572	3,040	6,248	5,975	111
Central Maine	3	4	18	745	540		565	35	7,550	6,630	780		
Western Maine	14	73	260	32,950	24,525		60,050	6,825	35,990	79,200	6,090	310	508
Eastern Massachusetts	39	215	798	61,198	92,935	15,720	34,970	69,900	196,955	110,865	2,584,300	7,200	173
Inner Grounds	43	152	701	39,701	42,807	5,405	93,635	15,160	76,795	14,120	174,548	37,632	32
Western Side South Channel	64	417	2,609	394,421	441,899	4,960	2,732,042	1,343,837	293,263	38,655	197,877	18,311	2,404
Eastern Side South Channel	35	148	968	277,334	276,741	14,500	2,142,143	655,380	143,330	103,256	11,402	5,682	5,824
Northern Edge of Georges	24	56	336	122,259	321,640	1,250	898,775	568,220	23,055		32,311	290	3,554
Northeast Peak of Georges	12	44	303	460,212	338,215	8,500	707,615	439,045	9,109		64,673	315	2,023
Central Georges	20	85	599	194,822	268,350	5,400	1,452,850	679,563	10,442		78,592	350	5,518
Southeast Georges	11	27	188	391,763	149,420	450	384,230	193,400	4,675		42,075		4,898
Southwest Georges	11	26	185	12,375	78,950	450	591,720	207,020	5,915		4,732		
Lightship Grounds	10	13	91	7,880	36,010		363,845	60,860	4,540	655	3,650		
Nantucket Shoals	4	5	28	400	1,000	100	400		315	1,025			
Off No Mans Land	6	8	35	460	810		150		5,630		16,000		
Southern New England, unclassified	11	17	88	27,780	28,835	100	130,230	57,840	8,070		300	200	795
Total	186	1,531	9,115	2,447,290	2,431,312	60,255	10,314,640	4,494,805	975,100	264,165	3,415,443	90,423	28,553

Otter trawls, small:													
Western Nova Scotia.....	1	2	18	325	515		480	200	355	75	70	50	195
Eastern Maine.....	1		5										270
Central Maine.....	18	150	1,060	68,486	41,819	985	213,725	6,215	241,411	109,970	4,155	110	270
Western Maine.....	48	203	671	52,167	40,676	8,775	98,822	2,200	100,054	197,790	6,165	2,560	192
Eastern Massachusetts.....	76	1,454	4,422	347,420	459,919	76,115	214,533	52,947	136,059	628,045	788,658	6,005	322
Inner Grounds.....	38	100	367	22,935	29,035	2,995	34,145	4,635	22,150	20,095	28,935	615	17
Western Side South Channel.....	40	95	353	52,455	50,945	26,635	52,744	19,560	4,170	300	350	45	10
Eastern Side South Channel.....	3	8	39	3,205	5,150		2,646	4,140	180				
Central Georges.....	1	1	8		1,800		57,200	3,050	2,440		545		
Lightship Grounds.....	6	6	34	1,275	9,025		1,590		12,145	1,000	700		13
Nantucket Shoals.....	11	26	93	1,290	3,695				3,200		25		
Off No Mans Land.....	9	17	58	100	970				3,300		75		
Southern Massachusetts.....	3	6	20										
Total.....	198	2,069	7,148	549,648	643,549	115,505	780,340	107,242	546,119	980,745	834,248	10,445	1,019
Sink gill nets:													
Western Maine.....	18	2,212	2,212	1,562,599	480,275	6,244	291,802	1,220	757,295	73,030	1,938,061	9,716	241
Eastern Massachusetts.....	37	3,842	3,842	1,370,806	952,840	9,780	456,898	1,920	948,384	4,467	8,850,953	4,160	588
Total.....	148	6,054	6,054	2,933,405	1,433,115	16,024	748,700	3,140	1,705,679	77,497	10,789,014	13,876	829
Drift gill nets:													
Western Maine.....	2	18	18	265	595						20	400	
Eastern Massachusetts.....	33	222	262								7,145		
Inner Grounds.....	5	6	16										
Western Side South Channel.....	9	21	68										
Southern Massachusetts.....	1	1	3										
Total.....	135	268	367	265	595						7,165	400	
Purse seines:													
Magdalen Islands.....	1	1	16										
Northeast Cape Breton.....	1	1	72										
Canso.....	2	2	19										
Eastern Nova Scotia.....	4	5	34										
Central Nova Scotia.....	4	5	51										
Browns Bank.....	1	1	4										
Central Maine.....	21	53	256	350	105	65					48,430		
Western Maine.....	8	9	28										
Eastern Massachusetts.....	61	424	1,222		45	25			80		5,090		
Inner Grounds.....	1	1	5		100								
Western Side South Channel.....	23	36	123										
Lightship Grounds.....	15	17	67										
Nantucket Shoals.....	2	2	6										
Off No Mans Land.....	40	91	369										

See footnotes at end of table.

Landings by fishing vessels at the three principal New England ports, 1937—Continued

BY GEAR AND FISHING AREAS—Continued

Gear and fishing areas	Vessels fishing	Trips	Days absent	Cod			Haddock		Hake		Pollock	Cusk	Halibut
				Large	Market	Scrod	Large	Scrod	Large	Small			
	Number	Number	Number	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
Purse seines—Continued													
Southern Massachusetts	1	1	2										
Rhode Island	7	8	23										
South	24	34	125										
Total	¹ 76	691	2,422	¹ 350	¹ 250	¹ 90			¹ 80		¹ 53,520		
Scallop drags:													
Northern Edge of Georges	1	1	9										
Southwest Georges	1	1	5										
Total	2	2	14										
Grand total	¹ 373	15,431	56,057	37,539,038	61,640,848	3,207,537	102,909,169	34,266,100	12,256,169	1,948,442	28,674,406	8,027,037	2,010,363

¹ Exclusive of duplication.² Incidental catch.

NOTE.—The 3 principal New England ports are Boston and Gloucester, Mass., and Portland, Maine. Otter 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. The statistics of landings shown in this bulletin do not correspond exactly with the total of the 12 monthly bulletins since some of the monthly figures have been revised.

Landings by fishing vessels at the three principal New England ports, 1937—Continued

BY GEAR AND FISHING AREAS—Continued

Gear and fishing areas	Mackerel	Flounders						Sword-fish	Whiting	Wolf-fish	Rosefish	Herring	Other	Total
		Gray sole	Lemon sole	Yellow-tail	Black-back	Dab	Other							
	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	
Line trawls:														
Treaty Coast													516,660	
Magdalen Islands													1,369,200	
Magdalen Islands (occasional)													95,000	
Gulf of St. Lawrence, unclassified													336,741	
Grand Bank								300					416,330	
Green Bank													109,006	
St. Pierre Bank													213,153	
Northeast Cape Breton													134,681	
Banquereau								614					499,365	
Middle Ground													106,841	
Northeast Sable Island Bank										75			109,771	
Southeast Sable Island Bank										460			38,001	
Horseshoe Ground		52,700								425			175,209	
Southwest Sable Island Bank										1,675			227,029	
Eastern Nova Scotia													144,733	
Emerald Bank								312		5,870			869,026	
Central Nova Scotia										100			79,022	
La Have Bank (including Sambro Bank)								1,221		15,425	200		2,395,320	
Southern Nova Scotia		840				2,675				44,726			2,411,405	
Browns Bank			2,100			1,810		2,200		86,217	160		9,495,611	
Western Nova Scotia										28,355			2,505,301	
Southern Bay of Fundy													120,950	
Nova Scotia, unclassified										6,085			654,406	
Eastern Maine													66,255	
Central Maine		7,300	20			100				1,335	325		2,621,364	
Western Maine		15			110	335			7,200	535	650		20	
Eastern Massachusetts		425		20,900	3,600	4,115			6,400	22,450	435		1,846,913	
Eastern Massachusetts (occasional)													3,250	
Inner Grounds		700		5,000		495				500	8,465	230	48	
Western Side South Channel		1,225			150	150	650	437	1,300	1,800	64,210		825	
Eastern Side South Channel				4,300		1,900				8,090			3,215,993	
Northern Edge of Georges						140							2,164,019	
Northeast Peak of Georges													670	
Lightship Grounds													125	
Nantucket Shoals													290,422	
Off No Mans Land				14,400					1,800	100			114,960	
Southern New England, unclassified										1,300			50,272	
										110			100,533	
													186,581	
Total		63,205	2,120	44,600	3,860	11,720	650	4,984	17,200	234,393	66,200		2,551	44,006,603

* Incidental catch.

Landings by fishing vessels at the three principal New England ports, 1937—Continued

BY GEAR AND FISHING AREAS—Continued

Gear and fishing areas	Mackerel	Flounders						Sword-fish	Whiting	Wolf-fish	Rosefish	Herring	Other	Total
		Gray sole	Lemon sole	Yellow-tail	Black-back	Dab	Other							
Hand lines:	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
Central Maine (occasional)														1,435
Western Maine														1,335
Eastern Massachusetts														8,694
Eastern Massachusetts (occasional)														690
Western Side South Channel														13,600
Total														25,754
Harpoons:														
Grand Bank (occasional)								3,264						3,264
Green Bank (occasional)								567						567
Northeast Cape Breton								103,349					397	103,746
Banquereau								20,312						20,312
Northeast Sable Island Bank								4,765						4,762
Horseshoe Ground								1,301						1,301
La Have Bank (including Sambro Bank)								4,140						4,140
La Have Bank (including Sambro Bank) (occasional)								918						918
Southern Nova Scotia (occasional)								4,983						4,983
Browns Bank								363,109						363,109
Browns Bank (occasional)								8,585						8,585
Western Nova Scotia (occasional)								2,971						2,971
Nova Scotia, unclassified								6,946						6,946
Western Maine														
Eastern Massachusetts								185					4,424	4,424
Eastern Massachusetts (occasional)														185
Western Side South Channel													65	65
Eastern Side South Channel								5,499						5,499
Northern Edge of Georges								2,657						2,657
Northern Edge of Georges (occasional)								54,164						54,164
Northeast Peak of Georges								540						540
Southeast Georges								83,403						83,403
Southwest Georges								79,499						79,499
Lightship Grounds								199,218						199,218
Nantucket Shoals (occasional)								75,808						75,808
Off No Mans Land								502						502
								10,397						10,397

Southern New England, unclassified.										47, 512									
South										34, 163									
Total										1, 118, 757		4, 836		1, 123, 643					
Otter trawls, large:																			
Newfoundland Banks, unclassified												20		420, 547					
Missine Bank												100		126, 001					
Banquereau										3, 000		5, 000							
										80, 909		5, 367		298, 545					
										298, 545		587		182, 812					
										87, 530									
Middle Ground										138		2, 997		346, 713		47, 872			
										137		32, 445		12, 868		69, 895			
												6, 350		700		13, 517			
										1, 475, 346		28, 488		159, 765		228			
										36, 670		8, 350		700		32, 136			
										1, 475, 346		28, 488		159, 765		228			
										88, 954		13, 394		24, 776		340			
										62, 490		180		395		700			
										458, 620		7, 893		27, 649		10			
										450		270		2, 280		1, 400			
La Have Bank (including Sambro Bank)										4, 268		855		1, 800		50			
										256, 240		10, 970		2, 875		350			
										301, 561		44, 698		55, 143		2, 890			
										4, 950				27, 205		995			
										107, 630		3, 140		78, 500		3, 590			
										860		240				28, 180			
										202		165, 404		116, 365		28, 182			
										350		250, 529		114, 100		40, 522			
										8, 141		101, 926		429, 524		112, 976			
										28, 082		59, 286		398, 449		89, 992			
										175		21, 603		222, 297		63, 376			
										4, 735		13, 920		28, 251		28, 725			
												55		12, 729		3, 511			
												4, 800		540		280			
												7, 835		1, 275		11, 364			
										19, 835		22, 695		10, 595		8, 580			
																1, 450			
																1, 975			
Total										42, 076		3, 966, 854		1, 499, 535		1, 478, 180		275, 120	
																950, 010			
																617, 725			
																127, 905			
																1, 546, 098			
																26, 183, 373			
																64, 149			
																238, 773, 420			
Otter trawls, medium:																			
												2, 625				1, 000			
												187, 127		2, 250		1, 470			
										22		125, 226		2, 680		1, 270			
												59, 307		665		500			
												17, 375				4, 250			
												357, 350		2, 190		11, 305			
										600		180, 385		1, 150		96, 912			
												241, 463		1, 195		9, 235			
										745		287, 467		83, 240		22, 598			
																93, 360			
																101, 713			
																5, 073			
																8, 000			
																2, 895			
																8, 000			
																2, 995			
																15, 898			
																119, 742			
																17, 266			
																12, 944, 548			
																23, 555			
																19, 166, 976			

† Incidental catch.

Landings by fishing vessels at the three principal New England ports, 1937—Continued

BY GEAR AND FISHING AREAS—Continued

Gear and fishing areas	Mackerel	Flounders						Sword-fish	Whiting	Wolf-fish	Rosefish	Herring	Other	Total
		Gray sole	Lemon sole	Yellow-tail	Black-back	Dab	Other							
Otter trawls, medium—Continued	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	
Eastern Side South Channel	100	89,445	157,510	32,450	33,210	164,447	30,040		27,752	33,091	2,041,684			
Northern Edge of Georges		3,455	69,248	14,460	19,805	37,714	2,390	540	7,525	9,240	34,420	2,325	6,243,822	
Northeast Peak of Georges	73	3,690	54,580	24,052	13,875	4,668	810		25	6,000		523	2,170,674	
Central Georges		4,955	212,949	102,240	75,700	6,493	5,902		463	5,415	4,500	600	2,134,930	
Southeast Georges		4,890	29,972	13,943	6,585	1,607	470			2,600		275	3,210,379	
Southwest Georges		1,235	168,647	11,410	38,300	1,800	9,565			1,845	2,200	140	1,227,901	
Lightship Grounds	585	4,308	1,850	2,550	3,900	5,360	480			485	182,576	60	1,140,902	
Nantucket Shoals		4,000		71,970	925	500	7,550				6,500	9,690	679,874	
Off No Mans Land		6,945		123,100	620	620	1,845		6,500		32,170	13,410	209,270	
Southern New England, unclassified		5,460	21,008	7,165	1,760	5,465			1,200	1,285	49,950	450	345,873	
Total	2,125	1,586,708	909,134	550,880	318,775	651,653	83,155	540	709,155	120,145	31,016,576	70,170	60,541,002	
Otter trawls, small:														
Western Nova Scotia		260				1,560				170			10,400	
Eastern Maine		8,000				500	900				14,300		18,555	
Central Maine		390,680	1,165	27,680	29,432	115,255	4,765		3,000	13,515		1,000	1,376,586	
Western Maine		583,515	25,275	74,000	40,435	129,110	10,954	139	236,609	9,427	413,440	308	1,376,586	
Eastern Massachusetts	600	1,001,690	6,825	980,175	392,905	603,710	2,950		5,191,981	57,405	266,138	400	11,072	
Inner Grounds		137,585		34,870	13,265	55,025	65		2,610	93,815			59,063	
Western Side South Channel		99,808	11,737	67,820	20,755	40,310	2,100		184,648	18,500	159,060		11,273,865	
Eastern Side South Channel		2,803	60	3,283	140				5,126	27			2,440	
Central Georges		540	207	225					478	700			555,469	
Lightship Grounds		297	2,830	75,815	1,965		135			230			101,744	
Nantucket Shoals	165	2,277	6,703	393,300	4,810		815		600	320			10,062	
Off No Mans Land		575		322,390	140		1,930		9,000				154,660	
Southern Massachusetts				89,100									430,778	
Total	765	2,227,490	55,135	2,068,640	504,072	948,805	24,614	139	5,681,201	102,682	1,051,093	1,400	3,925	
Sink gill nets:													60	
Western Maine	307	1,353		65	2,497	2,326	65						92,460	
Eastern Massachusetts	249	175		1,320	2,075	7,755	570		85	1,322	9,257		29,644	
Total	556	1,528		1,385	4,572	10,081	635		85	2,082	9,977	4,875	12,690,438	
									85	2,082	9,977	4,875	100,787	
													17,857,842	

Drift gill nets:														
Magdalen Islands (occasional).....	176,580												176,580	
Western Maine.....	16,006										37	227	17,550	
Eastern Massachusetts.....	771,193						3,256					5,958	787,552	
Inner Grounds.....	86,300											340	86,640	
Western Side South Channel.....	274,350											2,196	276,546	
Southern Massachusetts.....	6,275											225	6,500	
Total.....	1,330,704						3,256				37	8,946	1,351,368	
Purse seines:														
Magdalen Islands.....	161,730												161,730	
Northeast Cape Breton.....	770												770	
Canso.....	90,375												90,375	
Eastern Nova Scotia.....	196,470												196,470	
Central Nova Scotia.....	166,395												166,395	
Browns Bank.....	36,775												36,775	
Central Maine.....	371,702										200	10,670	431,522	
Western Maine.....	90,450											2,000	92,450	
Eastern Massachusetts.....	2,226,648			25								220,903	2,452,816	
Eastern Massachusetts (occasional).....	3,355											400	3,755	
Inner Grounds.....	140												140	
Western Side South Channel.....	382,690											4,610	387,300	
Lightship Grounds.....	390,300											165	390,465	
Nantucket Shoals.....	63,000												63,000	
Nantucket Shoals (occasional).....	910												910	
Off No Mans Land.....	2,310,710											1,200	2,311,910	
Southern Massachusetts.....	27,800												27,800	
Rhode Island.....	282,140												282,140	
South.....	1,124,035											1,710	1,125,745	
Total.....	7,926,395			25							200	241,658	8,222,568	
Scallop drags:														
Northern Edge of Georges.....												4,059	4,059	
Southwest Georges.....												4,500	4,500	
Total.....												8,559	8,559	
Grand total.....	9,302,621	7,845,785	2,465,924	4,143,685	1,106,424	2,572,269	726,779	1,124,420	6,538,802	2,005,400	58,327,219	6,512	584,294	389,228,243

* Incidental catch.

Landings by fishing vessels at the three principal New England ports, 1937—Continued

SUMMARY: BY FISHING AREAS

Fishing areas	Vessels fishing	Trips	Days absent	Cod			Haddock		Hake		Pollock	Cusk	Halibut	
				Large	Market	Scrod	Large	Scrod	Large	Small				
Gulf of St. Lawrence (Area XIX):	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	
Treaty Coast.....	2	2	207	138,934	314,767	66,683			3,749		2,527			
Magdalen Islands.....	1	4	152	1,221,700	242,500									
Gulf of St. Lawrence, unclassified.....	5	7	140	39,779	25,751		6,700		149,075			11,255	104,181	
Newfoundland Banks (Area XX):														
Grand Bank.....	2	6	158	98,496	11,650				7,564				298,320	
Green Bank.....	1	2	48	5,113	233				3,470			2,496	97,696	
St. Pierre Bank.....	2	4	86	2,726	1,900								208,527	
Newfoundland Banks, unclassified.....	3	4	32	62,600	103,700	9,400	220,300	18,080	760		2,560	20	87	
Total.....	1	12	29	1,569,348	700,501	66,083	227,000	18,080	164,618		5,087	13,771	708,811	
Off Nova Scotia (Area XXI):														
Northeast Cape Breton.....	18	20	415	7,521	3,776		20,255	165	11,200		855	35,300	55,609	
Misaine Bank.....	1	1	12	6,500	22,500	2,700	81,000	500	100		100		251	
Banquereau.....	53	151	1,698	2,998,907	12,114,964	1,017,816	3,881,991	774,350	106,077		200,030	15,226	289,040	
Canso.....	2	2	19											
Middle Ground.....	38	77	635	977,575	2,236,341	176,815	3,000,470	166,605	68,535		152,715	8,335	13,853	
Northeast Sable Island Bank.....	41	84	649	1,177,898	2,656,991	82,535	2,998,095	296,515	44,560		227,327	30,623	45,334	
Southeast Sable Island Bank.....	17	19	127	530,555	851,125	11,600	352,065	16,265	18,510		58,528	6,805	11,669	
Horseshoe Ground.....	63	188	1,546	3,343,271	3,221,683	93,881	8,672,833	309,915	256,931		1,432,701	49,074	65,783	
Southwest Sable Island Bank.....	44	92	624	1,510,277	1,672,560	60,935	3,591,453	310,620	49,367	190	383,055	5,633	31,366	
Eastern Nova Scotia.....	12	13	72	37,760	50,980	4,400	145,365	12,100	45,260		5,915	16,940	1,209	
Emerald Bank.....	54	130	955	1,340,646	1,299,715	72,443	5,949,622	435,294	266,860		698,280	164,170	52,781	
Central Nova Scotia.....	8	9	75	14,170	16,800		34,340	22,520	40,060		1,622	24,200	168	
La Have Bank (including Sambro Bank).....	27	51	465	472,047	530,655	20,500	527,030	60,513	372,363		46,933	420,915	137,826	
Southern Nova Scotia.....	66	237	1,763	816,744	759,642	38,745	1,144,003	196,075	338,656	7,030	301,270	351,677	10,909	
Brown Bank.....	124	564	4,529	3,121,337	3,699,368	127,065	11,645,502	2,219,638	829,625	5,060	1,774,137	1,027,070	268,258	
Western Nova Scotia.....	47	96	873	697,496	915,207	24,410	1,019,363	121,185	575,662	3,115	329,303	304,102	18,743	
Southern Bay of Fundy.....	1	3	24	11,250	8,695		70,455	2,020	12,990		895	14,405	240	
Nova Scotia, unclassified.....	32	46	525	551,065	775,660	75,700	1,147,580	155,245	187,100		201,220	138,450	17,577	
Total.....	1	160	1,783	15,006	17,615,009	30,836,662	1,809,545	44,281,422	5,099,525	3,223,856	15,395	5,814,886	2,612,925	1,020,616

Off New England (Area XXII):																			
Eastern Maine.....	3	6	53	8,450	6,580	480	23,295	1,260	7,050	6,900	4,540	6,220	1,480						
Central Maine.....	59	367	2,548	219,829	163,369	5,475	330,474	9,430	1,497,881	165,555	132,148	839,147	3,144						
Western Maine.....	94	2,685	3,407	1,682,951	564,441	16,934	505,104	11,955	996,340	369,310	1,960,501	74,660	2,058						
Eastern Massachusetts.....	190	6,860	11,986	2,160,024	1,975,994	159,415	1,045,681	126,902	1,322,133	1,049,232	12,372,751	95,620	1,285						
Inner Grounds.....	131	700	3,157	625,338	645,542	29,600	2,039,507	92,780	2,115,359	276,595	483,262	3,503,485	24,065						
Western Side South Channel.....	179	836	4,846	1,481,154	1,893,424	69,720	8,284,512	3,134,617	907,623	62,125	1,170,589	194,792	21,541						
Eastern Side South Channel.....	106	398	2,394	1,124,306	1,279,491	37,545	6,421,584	1,917,539	1,052,308	650	1,421,931	443,111	27,054						
Northern Edge of Georges.....	100	508	3,216	2,824,740	9,578,034	406,145	12,435,370	7,773,484	405,733		1,510,481	92,396	73,892						
Northeast Peak of Georges.....	98	613	4,612	6,172,997	11,362,110	525,305	19,426,754	11,575,874	324,332		3,118,928	88,702	84,065						
Central Georges.....	55	161	1,011	533,572	1,056,865	30,700	3,112,566	1,741,197	37,482		212,377	5,366	15,492						
Southeast Georges.....	54	112	836	1,210,048	938,610	18,500	2,667,765	1,947,487	90,808		317,805	4,722	14,359						
Southwest Georges.....	33	52	490	30,345	111,800	1,390	663,390	254,940	12,405		16,372		5,196						
Lightship Grounds.....	41	54	351	30,700	80,870		506,365	78,305	9,965	655	6,375	15	469						
Nantucket Shoals.....	29	38	165	34,470	111,885	1,800	178,140	103,800	16,760	2,025	9,460	600	1,765						
Off No Mans Land.....	60	122	514	8,960	11,530	200	28,050	4,800			3,575	22,575	708						
Southern Massachusetts.....	5	8	25						3,300										
Rhode Island.....	7	8	23																
Southern New England, unclassified.....	39	52	396	206,735	323,540	28,700	732,190	374,125	52,886		113,338	28,930	4,363						
Total.....	1 368	13,579	40,030	18,354,681	30,103,685	1,331,909	58,400,747	29,148,495	8,866,695	1,933,047	22,854,433	5,400,341	280,936						
Off Middle Atlantic States (Area XXIII), South.....	30	40	198																
Grand total.....	1 373	15,431	56,067	37,539,038	61,640,848	3,207,537	102,909,169	34,266,100	12,255,169	1,948,442	28,674,406	8,027,037	2,010,363						

1 Exclusive of duplication.

Landings by fishing vessels at the three principal New England ports, 1937—Continued

SUMMARY: BY FISHING AREAS—Continued

Area	Mack- erel	Flounders						Sword- fish	Whiting	Wolf- fish	Rose- fish	Her- ring	Other	Total
		Gray sole	Lemon sole	Yellow- tail	Black- back	Dab	Other							
Gulf of St. Lawrence (Area XIX):	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
Treasty Coast.....														516,660
Magdalen Islands.....	338,310													1,802,510
Gulf of St. Lawrence, unclassified.....														336,741
Newfoundland Banks (Area XX):														
Grand Bank.....								3,564						419,594
Green Bank.....								567						109,575
St. Pierre Bank.....														213,153
Newfoundland Banks, unclassified.....			20	2,400			500			100	20			420,547
Total.....	338,310		20	2,400			500	4,131		100	20			3,818,780
Off Nova Scotia (Area XXI):														
Northeast Cape Breton.....	770							103,349					397	239,197
Misaine Bank.....		3,000	5,000			4,250				100				126,001
Banquereau.....		80,909	5,367	298,545	587	182,812	87,530	20,826		83,524	72,640	2,229		22,233,370
Canso.....	90,375													90,375
Middle Ground.....	138	419,903	2,997	346,713		47,872	42,340		2,200	58,415	15,303	2,170		7,739,295
Northeast Sable Island Bank.....	137	32,445	12,868	69,895	240	44,941	31,745	4,765		79,726	167,710	307		8,004,657
Southeast Sable Island Bank.....		39,295	6,350	700		14,517	33,865			23,255	28,395			2,003,499
Horseshoe Ground.....		1,528,046	28,488	159,785	228	32,136	118,873	1,301	1,500	161,582	84,089	827		10,562,907
Southwest Sable Island Bank.....		88,954	13,394	24,776	340	21,477	14,793			155,347	53,184	188		7,987,909
Eastern Nova Scotia.....	196,470	62,490	180			39,395	700			1,530	6,488	22		588,194
Emerald Bank.....		458,620	7,893	27,649	10	48,411	46,548	312		194,826	18,525	656		11,083,261
Central Nova Scotia.....	166,395	450	270	2,280		1,400				340				325,015
La Have Bank (including Sambro Bank).....		4,268	855	1,800	50	1,335		6,279		16,940	62,507			2,682,816
Southern Nova Scotia.....		444,207	13,220	4,545	400	86,394	21,297	4,983	280	62,218	12,005,965	998		16,600,058
Browns Bank.....	36,913	426,787	49,478	56,413	3,700	151,362	32,729	373,894	2,490	317,258	11,522,904	3,885		37,694,873
Western Nova Scotia.....		64,517	665	27,705	1,070	16,497	290			31,063	1,961,505			6,114,889
Southern Bay of Fundy.....														120,950
Nova Scotia, unclassified.....		107,630	3,140	78,500		3,590	20,130	6,946		26,840	263,061			3,759,454
Total.....	491,196	3,761,521	150,165	1,099,066	6,625	657,389	450,840	525,626	6,470	1,212,984	26,262,296	11,679		146,965,720

Off New England (Area XXII):														
Eastern Maine		8,000				500	900					1,000	76,655	
Central Maine	371,702	415,356	1,185	31,930	30,232	118,060	5,565		3,000	14,960	113,600	200	11,186	4,483,447
Western Maine	106,763	942,233	27,465	85,370	45,742	197,866	19,019	139	322,044	14,024	784,078	37	49,217	8,778,271
Eastern Massachusetts	3,002,645	1,182,675	7,975	1,099,307	421,890	689,930	6,415	185	5,653,037	86,525	572,218	5,275	370,234	33,407,348
Inner Grounds	86,440	380,608	1,195	49,345	16,700	98,757	65		94,815	13,113	2,674,093		7,828	13,258,492
Western Side South Channel	657,987	553,904	211,342	118,600	216,199	180,028	16,253	5,936	350,160	74,477	20,531,431		39,408	40,175,822
Eastern Side South Channel	450	342,777	271,670	80,555	76,873	420,173	74,560	2,657	43,244	95,037	6,441,140		5,642	21,580,299
Northern Edge of Georges	8,141	105,381	498,772	127,436	68,492	119,426	41,134	55,244	38,836	188,711	230,841		15,115	36,603,904
Northeast Peak of Georges	28,155	62,976	453,029	114,044	40,200	42,135	48,674	83,403	3,585	251,489	240,999		22,571	54,070,327
Central Georges	175	26,855	535,786	165,823	101,690	16,763	28,654		4,511	23,038	4,720		933	7,654,365
Southeast Georges	4,735	18,810	58,223	42,668	7,065	15,127	9,685	79,499		16,913	720		12,871	7,476,420
Southwest Georges		1,290	181,376	14,921	41,272	2,180	10,025	199,218		2,080	6,520		4,650	1,559,370
Lightship Grounds	390,885	4,308	9,490	78,905	5,865	5,360	875	75,808		775	193,976		375	1,480,191
Nantucket Shoals	64,075	6,277	14,538	466,545	17,099	500	8,365	502	600	2,220	6,500		11,555	1,069,481
Off No Mans Land	2,310,710	7,520		459,890	140	620	3,775	10,397	17,300	1,300	49,950		18,535	2,974,865
Southern Massachusetts	34,075			89,100									285	126,760
Rhode Island	282,140													282,140
Southern New England, unclassified		25,295	43,703	17,760	10,340	6,915	1,975	47,512	1,200	7,654	206,117		500	2,235,778
Total	7,349,078	4,084,264	2,315,739	3,042,199	1,099,799	1,914,380	275,939	560,500	6,532,332	792,316	32,064,903	6,512	570,905	237,283,835
Off Middle Atlantic States (Area XXIII), South														
	1,124,035							34,163					1,710	1,159,908
Grand total	9,302,621	7,845,785	2,465,924	4,143,685	1,106,424	2,572,269	726,779	1,124,420	6,538,802	2,005,400	58,327,219	6,512	584,294	389,228,243

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.

MACKEREL FISHERY OF THE ATLANTIC COAST¹

The mackerel season of 1937 extended from April 12, 1937, to January 13, 1938. Ninety-six vessels landed 13,997,200 pounds, which represents a decrease of 65 percent as compared with corresponding landings of the preceding year.

Of the total landings, about 1,000,000 pounds were tinkers (fish under 1 pound) while the remainder were of larger sizes. The tinkers were caught between July 1 and October 31.

The fishery was unusual because of its small yield (one of the lowest since the fishery began) and the comparative failure of the Gulf of Maine region. The season was unique in that it was the first to extend into January.

In this analysis, vessels include United States craft of 5 net tons capacity or over. Vessels are classed as "regular" and "miscellaneous" on the basis of their effort throughout the whole mackerel season. Regular seiners fished in all three major areas and were active for more than two-thirds the duration of the Gulf of Maine fishery. Miscellaneous seiners are those who did not fish in the Southern area, or ceased seining activity for three months or more during the time of Gulf of Maine fishery. All netters are considered miscellaneous, inasmuch as each one enters the mackerel fishery for only a portion of the year. Craft using purse seines may change gear and engage in netting for a portion of the season, and during this time are classed as netters. Allowance for such duplication has been made in the summary "Operating Units and Catch."

Division of the whole mackerel season into three periods is determined by the gill-net fishery. The end of the early netting season terminates the period "Spring." Resumption of netting in the fall marks the beginning of the period "Fall and Winter." "Summer" is included between these two periods.

Mackerel fishery of the Atlantic coast, 1937¹

CATCH: BY AREAS IN 5-DAY PERIODS

Date	South (Area XXIII)		Block Island (Area XXII west of Nantucket Shoals)		Gulf of Maine (Area XXII north of Nantucket Shoals)		Nova Scotia (Area XXI)	Total
	Seiners	Netters	Seiners	Netters	Seiners	Netters	Seiners	
SPRING	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>
Apr. 11-15	130,700							130,700
Apr. 16-20	281,800	3,700						285,500
Apr. 21-25	573,500	9,800						583,300
Apr. 26-30		9,000						9,000
May 1-5	93,200	68,100						161,300
May 6-10	579,800	47,800						627,600
May 11-15	728,100	71,200	134,300					933,600
May 16-20	231,900	51,900	1,277,100	1,400				1,562,300
May 21-25		15,000	827,300	10,100				852,400
May 26-31			421,000	600		3,400		425,000
June 1-5			307,800	9,300		5,000	137,600	459,700
June 6-10			527,600	5,800	25,000	3,500	187,700	729,600

¹ Includes the catch made between Jan. 1 and 15, 1938.

² This section, prepared by J. R. Webster of the Division of Scientific Inquiry, includes landings at Cape May and Wildwood, N. J.; New York, N. Y.; Newport and Block Island, R. I.; New Bedford, Buzzards Bay (Cape Cod Canal), Provincetown, Plymouth, Boston, and Gloucester, Mass.; and Portland, Maine; by purse-seine vessels or "seiners" and drift-gill-net vessels or "netters". It does not include incidental catches by other vessels such as menhaden seiners, otter trawlers, line trawlers, etc., or by traps.

Mackerel fishery of the Atlantic coast, 1937—Continued

CATCH: BY AREAS IN 6-DAY PERIODS—Continued

Date	South (Area XXIII)		Block Island (Area XXII west of Nantucket Shoals)		Gulf of Maine (Area XXII north of Nantucket Shoals)		Nova Scotia (Area XXI)	Total
	Seiners	Netters	Seiners	Netters	Seiners	Netters	Seiners	
	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
SPRING—contd.								
June 11-15			143,900	7,100	18,300	3,600	158,300	331,100
June 16-20				100	130,000	4,000		134,100
June 21-25				100	16,800	1,900	31,600	50,300
June 26-30					12,400	400		12,800
July 1-5					112,100	100		112,200
SUMMER								
July 6-10					51,400			51,400
July 11-15					420,300			420,300
July 16-20					314,800			314,800
July 21-25					259,200			259,200
July 26-31					265,800			265,800
Aug. 1-5					134,000			134,000
Aug. 6-10					31,300			31,300
Aug. 11-15					29,100			29,100
Aug. 16-20					94,100			94,100
Aug. 21-25					57,000			57,000
Aug. 26-31				300	175,300			175,600
Sept. 1-5				200	48,700			48,900
Sept. 6-10				100	16,400			16,500
Sept. 11-15					150,300			150,300
Sept. 16-20					102,300			102,300
Sept. 21-25					148,800			148,800
Sept. 26-30					47,700			47,700
FALL AND WINTER								
Oct. 1-5					728,200	800		729,000
Oct. 6-10					47,700	200		47,900
Oct. 11-15					14,700	100		14,800
Oct. 16-20					100	100		200
Oct. 21-25						800	800	1,600
Oct. 26-31					6,900	800		7,700
Nov. 1-5			219,000			300		219,300
Nov. 6-10			89,600			1,000		70,600
Nov. 11-15			400,000		8,000	14,500		422,500
Nov. 16-20						213,300		213,300
Nov. 21-25			5,200		77,600	210,400		293,200
Nov. 26-30	62,200		96,900		109,000	310,000		578,100
Dec. 1-5	673,300					185,900		859,200
Dec. 6-10	45,400					259,800		305,200
Dec. 11-15	147,800					45,200		193,000
Dec. 16-20						36,900		36,900
Dec. 21-25	4,000					22,300		26,300
Dec. 26-31	19,000					6,700		25,700
Jan. 1-5	25,000							25,000
Jan. 6-10	81,000							81,000
Jan. 11-15	99,100							99,100
Total	3,775,800	276,500	4,429,700	35,100	3,653,300	1,330,900	495,900	13,997,200

NOTE.—The roman numerals appearing in the box heads 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, 1937—Continued

OPERATING UNITS AND CATCH: BY GEAR CLASSIFICATION AND GROUNDS

[Vessels of 5 net tons and over]

Designation	Vessels	Tonnage	Crew	Trips	Total catch
SOUTH—AREA XXIII					
Seiners:					
Spring:	<i>Number</i>	<i>Net tons</i>	<i>Number</i>	<i>Number</i>	<i>Pounds</i>
Regular vessels	27	1,111	351	114	1,904,800
Miscellaneous vessels	15	586	178	46	714,200
Fall and winter:					
Regular vessels	19	775	250	37	1,011,800
Miscellaneous vessels	6	229	75	13	145,000
Netters:					
Spring	5	114	33	26	275,500
Total	147	1,862	1,581	236	4,052,300
BLOCK ISLAND					
(Area XXII west of Nantucket Shoals)					
Seiners:					
Spring:					
Regular vessels	26	1,097	339	103	2,053,000
Miscellaneous vessels	24	851	293	68	1,586,000
Fall and winter:					
Regular vessels	21	926	277	40	790,700
Netters:					
Spring	6	128	38	22	34,500
Summer	1	14	5	5	600
Total	155	12,058	1,663	238	4,464,800
GULF OF MAINE					
(Area XXII north of Nantucket Shoals)					
Seiners:					
Spring:					
Regular vessels	18	718	231	29	127,900
Miscellaneous vessels	27	698	276	51	186,700
Summer:					
Regular vessels	27	1,111	351	227	1,515,900
Miscellaneous vessels	34	713	315	247	830,600
Fall and winter:					
Regular vessels	25	1,049	326	77	820,000
Miscellaneous vessels	14	267	129	25	172,200
Netters:					
Spring	6	76	33	33	21,800
Fall and winter	27	482	188	262	1,309,100
Total	188	12,375	1,893	951	4,984,200
NOVA SCOTIA—AREA XXI					
Seiners:					
Spring:					
Regular vessels	4	209	55	6	211,200
Miscellaneous vessels	5	254	69	7	283,900
Fall:					
Miscellaneous vessels	1	62	16	1	800
Total	10	1,463	1,24	14	495,900
SUMMARY					
Seiners:					
Regular	127	1,111	1,351	634	8,435,800
Miscellaneous	148	1,234	1,487	457	3,919,400
Netters:	133	1,586	1,223	348	1,642,800
Grand total	196	12,704	1,980	1,439	13,997,200

1 Exclusive of duplication.

FISHERIES OF THE MIDDLE ATLANTIC STATES
(Area XXIII)⁶

The yield of the commercial fisheries of the Middle Atlantic States (New York, New Jersey, Pennsylvania, and Delaware) during 1937 amounted to 264,651,900 pounds, valued at \$7,895,990 to the fishermen, representing a decrease of 5 percent in volume but an increase of 23 percent in value as compared with the catch in 1935, the most recent previous year for which catch statistics are available. These fisheries gave employment to 7,720 fishermen, as compared with 9,620 in 1935.

There were 419 fishery wholesale and manufacturing establishments in the 4 States in 1937 as compared with 408 in 1935 when the most recent previous survey was made. In 1937 these establishments employed 6,839 persons, paid \$8,611,693 in salaries and wages, and produced manufactured products (canned, cured, packaged, and by-products), valued at \$18,658,605. In 1935 the wholesale and manufacturing firms employed 6,143 persons, paid \$6,666,507 in salaries and wages, and produced manufactured products valued at \$13,441,812.

Fisheries of the Middle Atlantic States, 1937

SUMMARY OF CATCH

Product	New York		New Jersey		Pennsylvania	
	Pounds	Value	Pounds	Value	Pounds	Value
Fish.....	64,882,400	\$1,531,483	115,471,800	\$1,899,388	34,700	\$4,632
Shellfish, etc.....	19,278,100	2,839,563	14,044,400	1,301,870	-----	-----
Total.....	84,160,500	4,371,046	129,516,200	3,200,958	34,700	4,632

Product	Delaware		Total	
	Pounds	Value	Pounds	Value
Fish.....	49,804,600	\$264,769	230,193,500	\$3,700,272
Shellfish, etc.....	1,135,900	54,585	34,458,400	4,195,718
Total.....	50,940,500	319,354	264,651,900	7,895,990

OPERATING UNITS: BY STATES

Item	New York	New Jersey	Pennsylvania	Delaware	Total
Fishermen:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
On vessels.....	1,188	1,132	-----	337	2,627
On boats and shore:					
Regular.....	1,104	992	-----	26	2,121
Casual.....	1,027	1,581	34	330	2,972
Total.....	3,289	3,705	34	692	7,720
Vessels:					
Steam.....	1	-----	-----	9	10
Net tonnage.....	45	-----	-----	1,167	1,212
Motor.....	244	187	-----	7	438
Net tonnage.....	3,989	3,197	-----	138	7,324
Sail.....	-----	3	-----	-----	3
Net tonnage.....	-----	32	-----	-----	32
Total vessels.....	245	190	-----	16	451
Total net tonnage.....	4,034	3,229	-----	1,306	8,568

⁶ 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, 1937—Continued

OPERATING UNITS: BY STATES—Continued

Item	New York	New Jersey	Pennsylvania	Delaware	Total
Boats:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Motor.....	511	971		22	1,504
Other.....	808	1,317	8	128	2,261
Accessory boats.....	125	71		27	223
Apparatus:					
Purse seines:					
Mackerel.....	3				3
Length, yards.....	1,330				1,330
Menhaden.....	9	6		9	24
Length, yards.....	3,530	1,680		4,335	9,545
Other.....	1	8	8		17
Length, yards.....	400	2,790	1,650		4,840
Haul seines.....	71	121		47	239
Length, yards.....	13,625	9,573		11,715	34,913
Gill nets:					
Anchor.....	11	6			17
Square yards.....	666	9,340			10,006
Drift.....	189	678		26	893
Square yards.....	596,986	470,822		51,925	1,119,733
Runaround.....	4	52		10	66
Square yards.....	9,840	189,590		8,210	207,640
Stake.....	354	579		27	960
Square yards.....	88,936	219,175		14,180	322,291
Lines:					
Hand.....	105	444		8	557
Hooks.....	105	885		16	1,006
Trawl.....	3,894	566		1	4,461
Hooks.....	248,660	373,000		3,000	624,660
Troll.....		482			482
Hooks.....		482			482
Trot with baits or snoods.....	72	21			93
Baits or snoods.....	44,000	14,806			58,806
Trot with hooks.....	14	1			15
Hooks.....	2,385	150			2,535
Pound nets.....	136	191		17	344
Weirs.....		91			91
Stop nets.....		59		11	70
Square yards.....		63,317		1,580	64,897
Fyke nets.....	573	832		233	1,638
Dip nets.....	36	28		67	131
Cast nets.....		3		1	4
Drag nets.....		12			12
Yards at mouth.....		24			24
Drop nets.....		40			40
Push nets.....		13			13
Otter trawls:					
Fish.....	152	60			212
Yards at mouth.....	3,108	1,367			4,475
Shrimp.....	1				1
Yards at mouth.....	23				23
Wire baskets.....		25			25
Eel traps.....	60				60
Pots:					
Crab.....		10			10
Eel.....	1,488	1,478		340	3,304
Fish.....	1,110	10,047			11,157
Lobster.....	13,850	9,699		115	23,664
Harpoons.....	13				13
Spears.....	56	40			96
Dredges:					
Clam.....	42	72		10	124
Yards at mouth.....	42	74		12	128
Crab.....	7	58		8	73
Yards at mouth.....	12	84		10	106
Mussel.....	2				2
Yards at mouth.....	2				2
Oyster.....					
Common.....	104	176		10	290
Yards at mouth.....	145	214		14	373
Suction.....	1				1
Yards at mouth.....	2				2
Scallop.....	72	6			78
Yards at mouth.....	244	20			264
Tongs:					
Oyster.....	313	187			500
Other.....	1,287	572		3	1,862
Rakes:					
Oyster.....		34			34
Other.....	177	871			1,048
Forks:	402				402
Hoes:		101			101

Fisheries of the Middle Atlantic States, 1937—Continued

CATCH: BY STATES

Species	New York		New Jersey		Pennsylvania		Delaware		Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives	221,800	\$3,889	423,100	\$4,222			69,900	\$1,402	714,800	\$9,513
Bluefish	858,100	68,392	1,484,300	101,623			5,500	385	2,347,900	170,400
Bonito	50,400	2,061	174,400	7,442					224,800	9,503
Butterfish	1,900,200	112,465	3,055,700	116,875					4,955,900	229,340
Carp	135,700	9,466	323,900	22,824	3,500	\$210	44,800	3,584	507,900	36,084
Catfish and bullheads	24,100	2,479	60,200	2,446			30,800	927	115,100	5,852
Cero			51,100	1,272					51,100	1,272
Cod	3,802,500	153,818	2,564,900	67,815			48,000	1,680	6,415,400	223,313
Croaker	29,900	315	3,934,300	67,443			271,800	3,216	4,236,000	70,974
Cusk	90,900	1,283							90,900	1,283
Drum:										
Black			5,100	73					5,100	73
Red or redfish	100	1	10,100	200					10,200	201
Eels:										
Common	172,400	10,075	272,400	26,307			33,600	4,928	478,400	41,310
Conger	1,000	22	31,000	520					32,000	542
Flounders:										
Gray sole	89,100	6,261	5,100	163					94,200	6,424
Lemon sole	145,800	9,610							145,800	9,610
Yellowtail and dab	2,817,000	126,579	13,800	367					2,830,800	126,946
Blackback	2,736,800	145,676	134,500	5,077					2,871,300	150,753
Fluke	2,008,300	104,113	2,182,200	171,907					4,250,500	276,020
Unclassified	679,100	33,953					4,200	214	683,300	34,167
Frigate mackerel	26,500	265	158,200	1,925					184,700	2,190
Gizzard shad							500	10	500	10
Grayfish	100	2	57,600	543					57,700	545
Groupers			21,500	978					21,500	978
Haddock	2,281,900	75,757							2,281,900	75,757
Hake	317,200	4,107	49,500	1,437					366,700	5,544
Halibut	2,800	291							2,800	291
Herring, sea	4,600	46	365,900	3,500					370,500	3,546
Hickory shad			2,000	32					2,000	32
Kingfish or "king mackerel"			149,500	5,677					149,500	5,677
King whiting or "kingfish"	72,600	893	78,300	3,048					150,900	3,941
Mackerel	1,447,900	35,078	1,669,100	59,393					3,117,000	94,471
Menhaden	31,892,000	164,431	67,756,000	264,315			48,857,000	227,831	148,505,000	656,577
Mullet			500	14			64,400	2,582	64,900	2,596
Mummichog	1,300	140							1,300	140
Pigfish			100	2					100	2
Pollock	116,100	3,018	1,500	45					117,600	3,063
Pompano			100	35					100	35

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Fisheries of the Middle Atlantic States, 1937—Continued

CATCH: BY STATES—Continued

Species	New York		New Jersey		Pennsylvania		Delaware		Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Rosefish	1,500	\$15							1,500	\$15
Rudderfish			2,100	\$21					2,100	21
Scup or porgy	1,707,100	50,449	5,044,800	84,718					6,751,900	135,167
Sea bass	527,400	38,557	2,111,300	115,634					2,638,700	154,391
Sea robin	16,000	325	55,400	597					71,400	922
Shad	1,021,400	76,863	3,339,500	322,730	12,600	\$3,522	20,500	\$3,247	4,394,000	406,362
Sharks	22,200	1,137	43,700	690					65,900	1,827
Skates	63,300	642	57,700	437					121,000	1,079
Smelt	600	76							600	76
Snapper, red			53,900	3,794					53,900	3,794
Spanish mackerel	100	2	50,300	4,200					50,400	4,202
Spot	300	5	14,800				3,000	150	18,100	465
Squeteagues or "sea trout," gray	1,467,100	58,711	10,515,200	290,849			292,100	8,763	12,264,400	358,323
Squirrel hake	5,000	98	115,200	1,162					120,200	1,260
Striped bass	132,000	11,702	241,200	31,738			31,800	3,548	405,000	46,988
Sturgeon	1,200	275	6,300	645			400	74	7,900	994
Suckers	29,900	1,966	21,100	1,090	18,600	900			69,600	3,976
Sunfish	1,600	93							1,600	93
Swellfish	56,100	579	100	1					56,200	580
Swordfish	109,000	20,216							109,000	20,216
Tanog	5,900	80	14,200	289			1,100	33	21,200	402
Thimble-eyed mackerel	47,900	1,477	15,100	275					63,000	1,752
Tilefish	2,389,600	101,864	300	15					2,389,900	101,879
Tomcod	3,100	120							3,100	120
Tuna	43,400	2,218	50,700	1,748					94,100	3,966
White perch			82,900	8,236			19,000	1,893	101,900	10,129
Whiting	5,189,200	87,117	8,623,700	91,809					13,812,900	178,926
Wolfish	5,800	139							5,800	139
Yellow perch	29,500	2,051	5,700	666			6,200	302	41,400	3,019
Yellowtail			700	14					700	14
Total	64,882,400	1,531,483	115,471,800	1,869,388	34,700	4,632	49,804,600	264,769	230,193,500	3,700,272
SHELLFISH, ETC.										
Crabs:										
Hard	511,100	11,350	635,600	21,904			264,400	4,708	1,411,100	37,962
Soft and peelers	12,500	2,500	59,600	20,081			78,500	14,894	150,600	37,475
King			2,766,500	7,221			489,000	854	3,255,500	8,075
Lobsters	366,800	75,663	268,800	56,078			4,300	1,290	639,900	133,061
Shrimp	78,800	6,996	37,100	9,275					115,900	16,271
Clams:										
Hard, public	2,147,900	374,543	2,211,500	383,275			7,600	920	4,367,000	758,738

Hard, private ¹	383,500	67,914	311,700	47,497			16,000	2,330	711,200	117,741
Soft, public ²	770,000	85,445	1,177,700	68,646					1,947,700	154,091
Soft, private ³	12,800	1,536							12,800	1,536
Surf of skimmer	971,800	60,114	613,900	18,964					1,585,700	79,098
Conchs	12,600	1,236							12,600	1,236
Mussels, sea	90,700	5,262					2,800	173	93,500	5,435
Oysters, market: ³										
Public, spring	499,700	83,950	53,000	11,435					552,700	95,385
Public, fall	200,200	32,432	143,300	13,389					343,500	45,771
Private, spring	4,227,700	748,303	1,935,400	262,928					6,163,100	1,011,231
Private, fall	4,856,900	845,101	2,431,000	343,890			270,200	28,170	7,558,100	1,218,161
Scallops:										
Bay	36,000	8,650							36,000	8,650
Sea	2,818,700	329,255	234,100	13,659					3,062,800	342,914
Squid	1,207,200	44,471	1,145,700	22,386					2,352,900	66,857
Terrapin, diamond-back			700	261					700	261
Turtles:										
Hawksbill			3,900	78					3,900	78
Loggerhead			6,700	122					6,700	122
Snapper			8,200	511					11,300	757
Bloodworms	34,700	27,040					3,100	246	34,700	27,040
Sandworms	38,500	27,772							38,500	27,772
Total	19,278,100	2,839,663	14,044,400	1,301,570			1,135,900	54,585	34,458,400	4,195,718
Grand total	84,160,500	4,371,046	129,516,200	3,200,958	34,700	4,632	50,940,500	319,354	264,651,900	7,895,990

¹ Statistics on hard clams are based on yields of 8 pounds of meat to the bushel in New York, 8.07 pounds in New Jersey, and 10 pounds in Delaware.

² Statistics on soft clams are based on yields of 16 pounds of meat to the bushel in New York, and 20 pounds in New Jersey.

³ Statistics on oysters are based on yields of 7 pounds of meat to the bushel in New York, 6.05 pounds in New Jersey, and 7 pounds in Delaware.

NOTE.—The above includes the catch made by Middle Atlantic craft in the southern trawl fishery as well as in other fisheries in the South Atlantic.

Fisheries of the Middle Atlantic States, 1937—Continued

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, 533, 300	\$11, 350	1, 906, 800	\$21, 904	793, 200	\$4, 708	4, 233, 300	\$37, 962
King.....do.....			691, 625	7, 221	122, 250	854	813, 875	8, 075
Soft and peelers.....do.....	50, 000	2, 800	238, 400	20, 081	314, 000	14, 894	802, 400	37, 475
Clams:								
Hard, public.....bushels.....	268, 488	374, 543	274, 040	383, 275	760	920	543, 288	758, 738
Hard, private.....do.....	47, 938	67, 914	38, 624	47, 497	1, 600	2, 330	88, 162	117, 741
Soft, public.....do.....	48, 126	85, 445	58, 885	68, 646			107, 010	154, 091
Soft, private.....do.....	800	1, 536					800	1, 536
Surf or skimmer.....do.....	80, 983	60, 114	34, 489	18, 984			115, 472	79, 098
Conchs.....do.....	700	1, 236					700	1, 236
Mussels, sea.....do.....	9, 070	5, 262			233	173	9, 303	5, 435
Oysters, market:								
Public, spring.....do.....	71, 386	83, 960	8, 760	11, 435			80, 146	95, 385
Public, fall.....do.....	28, 600	32, 432	23, 686	13, 339			52, 286	45, 771
Private, spring.....do.....	603, 957	748, 303	319, 901	262, 928			923, 858	1, 011, 231
Private, fall.....do.....	683, 843	845, 101	401, 818	343, 890	38, 600	29, 170	1, 134, 261	1, 218, 161
Scallops:								
Bay.....do.....	7, 200	8, 650					7, 200	8, 650
Sea.....do.....	469, 783	329, 255	39, 017	13, 659			508, 800	342, 914

SEED OYSTER FISHERY

Item	New York		New Jersey		Delaware		Total	
	Number	Value	Number	Value	Number	Value	Number	Value
OPERATING UNITS								
Fishermen:								
On vessels.....	28		1, 158		40		1, 226	
On boats and shore:								
Regular.....	109		83				192	
Casual.....	39		120				159	
Total.....	176		1, 361		40		1, 577	
Vessels:								
Motor.....	5		2				7	
Net tonnage.....	149		23				172	
Sail.....			103		5		108	
Net tonnage.....			2, 371		89		2, 460	
Total vessels.....	5		105		5		115	
Total net tonnage.....	149		2, 394		89		2, 632	
Boats:								
Motor.....	20		75				95	
Other.....	128		121				249	
Apparatus:								
Dredges.....	10		210		10		230	
Yards at mouth.....	19		260		12		291	
Tongs.....	148		198				346	
Rakes.....			5				5	
CATCH								
Oysters, seed:								
Public, spring.....	Bushels	Value	Bushels	Value	Bushels	Value	Bushels	Value
Public, fall.....	39, 829	\$34, 995	1, 061, 010	\$403, 870	83, 600	\$13, 800	1, 184, 439	\$452, 665
Private, spring.....	12, 783	13, 760	11, 540	2, 980			24, 323	16, 740
Private, fall.....	5, 766	4, 996					5, 766	4, 996
Total.....	32, 161	33, 290					32, 161	33, 290
Total.....	90, 539	87, 041	1, 072, 550	406, 850	83, 600	13, 800	1, 246, 689	507, 691

NOTE.—Of the total number of persons fishing for seed oysters, 1,517 are duplicated among those fishing for market oysters or other species. Similarly, the following craft and gear are duplicated: 60 vessels, 92 motor boats, 248 other boats, 122 dredges, 341 tongs, and 4 rakes.

Industries related to the fisheries of the Middle Atlantic States, 1937

OPERATING UNITS, SALARIES, AND WAGES

Item	New York	New Jersey	Pennsylvania	Delaware	Total
Transporting:					
Persons engaged:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
On vessels.....	40	17	.....	.....	57
On boats.....	.....	69	.....	.....	69
Total.....	40	86	.....	.....	126
Vessels, motor.....	13	7	.....	.....	20
Net tonnage.....	298	134	.....	.....	432
Boats.....	.....	68	.....	.....	68
Wholesale and manufacturing:					
Establishments.....	235	126	42	16	419
Persons engaged:					
Proprietors.....	50	106	37	18	211
Salaried employees.....	762	156	82	20	1,020
Wage earners:					
Average for season.....	3,363	1,529	346	370	5,608
Average for year.....	2,820	967	270	172	4,229
Paid to salaried employees.....	\$2,415,285	\$347,792	\$142,174	\$25,409	\$2,930,660
Paid to wage earners.....	\$4,269,005	\$917,604	\$338,864	\$155,560	\$5,681,033
Total salaries and wages.....	\$6,684,290	\$1,265,396	\$481,038	\$180,969	\$8,611,693
Fishermen, manufacturing.....	236	49	.....	.....	285

PRODUCTS MANUFACTURED

Item	New York		New Jersey		Pennsylvania		Delaware	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
By manufacturing establishments:								
Buffalofish, smoked pounds.....	893,800	\$235,133	.....	.....	.....	.....	.....	.....
Butterfish, smoked do.....	612,900	187,382	74,365	\$22,626	(1)	(1)	.....	.....
Carp, smoked.....	.....	.....	67,700	25,776	.....	.....	.....	.....
Cisco, chubs, and tullibees, smoked.....	3,485,500	1,020,600	229,000	87,080	(1)	(1)	.....	.....
Cod, fresh fillets.....	3,747,500	473,675	493,500	58,009	.....	.....	.....	.....
Flounders, fresh fillets pounds.....	1,471,000	258,655	205,500	31,500	.....	.....	.....	.....
Haddock, fresh fillets pounds.....	1,664,000	206,515	1,518,700	175,377	.....	.....	.....	.....
Hake, fresh fillets.....	94,000	10,700	.....	.....	.....	.....	.....	.....
Herring, sea, kippered pounds.....	163,800	21,426	.....	.....	(1)	(1)	.....	.....
Herring, sea, bloaters, smoked.....	.....	.....	55,300	7,810	(1)	(1)	.....	.....
Lake trout, smoked pounds.....	189,500	89,702	(1)	(1)	(1)	(1)	.....	.....
Mackerel, smoked.....	766,300	110,732	(1)	(1)	(1)	(1)	.....	.....
Pollock, fresh fillets pounds.....	27,000	3,100	.....	.....	.....	.....	.....	.....
Paddlefish or spoonbill cat, smoked.....	308,600	127,150	.....	.....	.....	.....	.....	.....
Salmon:								
Smoked.....	6,706,900	1,952,117	418,975	145,981	(1)	(1)	.....	.....
Kippered.....	146,600	43,890	95,600	35,000	(1)	(1)	.....	.....
Roe, canned standard cases.....	1,534	36,001	.....	.....	.....	.....	.....	.....
Shad, smoked.....	79,500	15,593	(1)	(1)	(1)	(1)	.....	.....
Sturgeon:								
Smoked.....	1,162,700	787,194	210,949	155,496	(1)	(1)	.....	.....
Caviar, canned standard cases.....	3,053	435,370	.....	.....	.....	.....	.....	.....
Whale products:								
Sperm oil.....	5,837	1,500	.....	.....	.....	.....	.....	.....
Whale oil.....	8,270,752	3,693,169	.....	.....	.....	.....	.....	.....
Whitefish:								
Smoked.....	1,636,000	456,483	155,000	52,085	(1)	(1)	.....	.....
Caviar, canned standard cases.....	502	14,785	.....	.....	.....	.....	.....	.....

See footnotes at end of table.

Industries related to the fisheries of the Middle Atlantic States, 1937—Continued

PRODUCTS MANUFACTURED—Continued

Item	New York		New Jersey		Pennsylvania		Delaware	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity (¹)	Value (¹)
By manufacturing establishments—Continued.								
Crab, king, scrap and meal..... tons			300	\$12,124				
Clams:								
Hard, fresh-shucked gallons			(¹)	(¹)	4,510	\$10,557		
Soft, fresh-shucked gallons			5,820	5,820				
Clam chowder, canned standard cases	(¹)	(¹)	177,071	636,607				
Marine-shell products:								
Buttons..... gross	1,138,834	\$813,556	1,646,622	1,254,165	(¹)	(¹)		
Novelties.....		113,600		91,922				
Oysters, fresh-shucked gallons	387,481	765,213	382,471	675,659	60,080	116,785	(¹)	(¹)
Oyster-shell products:								
Poultry feed..... tons	(¹)	(¹)	4,441	35,174	4,294	88,989	(¹)	(¹)
Lime..... do	(¹)	(¹)	1,763	8,359	1,109	4,533	(¹)	(¹)
Unclassified products:								
Smoked..... pounds	(¹)	(¹)	130,370	26,607	2,031,900	528,651		
Canned standard cases	17,815	216,553	(¹)	(¹)				
Miscellaneous.....		826,079		771,516		172,996		585,648
Total.....		12,885,773		4,314,693		872,491		585,648
By fishermen:								
Bluefish, smoked pounds			2,500	500				
Butterfish, smoked do			3,000	600				
Cod, smoked do			1,500	300				
Eels, smoked do	38,400	9,724	10,000	3,300				
Mackerel, smoked do			2,000	400				
Whiting, smoked do			9,500	1,675				
Scallops:								
Bay, fresh-shucked gallons	3,958	6,041						
Sea, fresh-shucked gallons	148,018	159,944	26,000	22,500				
Crab, king, scrap and meal..... tons			127	3,432				
Sturgeon, roe, salted pounds			150	225				
Total.....		175,709		32,932				
Grand total.....		13,061,482		4,347,625		872,491		585,648

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

² This item has been included under "Miscellaneous."

³ Includes smoked eels, haddock, finnan haddie, hake, lake trout, mackerel, scup, shad, and whiting.

⁴ Includes smoked butterfish, chubs, cisco, haddock and haddock fillets, sea herring (kippers and bloaters), lake trout, mackerel, shad, salmon, sturgeon, tullibees, and whitefish, and kippered salmon.

⁵ Includes canned pickled eels, pickled sea mussels, fish paste, clam products, and turtle and terrapin products.

⁶ Includes fresh fillets of halibut and mackerel, smoked eels, halibut, swordfish, and tuna-liver oils, menhaden products, oyster- and mussel-shell products, and miscellaneous fish meals.

⁷ Includes fresh-shucked hard clams, canned clam products and fish chowder, cod, swordfish, and tuna-liver oils, salted boned cod, pickled eels, and herring roe; and menhaden and shark products.

⁸ Includes miscellaneous fish scrap and marine-shell buttons.

⁹ Includes salted sturgeon roe, fresh-shucked oysters, oyster-shell products, king-crab scrap, and menhaden products.

NOTE.—The total value of the manufactured products for the Middle Atlantic States was as follows: By manufacturing establishments, \$18,668,605; and by fishermen, \$208,641. 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, 122 have been included as fishermen, and among the total number of persons engaged in the preparation of fishermen's prepared products, 285 have been included as fishermen. The whale products shown above were manufactured on floating factory ships operating in the Southern Hemisphere. For additional data on the whale fishery, the reader is referred to the section in the latter part of this document entitled "Whaling."

NEW YORK

Fisheries of New York, 1937

OPERATING UNITS: BY GEAR

Item	Purse seines			Haul seines	Gill nets			
	Mack-erel	Men-haden	Other		Anchor	Drift	Run-around	Stake
	Number	Number	Number	Number	Number	Number	Number	Number
Fishermen:								
On vessels.....	32	207	12	7	4	4	14	2
On boats and shore:								
Regular.....				59		68		117
Casual.....				140		302		91
Total.....	32	207	12	206	4	274	14	210
Vessels:								
Stream, 41 to 50 tons.....		1						
Net tonnage.....		45						
Motor:								
5 to 10 tons.....	1			1	1	1	2	
11 to 20 tons.....		3		1			1	1
21 to 30 tons.....	1		1					
31 to 40 tons.....		1						
41 to 50 tons.....	1							
101 to 110 tons.....		2						
111 to 120 tons.....		1						
161 to 170 tons.....		1						
Total.....	3	8	1	2	1	1	3	1
Net tonnage.....	72	567	29	22	10	10	37	11
Total vessels.....	3	9	1	2	1	1	3	1
Total net tonnage.....	72	612	29	22	10	10	37	11
Boats:								
Motor.....				7				30
Other.....				67		198		87
Accessory boats.....	7	27	2	2	2	2	7	2
Apparatus:								
Number.....	3	9	1	71	11	189	4	354
Length, yards.....	1,330	3,530	400	13,625				
Square yards.....					666	596,986	9,840	88,936

Item	Lines				Pound nets	Fyke nets	Dip nets	Otter trawls	
	Hand	Trawl	Trot with baits or snoods	Trot with hooks				Fish	Shrimp
	Number	Number	Number	Number	Number	Number	Number	Number	Number
Fishermen:									
On vessels.....	64	185			52	6		227	2
On boats and shore:									
Regular.....	62	94	76	6	15	35		114	
Casual.....			50	21	2	116	36		
Total.....	126	279	126	27	69	157	36	341	2
Vessels, motor:									
5 to 10 tons.....	11	9			7	1		43	1
11 to 20 tons.....	7	4			4	1		35	
21 to 30 tons.....	1	1			2			8	
31 to 40 tons.....								5	
41 to 50 tons.....		3							
51 to 60 tons.....		3						2	
61 to 70 tons.....		2							
Total.....	19	22			13	2		93	1
Net tonnage.....	209	571			152	22		1,266	6
Boats:									
Motor.....	39	45	24		3	2		57	
Other.....	6		12	16	10	82	18		
Accessory boats.....		53			16				
Apparatus:									
Number.....	105	3,894	72	14	136	573	36	152	1
Yards at mouth.....								3,108	23
Hooks, baits, or snoods.....	105	248,660	44,000	2,385					

Fisheries of New York, 1937—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Eel traps	Pots			Harpoons	Spears	Dredges		
		Eel	Fish	Lobster			Clam	Crab	Mussel
Fishermen:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
On vessels.....	4	5	.....	6	35	.....	14	5	3
On boats and shore:									
Regular.....	20	46	21	86	.....	22	26	2	.....
Casual.....	.....	62	.....	44	.....	34	.....	.....	.....
Total	24	113	21	136	35	56	40	7	3
Vessels, motor:									
5 to 10 tons.....	2	1	.....	4	4	.....	4	1	.....
11 to 20 tons.....	.....	1	.....	.....	4	.....	3	1	1
21 to 30 tons.....	.....	.....	.....	.....	2	.....	.....	.....	.....
41 to 50 tons.....	.....	.....	.....	.....	2	.....	.....	.....	.....
51 to 60 tons.....	.....	.....	.....	.....	1	.....	.....	.....	.....
Total	2	2	.....	4	13	.....	7	2	1
Net tonnage.....	19	22	.....	29	291	.....	73	23	13
Boats:									
Motor.....	.....	.....	21	81	.....	12	13	1	.....
Other.....	9	64	.....	33	.....	22	.....	.....	.....
Accessory boats.....	.....	.....	.....	.....	13	.....	.....	.....	.....
Apparatus:									
Number.....	60	1,488	1,110	13,850	13	56	42	7	2
Yards at mouth.....	.....	.....	.....	.....	.....	.....	42	12	2

Item	Dredges—Continued			Tongs		Rakes, other than for oysters	Forks	Total, exclusive of duplication
	Oyster		Scallop	Oyster	Other			
	Common	Suction						
Fishermen:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
On vessels.....	198	4	207	36	100	.....	.....	1,158
On boats and shore:								
Regular.....	12	.....	.....	213	758	110	128	1,104
Casual.....	.....	.....	.....	64	430	67	274	1,027
Total	210	4	207	313	1,288	177	402	3,289
Vessels:								
Steam, 41 to 50 tons.....	.....	.....	.....	.....	.....	.....	.....	1
Net tonnage.....	.....	.....	.....	.....	.....	.....	.....	45
Motor:								
5 to 10 tons.....	12	.....	8	17	47	.....	.....	116
11 to 20 tons.....	23	1	17	1	2	.....	.....	79
21 to 30 tons.....	9	.....	7	.....	.....	.....	.....	24
31 to 40 tons.....	3	.....	3	.....	.....	.....	.....	10
41 to 50 tons.....	1	.....	.....	.....	.....	.....	.....	4
51 to 60 tons.....	.....	.....	.....	.....	.....	.....	.....	5
61 to 70 tons.....	.....	.....	1	.....	.....	.....	.....	2
101 to 110 tons.....	.....	.....	.....	.....	.....	.....	.....	2
111 to 120 tons.....	.....	.....	.....	.....	.....	.....	.....	1
161 to 170 tons.....	.....	.....	.....	.....	.....	.....	.....	1
Total	48	1	36	18	49	.....	.....	244
Net tonnage.....	805	20	653	120	326	.....	.....	3,989
Total vessels	48	1	36	18	49	.....	.....	245
Total net tonnage	805	20	653	120	326	.....	.....	4,034
Boats:								
Motor.....	4	.....	.....	101	345	25	76	511
Other.....	.....	.....	.....	76	422	152	131	808
Accessory boats.....	.....	.....	.....	.....	.....	.....	.....	125
Apparatus:								
Number.....	104	1	72	313	1,287	177	402	.....
Yards at mouth.....	145	2	244	.....	.....	.....	.....	.....

Fisheries of New York, 1937—Continued

CATCH: BY GEAR

Species	Purse seines						Haul seines	
	Mackerel		Menhaden		Other		Pounds	Value
	Pounds	Value	Pounds	Value	Pounds	Value		
Alewives							135,600	\$2,347
Bluefish							2,000	148
Butterfish							300	25
Carp							83,000	5,803
Catfish and bullheads							4,000	347
Croaker					1,900	\$10		
Flounders, blackback							100	6
King whiting or "king-fish"							17,900	204
Mackerel	153,100	\$6,704						
Menhaden			31,500,000	\$163,121				
Mummichog							1,300	140
Scup or porgy					110,000	2,200	39,800	2,694
Sea bass					1,200	96	200	15
Shad							19,700	1,433
Smelt							600	76
Spot							200	3
Squeteagues or "sea trout," gray					300,000	9,000	316,900	16,095
Striped bass							82,500	7,064
Suckers							3,800	264
Tautog					1,200	12	100	2
Thimble-eyed mackerel					1,900	57		
Tomcod							100	10
Yellow perch							4,400	236
Shrimp							20,600	5,150
Total	153,100	6,704	31,500,000	163,121	416,200	11,384	733,100	41,852

Species	Gill nets							
	Anchor		Drift		Runaround		Stake	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives			9,900	\$289			1,000	\$22
Bluefish	3,000	\$300	23,300	2,479	5,600	\$448	14,200	1,240
Butterfish							8,400	840
Carp			1,400	85			41,600	3,071
Catfish and bullheads			300	16			400	20
King whiting or "king-fish"							800	19
Mackerel			6,100	122	96,000	2,880		
Shad			932,600	70,009			30,400	2,656
Squeteagues or "sea trout," gray	5,700	342	6,000	240	4,000	320	18,000	850
Striped bass	2,500	375	6,700	813			15,400	1,545
Sturgeon			200	44			900	219
Suckers							900	60
Yellow perch			5,700	358			9,900	696
Total	11,200	1,017	992,200	74,455	105,600	3,648	141,900	11,038

Fisheries of New York, 1937—Continued

CATCH: BY GEAR—Continued

Species	Lines							
	Hand		Trawl		Trot with baits or snoods		Trot with hooks	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Bluefish	433,700	\$35,632	119,900	\$9,113				
Catfish and bullheads							1,800	\$185
Cod	270,800	12,085	1,837,000	66,219				
Cusk			90,900	1,283				
Eels, common							1,700	116
Flounders:								
Blackback	80,000	2,400	18,000	720				
Yellowtail and dab	4,000	80						
Fluke			4,000	440				
Unclassified			15,000	756				
Haddock	9,000	270	122,400	3,408				
Hake			278,300	2,922				
Hallbut			2,000	223				
Mackerel	105,300	2,283	16,000	387				
Pollock	83,600	2,273	16,200	312				
Scup or porgy	7,700	221	3,200	84				
Sea bass	92,000	7,361	1,300	99				
Squeteagues or "sea trout," gray	25,700	1,284	300	13				
Striped bass	1,900	176						
Swordfish			200	42				
Tilefish	42,600	2,192	2,312,000	97,922				
Wolfish			5,800	139				
Crabs, hard	2,600	175			478,200	\$10,321		
Total	1,158,900	66,482	4,842,500	184,082	478,200	10,321	3,500	301

Species	Pound nets		Fyke nets		Dip nets	
	Pounds	Value	Pounds	Value	Pounds	Value
Alewives	10,300	\$88				
Bluefish	216,300	15,691	61,100	\$1,093		
Bonito	50,400	2,061				
Butterfish	1,498,100	91,771				
Carp			9,700	707		
Catfish and bullheads			17,600	1,911		
Cod	18,900	885				
Eels:						
Common	14,100	723	1,200	95		
Conger	200	8				
Flounders:						
Blackback	2,600	133	35,200	2,037		
Fluke	79,800	4,668				
Frigate mackerel	26,500	265				
Grayfish	100	2				
Herring, sea	4,600	46				
King whiting or "kingfish"	16,100	258				
Mackerel	1,058,600	22,205				
Menhaden	392,000	1,310				
Pollock	700	22				
Scup or porgy	567,900	16,986				
Sea bass	53,600	4,341				
Sea robin	8,800	174				
Shad	38,700	2,865				
Sharks	17,100	1,053				
Skates	38,400	210				
Spanish mackerel	100	2				
Spot	100	2				
Squeteagues or "sea trout," gray	625,200	24,671	20,000	987		
Squirrel hake	100	2				
Striped bass	21,500	1,606	100	12		
Sturgeon	100	12				
Suckers						
Sunfish			25,200	1,672		
Swellfish			1,600	98		
Tautog	56,100	579				
Thimble-eyed mackerel	4,000	48	600	18		
Tomcod	46,000	1,420				
Tuna	43,400	2,218	3,000	110		
Whiting	304,900	5,294				
Yellow perch			9,500	861		
Crabs:						
Hard					4,400	\$165
Soft and peelers					12,500	2,500
Squid	608,200	23,999				
Total	5,820,200	225,648	184,800	9,596	16,900	2,665

Fisheries of New York, 1937—Continued

CATCH: BY GEAR—Continued

Species	Otter trawls				Eel traps		Eel pots	
	Fish		Shrimp		Pounds	Value	Pounds	Value
	Pounds	Value	Pounds	Value				
Alewives	3,900	\$50						
Bluefish	40,100	3,291						
Butterfish	393,400	19,829						
Cod	1,675,800	74,629						
Croaker	28,000	296						
Drum, red or redfish	100	1						
Eels:								
Common					13,400	\$730	111,700	\$6,866
Conger	800	14						
Flounders:								
Gray sole	80,100	6,241						
Lemon sole	145,800	6,610						
Yellowtail and dab	2,813,000	126,499						
Blackback	2,600,900	140,580						
Fluke	2,014,500	99,005						
Unclassified	663,800	33,182	300	\$15				
Haddock	2,150,500	72,079						
Hake	38,900	1,185						
Halibut	800	68						
King whiting or "kingfish"	34,500	362	3,300	50				
Macreral	15,500	497						
Pollock	15,600	411						
Rosefish	1,500	15						
Scup or porgy	978,500	28,264						
Sea bass	192,200	15,430						
Sea robin	7,500	151						
Sharks	5,100	54						
Skates	24,900	132						
Squeteagues or "sea trout," gray	135,300	4,909						
Squirrel hake	4,900	96						
Striped bass	1,100	111						
Swordfish	1,600	317						
Tilefish	35,000	1,750						
Whiting	4,884,300	81,823						
Lobsters	1,300	217						
Shrimp	12,600	1,236	58,200	1,846				
Conchs	599,000	20,472						
Squid								
Total	19,610,400	743,126	61,800	1,911	13,400	730	111,700	6,866

Species	Pots—Continued				Harpoons		Spears	
	Fish		Lobster		Pounds	Value	Pounds	Value
	Pounds	Value	Pounds	Value				
Eels, common							30,300	\$1,545
Sea bass	186,900	\$11,215			107,200	\$19,857		
Swordfish								
Lobsters	18,000	3,000	347,600	\$71,876				
Total	204,900	14,815	347,600	71,876	107,200	19,857	30,300	1,545

Species	Dredges							
	Clam		Crab		Mussel		Oyster	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Crabs, hard			25,900	\$689				
Clams:								
Hard, public	17,600	\$2,000						
Surf	971,800	60,114						
Mussels, sea					8,700	\$348		
Oysters, market:								
Public, spring							16,200	\$2,722
Public, fall							13,600	2,203
Private, spring							4,227,700	748,303
Private, fall							4,856,900	845,101
Total	989,400	62,114	25,900	689	8,700	348	9,114,400	1,668,329

Fisheries of New York, 1937—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Albany	Colum- bia	Dutchess	Greene	Kings	Nassau	New York	Orange
Apparatus—Continued	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Pots:		4	22		275			5
Eel.....						1,110		
Fish.....					5,114			
Lobster.....					1		7	
Harpoons.....					4			
Spears:								
Dredges:								
Clam.....					32	10		
Yards at mouth.....					32	10		
Crab.....					7			
Yards at mouth.....					12			
Mussel.....						2		
Yards at mouth.....						2		
Oyster:								
Common.....						26	2	
Yards at mouth.....						38	3	
Suction.....						1		
Yards at mouth.....						2		
Scallop.....					20	4	44	
Yards at mouth.....					67	13	150	
Tongs:								
Oyster.....							19	
Other.....							133	
Rakes, other than for oysters.							70	
Forks.....					22		28	

Item	Put- nam	Queens	Rensse- laer	Rich- mond	Rock- land	Suffolk	Ulster	West- chester
Fishermen:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
On vessels.....		2		9		570		3
On boats and shore:								
Regular.....	2				15	756	17	17
Casual.....	7		9		101	423	116	95
Total.....	9	2	9	9	116	1,749	133	115
Vessels:								
Steam, 41 to 50 tons.....						1		
Net tonnage.....						45		
Motor:								
5 to 10 tons.....				1		77		1
11 to 20 tons.....		1		1		36		
21 to 30 tons.....						10		
31 to 40 tons.....						3		
41 to 50 tons.....						1		
101 to 110 tons.....						2		
111 to 120 tons.....						1		
161 to 170 tons.....						1		
Total.....		1		2		131		1
Net tonnage.....		13		26		1,903		8
Total vessels.....		1		2		132		1
Total net tonnage.....		13		26		1,948		
Boats:								
Motor.....					72	404		
Other.....	4		4			338	73	63
Accessory boats.....				1		53		1
Apparatus:								
Purse seines:								
Menhaden.....						9		
Length, yards.....						3,530		
Haul seines.....	1		3		7	29	4	4
Length, yards.....	233		263		1,167	8,012	500	667
Gill nets:								
Anchor.....						11		
Square yards.....						666		
Drift.....	2				32	4	61	46
Square yards.....	1,111				98,750	1,487	179,944	158,333
Runaround.....						3		
Square yards.....						1,840		
Stake.....					26	290	5	10
Square yards.....					7,642	72,000	3,133	1,367

Fisheries of New York, 1937—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Putnam	Queens	Rensselaer	Richmond	Rockland	Suffolk	Ulster	Westchester
Apparatus—Continued.								
Lines:	Number	Number	Number	Number	Number	Number	Number	Number
Hand.....				3		28		
Hooks.....				3		28		
Trawl.....						290		
Hooks.....						52,000		
Trot with baits or snoods.....						72		
Baits or snoods.....						44,000		
Trot with hooks.....					5		2	
Hooks.....					710		250	
Pound nets.....						131		
Fyke nets.....	5		8		14	272	79	33
Dip nets.....						36		
Otter trawls, fish.....		1				59		
Yards at mouth.....		23				1,075		
Eel traps.....						60		
Pots:								
Eel.....	5				401	705	14	57
Lobster.....						8,736		
Harpoons.....				1		3		1
Spears.....						52		
Dredges:								
Oyster.....						76		
Yards at mouth.....						104		
Scallop.....				2		2		
Yards at mouth.....				7		7		
Tongs:								
Oyster.....						294		
Other.....						1,154		
Rakes, other than for oysters.....						107		
Forks.....						352		

CATCH: BY COUNTIES

Species	Albany		Columbia		Dutchess		Greene	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives.....	4,000	\$98	42,300	\$721	60,500	\$1,299	8,800	\$199
Carp.....	1,500	91	4,700	215	24,000	1,736	18,700	1,481
Catfish and bullheads.....	300	20	1,000	98	6,300	818	2,000	212
Eels, common.....			400	19	600	53	100	6
Shad.....			21,800	1,466	171,600	12,136	23,600	1,889
Striped bass.....					1,200	60		
Sturgeon.....					900	221	100	18
Suckers.....	500	31	3,400	186	3,400	235	300	18
Sunfish.....			200	16	400	30		
White perch.....	100	6	1,500	245	2,700	225	1,200	84
Total.....	6,400	246	75,300	3,066	280,600	16,803	54,800	3,907

Species	Kings		Nassau		New York		Orange	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives.....							23,100	\$315
Bluefish.....	328,900	\$26,654	47,400	\$3,130	192,800	\$15,627		
Bonito.....			11,200	520				
Butterfish.....	40,800	1,639	135,900	9,026	262,100	12,387		
Carp.....							8,000	549
Catfish and bullheads.....							1,600	165
Cod.....	587,400	25,450	310,000	13,375	2,819,500	91,135		
Croaker.....	1,900	19						
Cusk.....					90,900	1,288		
Eels:								
Common.....	9,100	976					700	41
Conger.....					800	14		
Flounders:								
Gray sole.....					88,900	6,256		
Lemon sole.....					145,800	9,610		
Yellowtail and dab.....	232,600	8,810	34,000	1,700	1,206,900	46,210		
Blackback.....	826,700	49,608	1,800	87	531,500	42,379		
Fluke.....	985,300	42,795	232,400	11,643	446,500	22,242		
Unclassified.....	150,000	7,500			561,300	25,040		

Fisheries of New York, 1937—Continued

CATCH: BY COUNTIES—Continued

Species	Kings		Nassau		New York		Orange	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Frigate mackerel			13,200					
Haddock	1,500	\$56			2,242,400	\$74,283		
Hake	24,400	898			292,400	3,201		
Halibut					2,800	291		
King whiting or "king-fish"			2,900	92	3,300	50		
Mackerel	176,000	4,547	127,800	2,557	189,400	7,641		
Mummichog	1,300	140						
Pollock					21,800	419		
Rosefish					1,500	15		
Scup or porgy	155,500	3,475	88,600	3,481	80,600	2,425		
Sea bass	12,700	1,019	187,600	11,273	83,400	6,663		
Sea robin	7,000	140	500	11				
Shad	6,700	807	3,600	360			26,700	\$1,674
Sharks	200	5						
Skates	24,800	430						
Smelt							200	38
Spanish mackerel			100	2				
Squeteagues or "sea trout," gray	300,000	9,000	124,000	4,960	1,600	64		
Squirrel hake	3,000	60	1,900	36				
Striped bass			14,500	1,148				
Suckers							1,000	64
Sunfish							200	11
Swordfish	200	22			78,700	13,627		
Tautog	1,200	12						
Thimble-eyed mackerel	1,900	57	46,000	1,420				
Tilefish	240,000	9,540			2,118,600	90,567		
Tomcod							100	10
White perch							700	60
Whiting	4,073,400	67,999	404,700	6,534	89,900	699		
Wolfish					5,800	139		
Crabs, hard	28,500	884						
Lobsters	196,000	39,200	18,000	3,600	500	57		
Shrimp					58,200	1,846		
Clams:								
Hard, public	17,600	2,000	351,600	66,335				
Hard, private			24,000	4,500				
Soft, public			253,200	21,878				
Surf	770,000	50,012	201,800	10,102				
Conchs	12,600	1,236						
Mussels, sea			25,900	1,374				
Oysters, market:								
Public, spring			5,900	991				
Public, fall			8,800	1,425				
Private, spring			1,176,800	208,294	5,300	938		
Private, fall			1,389,800	241,825	44,200	7,691		
Scallops:								
Bay			100	46				
Sea	722,400	94,029	107,800	13,600	1,904,200	211,507		
Squid	90,000	3,243	99,100	3,017	3,600	102		
Bloodworms	3,200	920	9,200	6,900				
Sandworms	4,700	432	14,200	10,600				
Total	9,987,000	452,394	5,533,900	665,674	13,259,200	694,608	62,300	2,927

Species	Putnam		Queens		Rensselaer		Richmond	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives	400	\$8			4,000	\$43		
Bluefish							33,000	\$2,680
Carp	2,600	124			29,300	1,919		
Catfish and bullheads	600	53			700	78		
Cod			200	\$4			24,400	1,252
Eels, common	800	48			100	11		
Flounders:								
Gray sole			200	5				
Yellowtail and dab			35,500	597				
Blackback			2,000	80				
Shad	5,000	500			100	5		
Striped bass	200	26			100	7		
Suckers	500	21			13,800	910		
Sunfish	100	3					1,800	324
Swordfish								
White perch	900	65			600	46		
Scallops, sea							84,800	10,119
Total	11,000	848	37,900	686	48,700	3,019	144,000	14,375

Fisheries of New York, 1937—Continued

CATCH: BY COUNTIES—Continued

Species	Rockland		Suffolk		Ulster		Westchester	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives	9,900	\$291	14,400	\$140	43,600	\$745	1,800	\$30
Bluefish			256,000	20,301				
Bon to			39,200	1,541				
Rutterfish			1,461,900	89,413				
Carp	1,900	76			35,300	2,526	9,800	649
Catfish and bullheads	700	72			5,900	591	5,000	372
Cod			561,000	22,602				
Croaker			28,000	296				
Drum, red or redfish			100	1				
Eels:								
Common	29,400	1,530	122,200	6,725	2,000	235	7,000	431
Conger			200	8				
Flounders:								
Yellowtail and dab			1,308,000	69,562				
Blackback			1,074,800	53,822				
Fluke			484,100	27,433				
Unclassified			27,800	1,413				
Frigate mackerel			13,300	133				
Grayfish			100	2				
Haddock			38,000	1,418				
Hake			400	8				
Herring, sea			4,600	46				
King whiting or "kingfish"			66,400	751				
Mackerel			954,700	20,333				
Menhaden			31,892,000	164,431				
Pollock			94,300	2,599				
Scup or porgy			1,382,400	41,068				
Sea bass			243,700	19,602				
Sea robin			8,500	174				
Shad	152,600	11,035	35,100	2,505	343,000	23,980	231,600	20,506
Sharks			22,000	1,132				
Skates			38,500	212				
Smelt					400	38		
Spot			300	5				
Squeteagues or "sea trout," gray			1,031,500	44,687				
Squirrel hake			100	2				
Striped bass	15,500	2,293	96,900	7,870	100	8	3,500	300
Sturgeon			100	12			100	24
Suckers	1,600	125			2,800	185	2,600	211
Sunfish					700	33		
Swellfish			56,100	579				
Swordfish			23,400	4,693			7,900	1,250
Tautog			4,700	68				
Tilfish			34,000	1,757				
Tomcod							3,000	110
Tuna			43,400	2,218				
White perch	9,000	593			2,300	201	10,500	526
Whiting			611,200	12,785				
Crabs:								
Hard			482,600	10,486				
Soft and peelers			12,500	2,500				
Lobsters			152,300	32,836				
Shrimp			20,600	5,150				
Clams:								
Hard, public			1,778,700	306,208				
Hard, private			359,500	63,414				
Soft, public			516,800	63,867				
Soft, private			12,800	1,536				
Mussels, sea			64,800	3,888				
Oysters, market:								
Public, spring			493,800	82,959				
Public, fall			191,400	31,007				
Private, spring			3,045,600	539,071				
Private, fall			3,422,900	595,585				
Scallops, bay			35,900	8,604				
Squid			1,014,500	38,109				
Bloodworms			22,300	19,220				
Sandworms			19,600	16,740				
Total	220,000	16,015	53,720,000	2,443,527	436,100	28,542	282,800	24,409

Fisheries of New York, 1937—Continued

SEED OYSTER FISHERY: BY GEAR

Item	Dredges		Tongs		Total, exclusive of duplication	
OPERATING UNITS						
Fishermen:	<i>Number</i>		<i>Number</i>		<i>Number</i>	
On vessels.....	28				28	
On boats and shore:						
Regular.....			109		109	
Casual.....			39		39	
Total	28		148		176	
Vessels, motor	5				5	
Net tonnage.....	149				149	
Boats:						
Motor.....			20		20	
Other.....			128		128	
Apparatus:						
Number.....	10		148			
Yards at mouth.....	19					
CATCH						
Oysters, seed:	<i>Bushels</i>	<i>Value</i>	<i>Bushels</i>	<i>Value</i>	<i>Bushels</i>	<i>Value</i>
Public, spring.....			39,829	\$34,995	39,829	\$34,995
Private, spring.....	12,783	\$13,760			12,783	13,760
Public, fall.....			5,766	4,996	5,766	4,996
Private, fall.....	32,161	33,290			32,161	33,290
Total	44,944	47,050	45,595	39,991	90,539	87,041

SEED OYSTER FISHERY: BY COUNTIES

Item	Nassau		Suffolk	
OPERATING UNITS				
Fishermen:	<i>Number</i>		<i>Number</i>	
On vessels.....			28	
On boats and shore:				
Regular.....			103	
Casual.....			33	
Total	12		164	
Vessels, motor			5	
Net tonnage.....			149	
Boats:				
Motor.....	2		18	
Other.....	10		118	
Apparatus:				
Dredges.....			10	
Yards at mouth.....			19	
Tongs.....			148	
CATCH				
Oyster, seed:	<i>Bushels</i>	<i>Value</i>	<i>Bushels</i>	<i>Value</i>
Public, spring.....			38,244	\$33,715
Private, spring.....	1,585	\$1,260		
Public, fall.....			12,783	13,760
Private, fall.....	386	221	5,390	4,375
Total	1,971	1,501	88,568	85,540

NOTE.—Of the total number of persons fishing for seed oysters, 156 are duplicated among those fishing for market oysters or other species. Similarly the following craft and gear are duplicated: 1 motor vessel, 20 motorboats, 128 other boats, 2 dredges, and 148 tongs.

NEW JERSEY

Fisheries of New Jersey, 1937

OPERATING UNITS: BY GEAR

Item	Purse seines		Haul seines	Gill nets				Lines	
	Menhaden	Other		Anchor	Drift	Run-around	Stake	Hand	Trawl
Fishermen:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
On vessels.....	128	94			8			58	54
On boats and shore:									
Regular.....			73	4	104	109	51	204	142
Casual.....			218	2	82	11	252	64	53
Total	126	94	291	6	194	120	303	326	249
Vessels, motor:									
5 to 10 tons.....		1			1			5	7
11 to 20 tons.....		2			1			6	12
21 to 30 tons.....		3						1	
31 to 40 tons.....	5	1						1	
41 to 50 tons.....		1							
141 to 150 tons.....	1								
Total	6	8			2			12	19
Net tonnage.....	332	192			17			155	197
Boats:									
Motor.....			3	3	64	52	44	138	90
Other.....			119		42		95	8	
Accessory boats.....	18	11			3			21	22
Apparatus:									
Number.....	6	8	121	6	678	52	579	444	566
Length, yards.....	1,680	2,790	9,573						
Square yards.....				9,340	470,822	189,590	219,175		
Hooks, baits, or snoods.....								885	373,000

Item	Lines—Continued			Pound nets	Wetrs	Stop nets	Fyke nets	Dip nets	Cast nets
	Troll	Trot with baits or snoods	Trot with hooks						
Fishermen:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
On vessels.....	22			242					
On boats and shore:									
Regular.....	71	16		112		23	34	15	
Casual.....	57	12	1	24	15	67	68	13	3
Total	150	28	1	378	15	90	102	28	3
Vessels, motor:									
5 to 10 tons.....	2			36					
11 to 20 tons.....	1								
21 to 30 tons.....	1								
Total	4			36					
Net tonnage.....	53			224					
Boats:									
Motor.....	113	16		23	6	9	24	4	
Other.....		5	1	13	1	44	37	22	
Accessory boats.....	8								
Apparatus:									
Number.....	482	21	1	191	91	59	832	28	3
Square, yards.....						63,317			
Hooks, baits or snoods.....	482	14,806	150						

Fisheries of New Jersey, 1937—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Drag nets	Drop nets	Push nets	Otter trawls	Wire baskets	Pots	
						Crab	Eel
	Number	Number	Number	Number	Number	Number	Number
Fishermen:							
On vessels.....				140			
On boats and shore:							
Regular.....	6	1	11	44		2	23
Casual.....	3		2	6	1		20
Total.....	9	1	13	190	1	2	52
Vessels, motor:							
5 to 10 tons.....				6			
11 to 20 tons.....				19			
21 to 30 tons.....				2			
31 to 40 tons.....				5			
41 to 50 tons.....				2			
51 to 60 tons.....				1			
71 to 80 tons.....				1			
Total.....				36			
Net tonnage.....				746			
Boats:							
Motor.....	6		10	24	1	1	21
Other.....		1	2				16
Apparatus:							
Number.....	12	40	13	60	25	10	1,476
Yards at mouth.....	24			1,367			

Item	Pots—Contd.		Spears	Dredges			
	Fish	Lobster		Clam	Crab	Oyster	Scallop
	Number	Number	Number	Number	Number	Number	Number
Fishermen:							
On vessels.....				78	21	427	24
On boats and shore:							
Regular.....	83	87	35	11	6	28	
Casual.....	13	7	5	6		2	
Total.....	66	94	40	96	27	457	24
Vessels:							
Motor:							
5 to 10 tons.....				10	5	10	
11 to 20 tons.....				13	3	38	
21 to 30 tons.....						16	1
31 to 40 tons.....						4	2
51 to 60 tons.....						5	
Total.....				23	8	72	3
Net tonnage.....				269	85	1,418	92
Sail:							
5 to 10 tons.....				2	1		
11 to 20 tons.....				1		1	
Total.....				3	1	1	
Net tonnage.....				32	8	18	
Total vessels.....				26	9	73	3
Total net tonnage.....				301	93	1,436	92
Boats:							
Motor.....	42	47		10	4	15	
Other.....			40				
Apparatus:							
Number.....	10,047	9,699	40	72	58	176	6
Yards at mouth.....				74	84	214	20

Fisheries of New Jersey, 1937—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Tongs		Rakes		Hoes	By hand		Total, exclusive of duplication
	Oyster	Other	Oyster	Other		Oyster	Other	
Fishermen:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
On vessels.....								1,132
On boats and shore:								
Regular.....	66	337	34	410	60	2	126	992
Casual.....	121	235		461	41	14	248	1,581
Total.....	187	572	34	871	101	16	374	3,705
Vessels:								
Motor:								
5 to 10 tons.....								68
11 to 20 tons.....								73
21 to 30 tons.....								21
31 to 40 tons.....								15
41 to 50 tons.....								2
51 to 60 tons.....								6
71 to 80 tons.....								1
141 to 160 tons.....								1
Total.....								187
Net tonnage.....								3,197
Sail:								
5 to 10 tons.....								2
11 to 20 tons.....								1
Total.....								3
Net tonnage.....								32
Total vessels.....								189
Total net tonnage.....								3,229
Boats:								
Motor.....	63	296	22	310	20		69	971
Other.....	117	255	9	546	75	3	264	1,317
Accessory boats.....								71
Apparatus, number.....	187	572	34	871	101			

CATCH: BY GEAR

Species	Purse seines				Haul seines		Gill nets	
	Menhaden		Other		Pounds	Value	Anchor	
	Pounds	Value	Pounds	Value			Pounds	Value
Alewives.....					68,400	\$719		
Bluefish.....			74,800	\$4,738				
Bonito.....			3,100	132			700	\$60
Butterfish.....			31,200	1,262				
Carp.....					126,700	8,361		
Catfish and bullheads.....					21,100	877		
Cod.....			69,400	2,500				
Croaker.....			522,300	7,207				
Eels, common.....					9,700	227		
Flounders:					58,200	3,841		
Blackback.....					300	30		
Fluke.....			2,900	280	5,400	623		
Frigate mackerel.....			300	3				
Herring, sea.....			2,000	27				
Hickory shad.....			600	12				
King whiting or "king-fish".....			300	4	700	42		
Mackerel.....			5,100	474				
Menhaden.....	51,510,000	\$210,073	10,687,000	35,635			2,000	20
Scup or porgy.....			453,600	9,474			100	2
Sea bass.....			14,700	955				
Shad.....			100	5	73,900	15,366	7,300	900
Spanish mackerel.....			300	19				
Spot.....			200	4				
Squeteagues or "sea trout," gray.....			2,120,600	39,913	25,600	1,680	1,100	45
Striped bass.....			8,100	812	83,100	11,635		

Fisheries of New Jersey, 1937—Continued

CATCH: BY GEAR—Continued

Species	Purse seines				Haul seines		Gill nets	
	Menhaden		Other				Anchor	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Suckers.....					20,900	\$1,076		
White perch.....					33,300	3,328		
Whiting.....			3,400	\$34				
Yellow perch.....					1,400	150		
Crabs:								
Hard.....					10,700	1,095		
Soft and peelers.....					14,400	4,570		
Shrimp.....					3,000	750		
Total.....	51,510,000	\$210,073	14,000,000	103,490	556,800	54,370	11,200	\$1,027

Species	Gill nets—Continued						Lines	
	Drift		Runaround		Stake		Hand	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives.....					2,400	\$24		
Bluefish.....	7,900	\$946	127,000	\$10,267			417,900	\$30,147
Bonito.....	100	8					700	42
Butterfish.....	2,400	93						
Carp.....					10,000	800		
Cod.....							19,000	609
Croaker.....	93,100	1,453	1,000	10			16,200	464
Eels:								
Common.....							5,500	396
Conger.....							300	3
Flounders:								
Blackback.....							100	10
Fluke.....							10,000	958
Groupers.....							21,500	978
Mackerel.....	372,900	19,519	37,100	1,146				
Pompano.....							100	35
Scup or porgy.....			600	6			37,500	506
Sea bass.....							325,700	23,528
Shad.....	168,100	14,402			1,944,300	168,137		
Sharks.....	100	3						
Snapper, red.....							53,900	3,794
Spot.....	500	10						
Squeteagues or "sea trout," gray.....	122,000	3,832	271,800	11,539	3,700	242	45,000	1,966
Striped bass.....	2,000	232			121,600	15,385	200	30
Sturgeon.....	2,000	150						
Tautog.....							2,700	54
White perch.....	1,200	100			15,300	1,398		
Whiting.....	100	2					800	15
Crabs, hard.....			3,100	90	1,100	30		
Total.....	772,400	40,750	440,600	23,058	2,098,400	186,016	957,100	63,535

Species	Lines—Continued							
	Trawl		Troll		Trot with baits or snoods		Trot with hooks	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Bluefish.....			475,900	\$33,457				
Bonito.....			47,200	2,726				
Carp.....	51,100	\$1,272						
Cod.....	2,244,800	58,648						
Frigate mackerel.....			300	10				
Kingfish or "king mackerel".....			149,500	5,877				
Mackerel.....			15,900	711				
Skates.....	1,900	10						
Tuna.....			4,400	210				
Crabs:								
Hard.....					132,300	\$6,016		
Soft and peelers.....					600	225		
Turtles, snapper.....							4,000	\$200
Total.....	2,297,800	59,930	693,200	42,791	132,900	6,241	4,000	200

Fisheries of New Jersey, 1937—Continued

CATCH: BY GEAR—Continued

Species	Pound nets		Weirs		Stop nets		Fyke nets	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives	352,300	\$3,479						
Bluefish	373,200	21,468						
Bonito	123,300	4,534						
Butterfish	2,554,500	95,248						
Carp					183,700	\$13,399		
Catfish and bullheads					8,000	167	36,100	\$1,402
Cod	189,100	4,685						
Croaker	2,147,200	37,541						
Drum:								
Black	5,100	73						
Red or redbfish	9,800	194						
Eels:								
Common	21,800	3,439					25,700	3,221
Conger	3,400	65						
Flounders:								
Gray sole	2,000	80						
Yellowtail and dab	5,000	194						
Blackback	20,300	828					89,600	3,483
Fluke	188,000	14,487						
Frigate mackerel	187,600	1,912						
Grayfish	50,900	509						
Hake	3,100	80						
Herring, sea	363,900	3,473						
Hickory shad	1,400	20						
King whiting or "kingfish"	68,600	2,763						
Mackerel	1,234,100	37,061						
Menhaden	5,587,000	18,587						
Mullet	500	14						
Pollock	1,400	41						
Rudderfish	2,100	21						
Scup or porgy	2,771,400	48,045						
Sea bass	90,000	5,153						
Sea robin	48,900	489						
Shad	1,145,600	123,896						
Sharks	43,100	675						
Skates	54,200	395						
Spanish mackerel	80,000	4,181						
Spot	13,800	290						
Squeteaguee or "sea trout," gray	7,432,900	219,385						
Squirrel hake	114,800	1,158						
Striped bass	800	74					25,400	3,570
Sturgeon	600	80						
Suckers					200	14		
Swellfish	100	1						
Tantog	8,600	180						
Thimble-eyed mackerel	15,100	275						
Tuna	46,300	1,538						
White perch							33,100	3,410
Whiting	8,243,100	84,809						
Yellow perch							4,300	516
Yellowtail	700	14						
Crabs:								
Hard	20,900	500						
King	1,760,300	5,021	998,200	\$2,170			8,000	30
Soft and peelers	100	1						
Lobsters	200	22						
Squid	978,400	18,430						
Turtles:								
Hawksbill	3,900	78						
Loggerhead	6,700	122						
Snapper							4,200	311
Total	36,286,100	765,208	998,200	2,170	186,900	13,579	226,400	15,943

Species	Dip nets		Cast nets		Drag nets		Drop nets	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Carp			3,500	\$265				
Crabs:								
Hard	15,600	\$1,841					500	\$216
Soft and peelers	40,700	13,885						
Shrimp					13,800	\$3,450		
Total	56,300	15,726	3,500	265	13,800	3,450	500	216

Fisheries of New Jersey, 1937—Continued

CATCH: BY GEAR—Continued

Species	Push nets		Otter trawls		Wire baskets		Pots			
	Pounds	Value	Pounds	Value	Pounds	Value	Crab		Eel	
Bluefish			6,700	\$524						
Butterfish			467,600	20,272						
Cod			41,200	1,437						
Croaker			1,144,800	20,541						
Drum, red or redfish			300	6						
Eels:										
Common									140,700	\$13,000
Conger			26,400	439						
Flounders:										
Gray sole			3,100	83						
Yellowtail and dab			8,800	173						
Blackback			24,200	726						
Fluke			1,945,900	155,559						
Grayfish			6,700	34						
Hake			46,400	1,357						
King whiting or "kingfish"			8,700	239						
Mackerel			4,000	482						
Pigfish			100	2						
Pollock			100	4						
Scup or porgy			1,780,700	26,674						
Sea bass			316,600	20,154						
Sea robin			6,500	108						
Shad			200	24						
Sharks			500	12						
Skates			1,600	32						
Spot			300	6						
Squeteagues or "sea trout," gray			491,400	12,230						
Sturgeon			3,700	415						
Tautog			1,100	16						
Tilefish			300	15						
Whiting			376,300	7,249						
Crabs:										
Hard			400	25	200	\$25	12,000	\$1,500		
Soft and peelers					200	50	3,600	1,350		
Lobsters			9,100	1,049						
Shrimp	20,300	\$5,075								
Scallops, sea			100	9						
Squid			167,300	3,956						
Total	20,300	5,075	6,891,100	273,862	400	75	15,600	2,850	140,700	13,000

Species	Pots—Continued				Spears		Dredges	
	Fish		Lobster		Pounds	Value	Pounds	Value
Bluefish	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
	200	\$16						
Cod	1,400	36						
Eels:								
Common					20,500	\$2,410		
Conger	900	13						
Scup or porgy	900	11						
Sea bass	1,335,300	64,357	29,000	\$1,687				
Squeteagues or "sea trout," gray	1,100	17						
Squirrel hake	400	4						
Tautog	1,800	39						
Crabs, hard							252,300	\$8,244
Lobsters	35,000	8,916	224,500	46,091				
Clams:								
Hard, public							57,100	6,068
Hard, private							73,500	11,132
Surf							613,900	18,984
Oysters, market:								
Public, spring							3,290	360
Public, fall							3,200	390
Private, spring							1,884,900	251,167
Private, fall							2,332,500	320,845
Scallops, sea							234,000	13,650
Total	1,377,000	73,409	253,500	47,778	20,500	2,410	5,464,600	630,805

Fisheries of New Jersey, 1937—Continued

CATCH: BY GEAR—Continued

Species	Tongs		Rakes		Hoes		By hand	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Crabs, hard.....			186,500	\$2,322				
Clams.....								
Hard, public.....	579,200	\$95,941	1,201,000	219,791			383,200	\$61,480
Hard, private.....	121,700	18,530	66,200	10,037			50,300	7,798
Soft, public.....					1,177,700	\$68,646		
Oysters, market:								
Public, spring.....	44,000	10,345	5,800	730				
Public, fall.....	134,300	12,218	5,800	731				
Private, spring.....	17,700	3,730	30,600	7,523			2,200	508
Private, fall.....	64,400	14,715	31,200	7,664			2,900	666
Terrapin, diamond-back.....							700	261
Total.....	952,300	155,509	1,527,100	248,798	1,177,700	68,646	439,300	70,713

OPERATING UNITS: BY COUNTIES

Item	Atlantic	Bergen	Bur- lington	Cam- den	Cape May	Cum- berland	Glouces- ter
Fishermen:							
On vessels.....	Number 61	Number 3	Number 9	Number	Number 352	Number 406	Number
On boats and shore:							
Regular.....	224	15	20		130	23	
Casual.....	198	104	44	18	248	187	18
Total.....	483	122	73	18	730	616	18
Vessels, motor:							
5 to 10 tons.....	2				30	7	
11 to 20 tons.....	11	1	2		21	36	
21 to 30 tons.....	2				4	15	
31 to 40 tons.....	1				5	4	
41 to 50 tons.....					2		
51 to 60 tons.....					1	5	
71 to 80 tons.....					1		
Total.....	16	1	2		64	67	
Net tonnage.....	233	15	22		1,001	1,374	
Boats:							
Motor.....	159	1	28		151	45	2
Other.....	249	59	20	9	214	153	12
Accessory boats.....	9				39		
Apparatus:							
Purse seines:							
Other than menhaden.....	1				7		
Length, yards.....	360				2,430		
Haul seines.....	27		7	9	8	14	2
Length, yards.....	1,884		544	700	407	1,344	185
Gill nets:							
Drift.....	2		8		383	38	1
Square yards.....	480		9,600		176,768	28,469	3,600
Stake.....	75	57				114	
Square yards.....	24,780	81,791				19,188	
Lines:							
Hand.....	10				270	5	
Hooks.....	19				670	6	
Trawl.....	153				287	4	
Hooks.....	118,400				190,800	1,800	
Troll.....	12				299		
Hooks.....	12				299		
Trot with baits or snoods.....					2	15	
Baits or snoods.....					6	13,100	
Trot with hooks.....						1	
Hooks.....						150	
Pound nets.....	2				88		
Weirs.....					62	29	
Stop nets.....			9	2		11	7
Square yards.....			10,325	3,400		13,267	19,000
Fyke nets.....	1		74		17	161	119
Dip nets.....	4				3		
Cast nets.....							2
Drop nets.....					40		
Push nets.....	2						
Otter trawls.....	14				44		
Yards at mouth.....	320				1,008		

Fisheries of New Jersey, 1937—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Atlantic	Bergen	Bur- lington	Cam- den	Cape May	Cum- berland	Glouces- ter
Apparatus—Continued							
Pots:	Number	Number	Number	Number	Number	Number	Number
Eel	12	137	35		95	40	
Fish	900				2,170		
Spears:					3		
Dredges:							
Clam	4				14	8	
Yards at mouth	3				12	9	
Crab		10					
Yards at mouth		10					
Oyster	16		10				134
Yards at mouth	16		12				168
Scallops	2				4		
Yards at mouth	7				13		
Tongs:							
Oyster	31		8		5	132	
Other	200		28		133		
Rakes:							
Oyster	14		3		2		
Other	210		7		116		
Hoes	15						

Item	Hudson	Hunter- don	Mercer	Middle- sex	Mon- mouth	Ocean	Salem
Fishermen:	Number	Number	Number	Number	Number	Number	Number
On vessels	2			2	160	137	
On boats and shore:							
Regular				8	280	269	23
Casual	9	32	20	6	280	363	54
Total	11	32	20	16	720	769	77
Vessels:							
Motor:							
5 to 10 tons	1			1	5	22	
11 to 20 tons					2		
31 to 40 tons					5		
141 to 150 tons					1		
Total	1			1	13	22	
Net tonnage	9			8	399	136	
Sail:							
5 to 10 tons					2		
11 to 20 tons					1		
Total					3		
Net tonnage					32		
Total vessels	1			1	16	22	
Total net tonnage	9			8	431	136	
Boats:							
Motor	1			7	240	310	27
Other	2	6	5	6	333	227	22
Accessory boats					22	1	
Apparatus:							
Purse seines, manbaden					6		
Length, yards					1,680		
Haul seines		6	2		4	27	15
Length, yards		1,150	470		78	1,165	1,646
Gill nets:							
Anchor				3	3		
Square yards				2,600	6,840		
Drift			1		215	9	21
Square yards			875		113,730	7,200	130,100
Runaround				6	29	17	
Square yards				16,470	105,420	67,700	
Stake	9			8	30	264	32
Square yards	9,639			1,600	51,985	27,392	2,800
Lines:							
Hand					114	45	
Hooks					135	55	
Trawl					27	95	
Hooks					14,000	48,000	

Fisheries of New Jersey, 1937—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Hudson	Hunterdon	Mercer	Middlesex	Monmouth	Ocean	Salem
Apparatus—Continued.							
Lines—Continued.							
Troll					104	67	
Hooks					104	67	
Trot with baits or snoods							4
Baits or snoods							1,700
Pound nets					48	58	
Stop nets							30
Square yards							17,325
Fyke nets					24	297	109
Dip nets					14	7	
Cast nets							1
Drag nets						12	
Yards at mouth						24	
Push nets						11	
Otter trawls	1				1		
Yards at mouth	27				12		
Wire baskets						25	
Pots:							
Crab							10
Eel	10			170	576	401	
Fish						6,977	
Lobster				100	9,599		
Spears						37	
Dredges:							
Clam				4	33	9	
Yards at mouth				5	33	12	
Crab				2	46		
Yards at mouth				4	70		
Oyster					2	14	
Yards at mouth					3	15	
Tongs:							
Oyster					2	9	
Other					1	210	
Rakes:							
Oyster					12	3	
Other				6	357	165	
Hoes						57	29

CATCH: BY COUNTIES

Species	Atlantic		Bergen		Burlington		Camden		Cape May	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives	100	\$1			2,800	\$26			500	\$5
Bluefish	12,500	702							597,500	41,164
Bonito	1,200	54							35,700	1,620
Butterfish	38,600	1,471							1,276,900	53,449
Carp					33,800	2,390	35,800	\$2,492		
Catfish and bullheads	11,300	397			4,200	184				
Cero	51,100	1,272								
Cod	575,200	15,993							1,188,200	33,818
Croaker	159,700	2,525							2,315,700	37,583
Drum:										
Black									2,300	23
Red or redfish									7,700	146
Eels:										
Common	49,100	2,511	23,100	\$1,878	500	35			37,900	6,260
Conger	3,200	57							25,900	438
Flounders:										
Gray sole									3,100	83
Yellowtail and dab									8,900	169
Blackback					500	15			7,500	412
Fluke	371,500	31,181							1,607,900	127,092
Frigate mackerel									39,700	546
Grayfish									5,700	34
Grouper									21,500	978
Hake	3,200	65							43,200	1,291
Herring, sea	2,000	20							23,000	237
Hickory shad	100	1							1,300	19
Kingfish or "king mackerel"									149,500	5,677
King whiting or "kingfish"	3,600	194								
Mackerel									36,000	938
Menhaden	5,000	12							234,400	15,252
									10,766,000	38,832

Fisheries of New Jersey, 1937—Continued

CATCH: BY COUNTIES—Continued

Species	Atlantic		Bergen		Burlington		Camden		Cape May	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Mullet	200								100	\$2
Flgfish									400	10
Pollock									2,754,100	40,794
Scup or porgy	59,300	1,454							974,700	66,781
Sea bass	109,100	6,676							16,500	208
Sea robin					6,400	\$1,612	10,900	\$1,515	3,800	343
Shad	142,100	22,789	860,100	\$69,565					3,200	44
Sharks									12,000	86
Skates									53,900	3,794
Snapper, red									6,200	398
Spanish mackerel	100	5							11,100	223
Spot	1,000	30								
Squeteagues or "sea-trout," gray	422,900	6,907							4,996,000	103,676
Squirrel hake	100	1							1,500	25
Striped bass	110,400	14,843			16,000	1,920			12,800	1,412
Sturgeon	200	24							3,600	395
Suckers					1,700	133	2,400	192		
Tautog	2,700	56							5,000	85
Thimble-eyed mackerel									100	1
Tilefish									300	15
Tuna									600	30
White perch	32,500	3,226			8,000	1,040			10,000	1,200
Whiting	20,800	277							523,100	8,656
Crabs:										
Hard	2,300	154	5,000	200					4,700	484
King									2,460,700	6,464
Soft and peelers	200	75							900	406
Lobsters	18,300	4,177							6,700	328
Shrimp	2,200	550								
Clams:										
Hard, public	355,900	54,281			17,900	2,348			405,300	81,594
Hard, private	25,900	4,290			22,400	3,211			700	278
Soft, public	516,400	32,007								
Surf	85,100	3,275							496,100	13,869
Oysters, market:										
Public, spring	38,500	9,145							1,300	425
Public, fall									1,200	400
Private, spring	44,700	10,740			82,000	19,538			18,000	4,453
Private, fall	91,800	21,805			82,000	19,537			18,900	4,671
Scallops, sea	54,000	3,150							180,000	10,600
Squid	10,100	324							579,100	10,519
Turtles, loggerhead									700	11
Total	3,434,200	256,720	888,200	71,643	278,000	51,989	48,900	4,199	32,002,400	726,146

Species	Cumberland		Gloucester		Hudson		Hunterdon		Mercer	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives	9,800	\$98							14,000	\$175
Carp	62,800	3,959	30,000	\$2,100			2,700	\$216	500	30
Catfish and bullheads	16,700	610	12,000	435						
Cod	9,100	230								
Croaker	71,500	830								
Eels, common	14,500	1,360	1,300	150	2,600	\$180				
Flounders, blackback					24,000	720				
Shad	49,800	12,603	900	300	37,200	3,475	22,000	4,075	6,500	900
Spot	500	10								
Squeteagues or "sea-trout," gray	112,600	3,217								
Striped bass	10,200	1,336								
Suckers			600	48			7,100	426	9,000	270
White perch	8,500	722								
Crabs:										
Hard	123,300	4,929								
King	288,000	678								
Clams, hard, private	27,700	3,290								
Oysters, market:										
Public, fall	128,900	11,073								
Private, spring	1,761,400	220,962								
Private, fall	2,204,200	289,640								
Terrapin, diamond-back	700	261								
Turtles, snapper	8,200	511								
Total	4,908,400	556,319	44,800	3,033	63,800	4,375	31,800	4,717	30,000	1,375

Fisheries of New Jersey, 1937—Continued

CATCH: BY COUNTIES—Continued

Species	Middlesex		Monmouth		Ocean		Salem	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives			212, 100	\$2, 121	179, 600	\$1, 752	4, 400	\$44
Bluefish	48, 200	\$3, 827	482, 200	33, 936	343, 900	21, 994		
Bonito			57, 200	2, 612	80, 300	3, 156		
Butterfish			355, 600	15, 304	1, 384, 600	46, 651		
Carp							168, 500	11, 637
Catfish and bullheads							16, 000	820
Cod			90, 900	2, 337	701, 500	15, 437		
Croaker			265, 800	3, 353	1, 121, 600	23, 132		
Drum:								
Black			200	4	2, 600	46		
Red or redfish			100	4	2, 300	50		
Eels:								
Common	2, 600	216	109, 800	11, 253	20, 500	1, 594	10, 500	870
Conger			800	8	1, 100	17		
Flounders:								
Gray sole					2, 000	80		
Yellowtail and dab			100	6	4, 500	192		
Blackback			13, 100	434	89, 300	3, 496		
Fluke			68, 700	6, 002	104, 100	7, 632		
Frigate mackerel			40, 400	484	78, 100	895		
Grayfish			50, 900	509				
Hake			500	1, 317	2, 600	70		
Herring, sea			143, 900	1, 317	197, 000	1, 926		
Hickory shad			600	12				
King whiting or "kingfish"			17, 300	990	21, 400	926		
Mackerel	600	28	674, 700	21, 180	757, 400	22, 933		
Menhaden			56, 764, 000	227, 575	221, 000	896		
Mullet			300	12				
Pollock			700	19	400	16		
Pompano			100	35				
Rudderfish			2, 100	21				
Scup or porgy			1, 144, 800	21, 395	1, 086, 600	21, 075		
Sea bass			64, 200	4, 221	963, 300	38, 156		
Sea robin			10, 100	101	28, 900	288		
Shad	12, 500	1, 472	1, 561, 400	141, 880	478, 700	51, 723	149, 200	10, 478
Sharks			9, 800	154	30, 700	492		
Skates			23, 000	229	22, 700	122		
Spanish mackerel			19, 100	2, 024	24, 900	1, 773		
Spot			1, 400	28	800	19		
Squeteagues or "sea trout",								
gray	76, 000	3, 605	1, 737, 800	56, 946	3, 169, 900	116, 498		
Squirrel hake			37, 700	377	75, 900	769		
Striped bass					91, 000	12, 132	800	95
Sturgeon			500	76			2, 000	150
Suckers							300	21
Swellfish			100	1				
Tautog			4, 400	96	2, 100	52		
Thimble-eyed mackerel					15, 000	274		
Tuna			22, 000	778	28, 100	940		
White perch					19, 400	1, 684	4, 500	864
Whiting			3, 981, 300	39, 858	4, 098, 500	43, 018		
Yellow perch					4, 800	576	900	90
Yellowtail			700	14				
Crabs:								
Hard	6, 000	170	273, 800	10, 025	198, 200	3, 067	22, 300	2, 875
King			17, 800	79				
Soft and peelers			40, 400	13, 325	13, 900	4, 700	4, 200	1, 575
Lobsters	100	25	224, 700	46, 098	19, 000	4, 950		
Shrimp					34, 900	8, 725		
Clams:								
Hard, public	11, 700	1, 418	806, 400	151, 366	614, 300	92, 268		
Hard, private			11, 000	2, 050	224, 000	34, 378		
Soft, public			478, 500	26, 895	182, 800	10, 744		
Surf			18, 500	1, 125	13, 200	715		
Oysters, market:								
Public, spring			9, 000	1, 090	4, 200	775		
Public, fall			9, 000	1, 091	4, 200	775		
Private, spring			3, 500	700	25, 800	6, 535		
Private, fall			3, 500	700	30, 600	7, 537		
Scallops, sea			100	9				
Squid			114, 000	2, 693	442, 500	8, 850		
Turtles:								
Hawksbill			3, 900	78				
Loggerhead			5, 400	105	600	6		
Total	157, 700	10, 761	69, 990, 900	864, 145	17, 283, 500	626, 517	373, 600	29, 019

Fisheries of New Jersey, 1937—Continued

SEED OYSTER FISHERY: BY GEAR

Item	Dredges		Tongs		Rakes		Total, exclusive of duplication	
OPERATING UNITS								
Fishermen:	<i>Number</i>		<i>Number</i>		<i>Number</i>		<i>Number</i>	
On vessels.....	1, 158						1, 158	
On boats and shore:								
Regular.....			81		2		83	
Casual.....			117		3		120	
Total.....	1, 158		198		5		1, 361	
Vessels:								
Motor.....	2						2	
Net tonnage.....	23						23	
Sail.....	103						103	
Net tonnage.....	2, 371						2, 371	
Total vessels.....	105						105	
Total net tonnage.....	2, 394						2, 394	
Boats:								
Motor.....			71		4		75	
Other.....			120		1		121	
Apparatus:								
Number.....	210		198		5			
Yards at mouth.....	260							
CATCH								
Oysters, seed:	<i>Bushels</i>	<i>Value</i>	<i>Bushels</i>	<i>Value</i>	<i>Bushels</i>	<i>Value</i>	<i>Bushels</i>	<i>Value</i>
Public, spring.....	991, 500	\$385, 680	68, 660	\$17, 978	850	\$212	1, 061, 010	\$403, 870
Public, fall.....			10, 990	2, 842	550	138	11, 540	2, 980
Total.....	991, 500	385, 680	79, 650	20, 820	1, 400	350	1, 072, 550	406, 850

SEED OYSTER FISHERY: BY COUNTIES

Item	Atlantic		Burlington		Cape May		Cumberland		Ocean	
OPERATING UNITS										
Fishermen:	<i>Number</i>		<i>Number</i>		<i>Number</i>		<i>Number</i>		<i>Number</i>	
On vessels.....							1, 158			
On boats and shore:										
Regular.....	36		20		2		22		3	
Casual.....	7		3				110			
Total.....	43		23		2		1, 290		3	
Vessels:										
Motor.....							2			
Net tonnage.....							23			
Sail.....							103			
Net tonnage.....							2, 371			
Total vessels.....							105			
Total net tonnage.....							2, 394			
Boats:										
Motor.....	39		9		2		24		1	
Other.....	3		13				103		2	
Apparatus:										
Dredges.....							210			
Yards at mouth.....							260			
Tongs.....	42		19		2		132		3	
Rakes.....	1		4							
CATCH										
Oysters, seed:	<i>Bushels</i>	<i>Value</i>	<i>Bushels</i>	<i>Value</i>	<i>Bushels</i>	<i>Value</i>	<i>Bushels</i>	<i>Value</i>	<i>Bushels</i>	<i>Value</i>
Public, spring.....	6, 710	\$2, 507	10, 300	\$2, 558	1, 000	\$250	1, 033, 000	\$396, 055	10, 000	\$2, 500
Public, fall.....	1, 240	421	10, 300	2, 559						
Total.....	7, 950	2, 928	20, 600	5, 117	1, 000	250	1, 033, 000	396, 055	10, 000	2, 500

NOTE.—Of the total number of persons fishing for seed oysters, 1,348 are duplicated among those fishing for market oysters or other species. Similarly the following craft and gear are duplicated: 56 sailing vessels, 1 motor vessel, 72 motorboats, 120 other boats, 116 dredges, 193 tongs, and 4 rakes.

PENNSYLVANIA

Fisheries of Pennsylvania, 1937¹

OPERATING UNITS: BY GEAR

Item	Haul seines	
	Number	
Fishermen, on boats and shore, casual.....	34	
Boats, other than motor.....	8	
Apparatus:		
Number.....	8	
Length, yards.....	1, 630	

CATCH: BY GEAR

Species	Haul seines	
	Pounds	Value
Carp.....	3, 800	\$210
Shad.....	12, 600	3, 522
Suckers.....	18, 600	900
Total.....	34, 700	4, 632

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

DELAWARE

Fisheries of Delaware, 1937

OPERATING UNITS: BY GEAR

Item	Purse seines, menhaden	Haul seines	Gill nets			Lines	
			Drift	Run-around	Stake	Hand	Trawl
	Number	Number	Number	Number	Number	Number	Number
Fishermen:	295						
On vessels.....							
On boats and shore:							
Regular.....		4		9	2		
Casual.....		185	38	11	24	8	2
Total.....	295	189	38	20	26	8	2
Vessels, steam:							
61 to 70 tons.....	1						
81 to 90 tons.....	1						
91 to 100 tons.....	1						
111 to 120 tons.....	1						
121 to 130 tons.....	1						
141 to 150 tons.....	1						
161 to 170 tons.....	2						
181 to 190 tons.....	1						
Total.....	9						
Net tonnage.....	1, 167						
Boats:							
Motor.....			9	6	1	2	1
Other.....		47	10	6	13	2	
Accessory boats.....	27						
Apparatus:							
Number.....	9	47	26	10	27	8	1
Length, yards.....	4, 335	11, 715					
Square yards.....			51, 925	8, 210	14, 180		
Hooks, baits, or snoods.....						16	3, 000

Fisheries of Delaware, 1937—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Pound nets	Stop nets	Fyke nets	Dip nets	Cast nets	Pots	
						Eel	Lobster
Fishermen:							
On boats and shore:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Regular.....	6	7	28	22	1	17	6
Casual.....				45			
Total.....	6	7	28	67	1	17	6
Boats:							
Motor.....			3	5		3	3
Other.....	4	4	12	51	1	7	
Apparatus:							
Number.....	17	11	233	67	1	340	115
Square yards.....		1,580					
Item	Dredges			Tongs, other than for oysters	By hand, other than for oysters	Total, exclusive of duplication	
	Clam	Crab	Oyster				
Fishermen:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	
On vessels.....	14	10	35			337	
On boats and shore:							
Regular.....						25	
Casual.....	2	2		3	27	330	
Total.....	16	12	35	3	27	692	
Vessels:							
Steam:							
61 to 70 tons.....						1	
81 to 90 tons.....						1	
91 to 100 tons.....						1	
111 to 120 tons.....						1	
121 to 130 tons.....						1	
141 to 150 tons.....						1	
161 to 170 tons.....						2	
181 to 190 tons.....						1	
Total.....						9	
Net tonnage.....						1,167	
Motor:							
11 to 20 tons.....	3	2	3			5	
21 to 30 tons.....	1	1	2			2	
Total.....	4	3	5			7	
Net tonnage.....	80	59	105			138	
Total vessels.....	4	3	5			16	
Total net tonnage.....	80	59	105			1,305	
Boats:							
Motor.....		1	1			22	
Other.....				3		128	
Accessory boats.....						27	
Apparatus:							
Number.....		10	8	10	3		
Yards at mouth.....		12	10	14			

Fisheries of Delaware, 1937—Continued

CATCH: BY GEAR

Species	Purse seines		Haul seines		Gill nets			
					Drift		Runaround	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives.....			64,600	\$1,298	2,800	\$54		
Bluefish.....			1,900	133	3,600	252		
Carp.....			25,400	2,032				
Catfish and bullheads.....			12,100	368				
Croaker.....			171,400	1,714	56,800	852	28,800	\$432
Flounders.....							200	10
Menhaden.....	48,857,000	\$227,831						
Mullet.....			1,300	52	1,000	40	62,100	2,490
Shad.....			2,600	467	13,800	2,085		
Spot.....					3,000	150		
Squeteagues or "sea trout," gray.....			256,000	7,680	25,100	753	2,400	72
Striped bass.....			15,100	1,604			1,500	180
Sturgeon.....					400	74		
White perch.....			12,100	1,209			200	20
Yellow perch.....			200	8				
Total.....	48,857,000	227,831	562,700	16,565	106,500	4,260	95,200	3,204

Species	Gill nets—Contd.		Lines				Pound nets	
	Stake		Hand		Trawl			
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives.....							2,500	\$50
Carp.....	9,600	\$768					100	8
Catfish and bullheads.....							1,300	39
Cod.....					48,000	\$1,680		
Croaker.....			14,000	\$210				
Eels, common.....							500	65
Flounders.....	200	10						
Gizzard shad.....							500	10
Shad.....	4,100	695						
Squeteagues or "sea trout," gray.....			7,000	210				
Striped bass.....	10,700	1,284						
Tautog.....			1,100	33				
White perch.....	1,000	100					1,900	184
Yellow perch.....							1,800	84
Total.....	25,600	2,857	22,100	453	48,000	1,680	8,600	440

Species	Stop nets		Fyke nets		Dip nets		Cast nets	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Carp.....	9,400	\$752						
Catfish and bullheads.....			17,400	\$520				
Croaker.....			800	8				
Eels, common.....			16,300	2,394				
Flounders.....			3,800	194				
Squeteagues or "sea trout," gray.....			1,600	48				
Striped bass.....			4,500	480				
White perch.....			3,800	380				
Yellow perch.....			4,200	210				
Crabs:								
Hard.....			800	16	180,000	\$2,705		
Soft and peelers.....					78,500	14,894		
Turtles, snapper.....			3,100	246				
Total.....	9,400	752	56,300	4,496	258,500	17,599	300	24

Fisheries of Delaware, 1937—Continued

CATCH: BY GEAR—Continued

Species	Pots				Dredges		Tongs		By hand	
	Eel		Lobster		Pounds	Value	Pounds	Value	Pounds	Value
Eels, common.....	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Crabs:	16,800	\$2,409								
Hard.....					83,600	\$1,987				
King.....									489,000	\$854
Lobsters.....			4,300	\$1,290						
Clams:										
Hard, public.....					7,600	920				
Hard, private.....					16,000	2,330				
Mussels, sea.....							2,800	\$173		
Oysters, market, private, fall.....					270,200	29,170				
Total.....	16,800	2,409	4,300	1,290	377,400	34,407	2,800	173	489,000	854

OPERATING UNITS: BY COUNTIES

Item	Kent	New Castle	Sussex
	Number	Number	Number
Fishermen:			
On vessels.....	42		295
On boats and shore:			
Regular.....			25
Casual.....	104	34	192
Total.....	146	34	612
Vessels:			
Steam:			
61 to 70 tons.....			1
81 to 90 tons.....			1
91 to 100 tons.....			1
111 to 120 tons.....			1
121 to 130 tons.....			1
141 to 150 tons.....			1
161 to 170 tons.....			2
181 to 190 tons.....			1
Total.....			9
Net tonnage.....			1,167
Motor:			
11 to 20 tons.....	5		
21 to 30 tons.....	2		
Total.....	7		
Net tonnage.....	138		
Total vessels.....	7		9
Total net tonnage.....	138		1,167
Boats:			
Motor.....	3	4	15
Other.....	20	14	94
Accessory boats.....			27
Apparatus:			
Purse seines, menhaden.....			9
Length, yards.....			4,335
Haul seines.....	16	8	23
Length, yards.....	3,365	995	7,355
Gill nets:			
Drift.....		7	19
Square yards.....		33,850	18,075
Runaround.....			10
Square yards.....			8,210
Stake.....	8	2	17
Square yards.....	9,360	600	4,220
Lines:			
Hand.....			8
Hooks.....			16
Trawl.....			1
Hooks.....			3,000

Fisheries of Delaware, 1937—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Kent	New Castle	Sussex
	Number	Number	Number
Apparatus—Continued			
Pound nets		6	11
Stop nets	5	6	
Square yards	740	840	
Fyke nets	5	141	87
Dip nets			67
Cast nets	1		
Pots:			
Eel	90	36	214
Lobster			115
Dredges:			
Clam	10		
Yards at mouth	12		
Crab	8		
Yards at mouth	10		
Oyster	10		
Yards at mouth	14		
Tongs, other than for oysters	3		

CATCH: BY COUNTIES

Species	Kent		New Castle		Sussex	
	Pounds	Value	Pounds	Value	Pounds	Value
Alewives			2,800	\$54	67,100	\$1,348
Bluefish	100	\$7			5,400	378
Carp	14,800	1,184	30,000	2,400		
Catfish and bullheads	2,000	60	28,300	847	500	20
Cod					48,000	1,680
Croaker	53,400	534			218,400	2,682
Eels, common	3,400	542	8,600	1,277	21,700	3,109
Flounders					4,200	214
Gizzard shad			800	10		
Mennaden					48,857,000	227,831
Mullet					64,400	2,582
Shad	5,600	983	11,700	1,749	3,200	515
Spot					8,000	150
Squeteagues or "sea trout," gray	113,500	3,405			178,600	5,358
Striped bass	4,900	490			28,900	3,058
Sturgeon			400	74		
Tautog					1,100	33
White perch	4,600	460	700	63	13,700	1,370
Yellow perch			800	32	5,400	270
Crabs:						
Hard	83,600	1,967	800	16	180,000	2,705
Soft and peeler					78,500	14,894
King	489,000	854				
Lobsters					4,800	1,290
Clams:						
Hard, public	7,600	920				
Hard, private	16,000	2,330				
Mussels, sea	2,800	173				
Oysters, market, private, fall	270,200	29,170				
Turtles, snapper			8,100	246		
Total	1,071,500	43,099	87,600	6,768	49,781,400	269,487

SEED OYSTER FISHERY: BY GEAR

Item	Dredges	
	Number	Value
OPERATING UNITS		
Fishermen, on vessels	40	
Vessels, sail	5	
Net tonnage	89	
Apparatus:		
Number	10	
Yards at mouth	12	
CATCH		
Oysters, seed, public, spring	83,600	\$13,800

NOTE.—The seed oyster fishery of Delaware was confined to Kent County. Of the total number of persons fishing for seed oysters 13 were duplicated among those fishing for market oysters or other species. Similarly the following craft and gear were duplicated: 2 sailing vessels and 4 dredges.

SHAD FISHERY OF THE HUDSON RIVER

The shad fishery of the Hudson River in 1937 was prosecuted by 613 fishermen who used 299 boats, 15 haul seines, 186 drift gill nets, and 113 stake gill nets. The total commercial catch amounted to 878,190 shad, having a weight of 2,732,200 pounds and a value to the fishermen of \$212,786. This is an increase of 26 percent in the number of shad and 25 percent in their value as compared with 1936. The average price per pound received by the fishermen was about 8 cents, compared with a price of about 7 cents in 1936.

Stake gill nets accounted for 65 percent of the weight of the shad taken, drift gill nets 34 percent, and haul seines 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, 1937

Item	New York			New Jersey			Total		
Fishermen:									
On boats and shore:	<i>Number</i>			<i>Number</i>			<i>Number</i>		
Regular.....	62			24			86		
Casual.....	353			174			527		
Total.....	415			198			613		
Boats:									
Motor.....				17			17		
Other.....	218			64			282		
Apparatus:									
Haul seines.....	15						15		
Length, yards..	2,422						2,422		
Gill nets:									
Drift.....	185			1			186		
S q u a r e									
yards.....	595,499			2,030			597,529		
Stake.....	26			87			113		
S q u a r e									
yards.....	3,599			133,776			137,375		
Shad caught:	<i>Number</i>	<i>Pounds</i>	<i>Value</i>	<i>Number</i>	<i>Pounds</i>	<i>Value</i>	<i>Number</i>	<i>Pounds</i>	<i>Value</i>
With haul seines....	5,900	19,700	\$1,433				5,900	19,700	\$1,433
With drift gill nets..	279,780	932,600	70,009	1,000	3,000	\$234	280,780	935,600	70,243
With stake gill nets..	7,110	23,700	1,749	584,400	1,753,200	139,381	591,510	1,776,900	141,110
Total.....	292,790	976,000	73,191	585,400	1,756,200	139,595	878,190	2,732,200	212,786

FISHERIES OF THE CHESAPEAKE BAY STATES

(Area XXIII) ⁷

The yield of the commercial fisheries of the Chesapeake Bay States (Maryland and Virginia) during 1937 amounted to 292,244,400 pounds, valued at \$6,361,234 to the fishermen, representing a decrease of 7 percent in volume and 2 percent in value as compared with the catch in the previous year. These fisheries gave employment to 16,529 fishermen, as compared with 18,283 in 1936.

⁷ 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 the 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."

There were 561 fishery wholesale and manufacturing establishments in the two States in 1937, as compared with 585 in 1936. In 1937 these establishments employed 12,005 persons, paid \$3,068,069 in salaries and wages, and produced manufactured products (canned, cured, packaged, and byproducts) valued at \$10,009,939. In 1936 the wholesale and manufacturing firms employed 12,663 persons, paid \$3,073,443 in salaries and wages, and produced manufactured products valued at \$9,813,684.

Fisheries of the Chesapeake Bay States, 1937

SUMMARY OF CATCH

Product	Maryland		Virginia		Total	
	Pounds	Value	Pounds	Value	Pounds	Value
Fish.....	10,365,000	\$392,995	199,118,300	\$1,982,849	209,483,300	\$2,375,844
Shellfish, etc.....	39,587,600	2,139,034	43,173,500	1,846,356	82,761,100	3,985,390
Total.....	49,952,600	2,532,029	242,291,800	3,829,205	292,244,400	6,361,234

OPERATING UNITS: BY STATES

Item	Maryland	Virginia	Total
Fishermen:	<i>Number</i>	<i>Number</i>	<i>Number</i>
On vessels.....	820	1,666	2,486
On boats and shore:			
Regular.....	4,278	4,861	9,129
Casual.....	1,844	3,070	4,914
Total.....	6,942	9,587	16,529
Vessels:			
Steam.....		25	25
Net tonnage.....		2,833	2,833
Motor.....	32	139	171
Net tonnage.....	202	2,469	2,671
Sail.....	151		151
Net tonnage.....	1,886		1,886
Total vessels.....	183	164	347
Total net tonnage.....	2,088	5,302	7,390
Boats:			
Motor.....	2,743	3,366	6,109
Other.....	1,688	3,004	4,692
Accessory boats.....		105	105
Apparatus:			
Purse seines, menhaden.....		36	36
Length, yards.....		11,050	11,050
Haul seines.....	132	139	271
Length, yards.....	24,402	53,876	78,278
Gill nets:			
Anchor.....	417	3	420
Square yards.....	58,794	3,600	62,394
Drift.....	235	223	458
Square yards.....	199,248	201,606	400,853
Stake.....	3,001	5,963	8,964
Square yards.....	261,435	135,732	387,167
Lines:			
Hand.....	100	93	193
Hooks.....	120	161	281
Trot with baits or snoods.....	1,586	1,982	3,568
Baits or snoods.....	1,005,750	1,023,610	2,029,360
Trot with hooks.....	3	6	8
Hooks.....	300	2,850	2,850
Pound nets.....	455	1,656	2,111
Crab pound nets.....		277	277
Stop nets.....		2	2
Square yards.....		1,300	1,300
Fyke nets.....	1,834	762	2,596
Dip nets.....	863	1,440	2,303
Otter trawls.....		19	19
Yards at mouth.....		515	515
Slat traps.....		4	4

Fisheries of the Chesapeake Bay States, 1937—Continued

OPERATING UNITS: BY STATES—Continued

Item	Maryland	Virginia	Total
Apparatus—Continued.			
Pots:	<i>Number</i>	<i>Number</i>	<i>Number</i>
Crab.....		1,060	1,060
Eel.....	10,598	677	11,275
Fish.....	10	221	231
Scrapes:	632	114	746
Yards at mouth.....	632	117	749
Dredges:		198	198
Crab.....		382	382
Yards at mouth.....		53	459
Oyster.....	406	84	562
Yards at mouth.....	478	2	2
Scallop.....		6	6
Yards at mouth.....			
Tongs:			
Oyster.....	4,252	2,877	7,129
Other.....	77	353	430
Rakes, oyster.....	29	515	544
Picks.....		375	375

CATCH: BY STATES

Species	Maryland		Virginia		Total	
	<i>Pounds</i>	<i>Value</i>	<i>Pounds</i>	<i>Value</i>	<i>Pounds</i>	<i>Value</i>
FISH						
Alewives.....	3,819,100	\$39,578	15,064,300	\$147,871	18,883,400	\$187,449
Black bass.....	41,400	4,909			41,400	4,909
Bluefish.....	80,900	6,709	528,500	23,187	609,400	29,896
Bonito.....	16,500	775	18,200	732	34,700	1,607
Butterfish.....	91,500	4,322	1,956,400	28,699	2,047,900	33,021
Cable or crab eater.....			20,100	715	20,100	715
Carp.....	239,500	14,207	393,700	8,027	633,200	22,234
Catfish and bullheads.....	500,400	14,555	607,100	21,468	1,107,500	36,023
Cod.....			900	17	900	17
Crappie.....	2,700	172			2,700	172
Cronker.....	982,900	18,171	33,111,700	498,163	34,094,600	516,334
Drum:						
Black.....	30,800	358	16,600	190	47,400	548
Red or redfish.....	2,200	49	43,300	768	45,500	817
Eels:						
Common.....	191,300	16,068	125,500	11,184	316,800	27,252
Conger.....	400	8	400	7	800	15
Flounders.....	30,000	1,729	500,000	25,893	530,000	27,622
Gizzard shad.....	112,800	1,782	238,600	2,571	351,400	4,353
Grayfish.....			5,400	170	5,400	170
Hake.....	2,500	40	1,090,500	10	3,000	50
Harvestfish or "starfish".....	2,800	78	1,090,500	19,802	1,093,300	19,878
Hickory shad.....	28,200	637	84,600	1,746	112,800	2,383
Hogchoker.....	17,700	471			17,700	471
Hogfish.....			600	18	600	18
King whiting or "kingfish".....	7,300	401	135,800	4,194	143,100	4,595
Mackerel.....	2,000	120	100,700	2,031	102,700	2,151
Menhaden.....	15,000	170	121,965,000	484,904	121,980,000	485,074
Mullet.....	2,900	131	11,400	282	14,300	413
Pike or pickerel.....	39,900	6,377	2,300	30	42,200	6,407
Pompano.....			11,100	988	11,100	988
Scup.....	26,000	590	1,931,400	31,008	1,957,400	31,598
Sea bass.....	15,100	904	197,500	8,586	212,600	9,490
Sea robin.....			2,800	44	2,800	44
Shad.....	404,800	39,538	3,085,800	273,073	3,490,600	312,611
Sharks.....			6,200	207	6,200	207
Sheepshead.....			100	2	100	2
Skates.....			16,400	161	16,400	161
Snapper, red.....			100	4	100	4
Spanish mackerel.....	33,800	2,378	805,500	18,007	839,300	20,385
Spot.....	27,600	1,172	2,978,500	64,659	3,006,100	55,831
Squeteagues or "sea trout":						
Gray.....	1,089,800	34,587	12,606,700	233,242	13,696,500	267,829
Spotted.....	7,400	526	140,600	7,042	148,000	7,568
Striped bass.....	2,011,300	156,809	1,004,500	62,757	3,015,800	219,566
Sturgeon.....			12,700	1,355	12,700	1,355
Suckers.....	2,800	143	300	6	3,100	149
Sunfish.....	1,500	49			1,500	49
Swallowfish.....			8,400	117	8,400	117
Tautog.....	200	10	300	11	500	21
Tomcod.....			100	1	100	1
Tuna.....	100	8			100	8

Fisheries of the Chesapeake Bay States, 1937—Continued

CATCH: BY STATES—Continued

Species	Maryland		Virginia		Total	
	Pounds	Value	Pounds	Value	Pounds	Value
FISH—continued						
White perch.....	296,700	\$12,668	195,400	\$5,183	492,100	\$17,851
Whiting.....			17,200	194	17,200	194
Yellow perch.....	187,200	11,798	76,600	3,523	263,800	16,321
Total.....	10,365,000	392,995	199,118,300	1,982,849	209,483,300	2,375,844
SHELLFISH, ETC.						
Crabs:						
Hard.....	16,198,300	393,304	27,927,500	565,052	44,125,800	958,356
Soft and peelers.....	2,514,100	211,196	2,475,300	224,915	4,989,400	436,111
Shrimp.....			1,700	120	1,700	120
Clams: ¹						
Hard, public.....	64,000	12,000	1,624,100	269,032	1,688,100	281,032
Hard, private.....			7,000	1,750	7,000	1,750
Mussels, sea.....			27,700	788	27,700	788
Oysters, market: ²						
Public, spring.....	6,223,200	406,089	1,284,600	88,460	7,507,800	494,549
Public, fall.....	12,936,000	903,568	2,104,800	144,570	15,040,800	1,048,138
Private, spring.....	585,100	90,393	169,730	2,932,900	2,600,000	260,123
Private, fall.....	985,400	119,424	6,248,800	378,390	6,234,200	497,814
Scallops, sea ³			10,800	1,426	10,800	1,426
Squid.....	73,000	1,120	111,900	2,101	184,900	3,221
Terrapin, diamond-back.....	3,500	1,590			3,500	1,590
Turtles, snapper.....	5,000	350	1,500	22	6,500	372
Total.....	39,587,600	2,139,034	43,173,600	1,846,356	82,761,100	3,985,390
Grand total.....	49,952,600	2,532,029	242,291,800	3,829,205	292,244,400	6,361,234

¹ Statistics on hard clams used in this table are based on yields of 8 pounds of meats per bushel for clams from public beds and 7 pounds for those from private beds.

² Statistics on market oysters used in this table are based on yields of 5.98 pounds of meats per bushel in Maryland, and 6.06 pounds in Virginia.

³ The sea scallops were taken by a Virginia vessel operating off the New England and Middle Atlantic States.

NOTE.—The seed oyster fishery was prosecuted in this section only in Virginia where 1,220 fishermen using 13 motor vessels, 433 motorboats, 33 other boats, and 910 tongs took 794,100 bushels of seed oysters, valued at \$198,485 from public beds and 2,400 bushels, valued at \$600, from private beds. Of the total number of persons fishing for seed oysters, 815 are duplicated among those fishing for market oysters or other species. Similarly, the following craft and gear are duplicated: 295 motorboats, 21 other boats, and 606 tongs.

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.....	48,594,900	\$393,304	83,782,500	\$565,052	132,377,400	\$958,356
Soft and peelers..... do.....	10,056,400	211,196	9,901,200	224,915	19,957,600	436,111
Clams:						
Hard, public..... bushels.....	8,000	12,000	203,012	269,032	211,012	281,032
Hard, private..... do.....			1,000	1,750	1,000	1,750
Mussels, sea..... do.....			2,308	788	2,308	788
Oysters, market:						
Public, spring..... do.....	1,040,669	406,089	211,980	88,460	1,252,649	494,549
Public, fall..... do.....	2,163,211	903,568	847,327	144,570	2,510,538	1,048,138
Private, spring..... do.....	97,843	90,393	387,426	169,730	485,269	260,123
Private, fall..... do.....	164,783	119,424	864,139	378,390	1,030,922	497,814
Scallops, sea..... do.....			2,700	1,426	2,700	1,426

Industries Related to the Fisheries of the Chesapeake Bay States, 1937

OPERATING UNITS, SALARIES, AND WAGES

Item	Maryland	Virginia	Total
	Number	Number	Number
Transporting:	815	881	1, 196
Persons engaged.....			
Vessels:			
Steam.....		1	1
Net tonnage.....		83	83
Motor.....	159	441	600
Net tonnage.....	2, 102	4, 251	6, 353
Sail.....	1	1	1
Net tonnage.....	21		21
Total vessels.....	160	442	602
Total net tonnage.....	2, 123	4, 334	6, 457
Wholesale and manufacturing:			
Establishments.....	319	242	561
Persons engaged:			
Proprietors.....	437	281	718
Salaried employees.....	212	173	385
Wage earners:			
Average for season.....	6, 266	4, 636	10, 902
Average for year.....	2, 837	1, 808	4, 645
Paid to salaried employees.....	\$226, 966	\$271, 771	\$498, 737
Paid to wage earners.....	\$1, 635, 704	\$938, 628	\$2, 569, 332
Total salaries and wages.....	\$1, 862, 670	\$1, 205, 399	\$3, 068, 069
Fishermen manufacturing.....	80		80

PRODUCTS MANUFACTURED

Item	Maryland		Virginia	
	Quantity	Value	Quantity	Value
By manufacturing establishments:				
Alewives:				
Salted:				
Canned.....pounds..	(1)	(1)	1, 943, 634	\$30, 337
Pickled ¹.....do...	2, 471, 576	\$70, 701		
Tight-pack cut.....do...	(1)	(1)	1, 597, 150	53, 787
Canned.....standard cases..	35, 511	84, 527	19, 482	55, 058
Ros, canned.....do...	15, 080	86, 535	23, 230	131, 202
Dry scrap.....tons.....	(1)	(1)	465	20, 347
Oil.....gallons.....	(1)	(1)	5, 200	1, 556
Croaker:				
Fresh fillets.....pounds.....			95, 800	11, 770
Fresh pan-dressed.....do.....			107, 000	9, 490
Flounders, fresh fillets.....do.....			54, 200	8, 136
Menhaden products:				
Dry scrap.....tons.....			14, 091	606, 841
Oil.....gallons.....			1, 361, 181	522, 476
Sea bass:				
Fresh fillets.....pounds.....			104, 800	17, 270
Fresh pan-dressed.....do.....			60, 000	6, 600
Scup:				
Fresh fillets.....do.....			24, 400	3, 690
Fresh pan-dressed.....do.....			28, 000	2, 620
Squeteagues:				
Fresh fillets.....do.....			163, 400	22, 910
Fresh pan dressed.....do.....			310, 000	23, 000
Crabs, blue, meat packaged, fresh-cooked.....do.....	2, 617, 704	896, 475	1, 637, 254	579, 199
Clams, hard, chowder, canned.....standard cases.....	37, 613	84, 681		
Oysters, fresh-shucked.....gallons.....	2, 630, 334	2, 937, 625	1, 376, 628	1, 596, 231
Oyster-shell products:				
Poultry feed.....tons.....	37, 621	171, 865	19, 377	113, 895
Lime.....do.....	29, 180	52, 190	18, 343	112, 082
Lime, "burned".....do.....			18, 098	89, 119

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

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

Industries Related to the Fisheries of the Chesapeake Bay States, 1937—Continued

PRODUCTS MANUFACTURED—Continued

Item	Maryland		Virginia	
	Quantity	Value	Quantity	Value
By manufacturing establishments—Continued.				
Unclassified products:				
Packaged, fresh fillets and pan-dressed . . . pounds.			150,000	\$10,830
Acid and dry scrap, and meal tons.	805	\$17,857	2,437	\$58,310
Canned standard cases	25,147	161,665	(?)	(?)
Smoked and salted pounds.	730,750	171,738	(?)	(?)
Miscellaneous		1,178,150		9,694
Total		5,913,969		4,095,950
By fishermen:				
Alewives, salted pounds..	188,025	7,087		
Eels:				
Salted do.	76,550	6,482		
Smoked do.	600	17 ^a		
Hogchokers, salted do.	9,075	475		
Total	274,250	14,220		
Grand total		5,928,209		4,095,950

^a Includes fresh fillets of sea robin; fresh pan-dressed flounders and whiting; and frozen fillets of croaker.

^b Includes alewife and blue crab dry scrap.

^c Includes blue crab and miscellaneous dry scrap; menhaden, starfish and miscellaneous fish meals; and alewife and menhaden acid scrap.

^d Includes canned oysters, fish paste, fish cakes, and oyster, shrimp, and terrapin soup.

^e The production of this item is included under "Miscellaneous."

^f Includes smoked butterfish, carp, chub, cisco, tullibees, eels, sea herring, salmon, shad, sturgeon, lake trout, and whitefish; corned alewives and tight-pack cut alewives.

^g Includes marine-shell buttons and novelties; canned cat and dog food; and alewife oil.

^h Includes fresh-shucked hard clams, tight-pack alewife roe, miscellaneous fish oil, and canned blue crabs.

NOTE.—The total value of manufactured products in the Chesapeake Bay States was as follows: By manufacturing establishments, \$10,009,939, and by fishermen, \$14,220. 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, 1,047 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, 1937

OPERATING UNITS: BY GEAR

Item	Haul seines	Gill nets			Lines		
		Anchor	Drift	Stake	Hand	Trot with baits or snoods	Trot with hooks
Fishermen:							
On boats and shore:							
Regular	Number	Number	Number	Number	Number	Number	Number
Casual	233	37	86	118	40	1,213	2
	150	28	216	146		163	
Total	383	65	272	264	40	1,376	2
Boats:							
Motor	75	26	66	116	20	1,227	2
Other	107	16	102	78		138	1
Apparatus:							
Number	132	417	235	3,001	100	1,586	3
Length, yards	24,402						
Square yards		58,794	199,248	251,435			
Hooks, bait, or snoods					120	1,005,750	300

Fisheries of Maryland, 1937—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Pound nets	Fyke nets	Dip nets	Pots		Scrapes
				Eel	Fish	
Fishermen:						
On boats and shore:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Regular.....	303	56	542	122		296
Casual.....	122	101	321	39	1	
Total.....	425	187	863	181	1	296
Boats:						
Motor.....	139	61	99	88		
Other.....	112	69	764	32	1	296
Apparatus:						
Number.....	455	1,834	863	10,596	10	632
Yards at mouth.....						623

Item	Dredges, oyster	Tongs		Rakes, other than for oysters	By hand, other than for oysters	Total, exclusive of duplication
		Oyster	Other			
Fishermen:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
On vessels.....	768	62				820
On boats and shore:						
Regular.....	97	3,486	66	29	57	4,278
Casual.....		704	11		1	1,844
Total.....	855	4,252	77	29	58	6,942
Vessels:						
Motor:						
5 to 10 tons.....	1	30				31
11 to 20 tons.....		1				1
Total.....	1	31				32
Net tonnage.....	7	195				202
Sail:						
5 to 10 tons.....	101					101
11 to 20 tons.....	25					25
21 to 30 tons.....	16					16
31 to 40 tons.....	6					6
41 to 50 tons.....	2					2
51 to 60 tons.....	2					2
Total.....	151					151
Net tonnage.....	1,886					1,886
Total vessels.....	152	31				183
Total net tonnage.....	1,893	195				2,088
Boats:						
Motor.....	39	2,006	24	5		2,743
Other.....	36	142	52	15	30	1,688
Apparatus:						
Number.....	406	4,252	77	29		
Yards at mouth.....	478					

CATCH: BY GEAR

Species	Haul seines		Gill nets					
			Anchor		Drift		Stake	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives.....	84,900	\$903	1,700	\$55	16,700	\$456	60,100	\$1,119
Black bass.....	23,600	2,576					100	7
Bluefish.....	3,600	294			6,200	610	900	72
Butterfish.....	400	40					200	14
Carp.....	203,000	12,421			2,600	125	5,400	204
Catfish and bullheads.....	164,600	4,080	300	9	3,200	83	1,500	54
Crapple.....	200	5					1,100	4
Croaker.....	376,700	6,629					5,100	169
Eels, common.....	1,300	123						

Fisheries of Maryland, 1937—Continued

CATCH: BY GEAR—Continued

Species	Haul seines		Gill nets								
			Anchor		Drift		Stake				
			Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	
Flounders.....	1,000	\$40									
Gizzard shad.....	19,200	269			2,000	\$20	1,400		1,400	\$24	
Hickory shad.....	700	24			400	17	1,600				38
Menhaden.....	3,000	60							2,000		80
Mullet.....	8,800	47							1,500		273
Pike or pickerel.....	11,100	2,190	100	\$15					9,000		860
Scup.....											
Shad.....	2,900	305	2,100	165	70,600	7,866	31,600				3,568
Spanish mackerel.....	1,000	79									
Spot.....	9,200	459									
Squeteagues or "sea trout":											
Gray.....	34,600	1,658	100	10					1,200		86
Spotted.....	4,200	285									
Striped bass.....	443,900	23,801	54,400	4,582	296,500	24,847	361,500				27,942
Suckers.....	800	20					100				3
Sunfish.....	1,000	29									
Tuna.....											8
White perch.....	48,300	2,191	1,500	75	5,200	248	11,900				677
Yellow perch.....	26,300	1,340	400	39			1,600				123
Crabs, soft and peelers.....	62,300	6,298									
Total.....	1,528,300	76,159	60,600	4,950	403,400	34,272	486,900				34,825

Species	Lines						Pound nets	
	Hand		Trot with baits or snoods		Trot with hooks			
	Pounds	Value	Pounds	Value	Pounds	Value		
Alewives.....							3,638,400	\$36,843
Black bass.....							1,200	129
Bluefish.....	80,000	\$4,000					20,200	1,733
Bonito.....	4,000	200					12,500	575
Butterfish.....							90,900	4,268
Carp.....							9,400	392
Catfish and bullheads.....					1,800	\$66	70,700	2,220
Crappie.....							800	19
Croaker.....							600,100	11,853
Drum:								
Black.....							30,800	358
Red or redfish.....							2,200	49
Eels:								
Common.....					100	9	6,100	462
Conger.....	400	8						
Flounders.....							27,300	1,557
Gizzard shad.....							85,100	1,289
Hake.....							2,500	40
Harvestfish or "starfish".....							2,800	78
Hickory shad.....							25,500	558
Hogchoker.....							17,700	471
King whiting or "kingfish".....							7,300	401
Mackerel.....							2,000	120
Menhaden.....							13,000	120
Pike or pickerel.....							1,500	208
Scup.....	5,000	50					12,000	180
Sea bass.....	15,000	900					100	4
Shad.....							295,000	27,264
Spanish Mackerel.....							32,800	2,299
Spot.....							18,400	718
Squeteagues or "sea trout":								
Gray.....	6,000	480					1,047,900	32,311
Spotted.....							3,200	241
Striped bass.....							887,000	64,800
Sunfish.....							500	20
Tautog.....	200	10						
White perch.....							141,600	5,568
Yellow perch.....							11,000	741
Crabs:								
Hard.....			16,050,800	\$389,617				
Soft and peelers.....			262,900	21,891				
Squid.....							73,000	1,120
Total.....	80,600	5,648	16,312,700	411,808	1,900	75	7,168,400	198,622

Fisheries of Maryland, 1937—Continued

CATCH: BY GEAR—Continued

Species	Fyke nets		Dip nets		Pots		Scrapes	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives.....	17, 800	\$202						
Black bass.....	16, 600	2, 197						
Carp.....	19, 100	1, 065						
Catfish and bullheads.....	257, 100	7, 963			1, 200	\$60		
Crapple.....	2, 100	141						
Croaker.....	1, 000	20						
Eels, common.....	5, 100	440			178, 700	15, 034		
Flounders.....	1, 700	132						
Gizzard shad.....	5, 100	180						
Mullet.....	100	4						
Pike or pickerel.....	25, 700	3, 691						
Shad.....			2, 600	\$340				
Squeteagues or "sea trout," gray.....	600	42						
Striped bass.....	8, 000	747						
Suckers.....	2, 100	120						
White perch.....	88, 200	3, 909						
Yellow perch.....	147, 900	9, 555						
Crabs:								
Hard.....			147, 500	3, 687				
Soft and peelers.....			701, 000	64, 575			1, 487, 900	\$118, 432
Total.....	597, 700	30, 428	851, 100	68, 602	179, 900	15, 094	1, 487, 900	118, 432

Species	Dredges		Tongs		Rakes		By hand	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Clams, hard, public.....			54, 400	\$10, 200	3, 200	\$600	6, 400	\$1, 200
Oysters, market:								
Public, spring.....	658, 200	\$49, 513	5, 565, 000	356, 576				
Public, fall.....	2, 829, 100	210, 810	10, 106, 900	692, 758				
Private, spring.....	65, 000	9, 444	520, 100	80, 949				
Private, fall.....	263, 300	51, 972	622, 100	67, 452				
Terrapin, diamond-back.....							3, 500	1, 590
Turtle, snapper.....							5, 000	350
Total.....	3, 915, 600	321, 739	16, 868, 500	1, 207, 935	3, 200	600	14, 900	3, 140

OPERATING UNITS: BY COUNTIES

Item	Anne Arundel	Baltimore	Calvert	Caroline	Cecil	Charles	Dorchester	Harford
Fishermen:								
On vessels.....	25	40	25			8	249	
On boats and shore:								
Regular.....	566	7	325	3	22	117	629	5
Casual.....	105	52	68	52	58	180	168	45
Total.....	696	99	418	55	80	305	1, 046	50
Vessels:								
Motor:								
5 to 10 tons.....	9		4			1	9	
11 to 20 tons.....	1							
Total.....	10		4			1	9	
Net tonnage.....	68		26			7	56	
Sail:								
5 to 10 tons.....			2			1	38	
11 to 20 tons.....	1	3	1				5	
21 to 30 tons.....		3	1				3	
31 to 40 tons.....		1						
51 to 60 tons.....		1						
Total.....	1	8	4			1	46	
Net tonnage.....	19	195	54			9	437	
Total vessels.....	11	8	8			2	55	
Total net tonnage.....	87	195	80			16	493	

Fisheries of Maryland, 1937—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Anne Arundel	Baltimore	Calvert	Caroline	Cecil	Charles	Dorchester	Harford
Boats:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Motor.....	277	20	189	14	32	102	474	14
Other.....	168	37	116	20	21	34	76	15
Apparatus:								
Haul seines.....	31	3	6	4	15	18	3	6
Length, yards.....	3,160	400	1,235	1,689	3,580	3,373	1,060	1,790
Gill nets:								
Anchor.....	3	4			80			
Square yards.....	955	1,200			18,745			
Drift.....	4			56	7	7	26	8
Square yards.....	2,400			27,836	12,650	8,065	22,146	16,500
Stake.....	14	42		57	37	1,071	145	137
Square yards.....	2,156	3,174		2,638	3,071	88,032	7,018	14,726
Lines:								
Trot with baits or snoods.....	88	20	63			68	552	
Baits or snoods.....	49,800	10,000	29,200			68,000	289,200	
Trot with hooks.....				2	1			
Hooks.....				200	100			
Pound nets.....	25	6	5	11	26	25	104	14
Fyke nets.....	16	134		25	950	35	5	273
Dip nets.....	125	20	124				41	
Pots:								
Fel.....	432	435	24	15	1,211	29	2,247	271
Fish.....				10				
Dredges, oyster:								
Yards at mouth.....	2	16	8			4	92	
Tongs, oyster.....	3	21	9			5	111	
	568		385			178	737	

Item	Kent	Prince Georges	Queen Annes	St. Marys	Somerset	Talbot	Wicomico	Worcester
Fishermen:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
On vessels.....	6		2	5	399	55	6	
On boats and shore:								
Regular.....	333	4	333	507	507	494	197	139
Casual.....	133	21	207	215	173	78	155	134
Total.....	472	25	542	727	1,169	627	358	273
Vessels:								
Motor, 5 to 10 tons.....	3		1		2	2		
Net tonnage.....	19		5		11	10		
Sail:								
5 to 10 tons.....					50	10		
11 to 20 tons.....					15			
21 to 30 tons.....					8		1	
31 to 40 tons.....				1	3			
41 to 50 tons.....					2			
51 to 60 tons.....					1			
Total.....				1	79	10	1	
Net tonnage.....				32	1,042	73	25	
Total vessels.....	3		1	1	81	12	1	
Total net tonnage.....	19		5	32	1,053	83	25	
Boats:								
Motor.....	288	5	250	243	158	408	134	155
Other.....	50	12	38	243	619	70	49	120
Apparatus:								
Haul seines.....	16	7	7	8	5	2	1	
Length, yards.....	2,675	910	1,750	1,790	50	450	500	
Gill nets:								
Anchor.....	330							
Square yards.....	37,894							
Drift.....	22	2			10	15	58	20
Square yards.....	48,666	2,400			6,265	9,220	37,500	5,600
Stake.....	1,070	2	11		86	7	315	7
Square yards.....	115,030	82	1,482		2,044	470	10,752	760

Fisheries of Maryland, 1937—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Kent	Prince Georges	Queen Annes	St. Marys	Somer-set	Talbot	Wicom-lee	Worces-ter
Apparatus—Continued.								
Lines:	Number	Number	Number	Number	Number	Number	Number	Number
Hand								100
Hooks								120
Trot with baits or snoods	126		76	137	134	202	5	115
Baits or snoods	100,800		45,900	104,400	92,200	130,750	4,000	81,600
Pound nets	26		6	64	21	74	27	21
Fyke nets	220	84	29		12	33	11	7
Dip nets	15		32	158	306	31		8
Pots, eel	780	45	2,377	15	40	2,660	15	
Scrapes					632			
Yards at mouth					632			
Dredges, oyster				2	202	20	2	58
Yards at mouth				3	254	27	3	42
Tongs:								
Oyster	326		499	571	223	459	277	29
Other								77
Rakes								29

CATCH: BY COUNTIES

Species	Anne Arundel		Baltimore		Calvert		Caroline	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives	463,200	\$4,822	11,600	\$233	108,000	\$851	20,500	\$494
Black bass	200	10	600	70			700	67
Bluefish	6,700	410			200	16		
Butterfish	200	16						
Carp	4,000	262	4,700	159	1,600	79	1,600	106
Catfish and bullheads	17,700	445	15,300	638	4,800	168	23,300	627
Crapple			600	42			300	18
Croaker	207,500	4,231			84,000	1,260	8,000	130
Eels, common	6,600	435	13,300	1,319	1,000	80	1,200	50
Flounders	3,600	132	400	20	100	5		
Gizzard shad	15,400	207	15,800	228	1,000	10	4,800	126
Hickory shad	3,200	38			1,300	39	200	7
Menhaden	12,000	120						
Mullet			100	4	700	45		
Pike or pickerel	500	85	2,200	487	200	30	700	74
Shad	27,200	2,901			9,900	1,015	7,100	1,120
Spanish mackerel	6,500	666						
Spot	4,300	129	200	4	1,000	50		
Squeteagues or "sea trout":								
Gray	384,500	13,073	2,100	198	6,000	280	2,000	100
Spotted					100	10		
Striped bass	410,800	28,716	23,000	2,467	39,100	2,786	129,000	10,964
Suckers							100	3
Sunfish	400	10						
Tuna	100	8						
White perch	13,300	506	6,100	352	1,100	35	85,400	2,882
Yellow perch	4,100	340	6,900	524	1,200	122	13,000	749
Crabs:								
Hard	817,000	18,190	100,000	3,000	600,000	14,000		
Soft and peelers	55,900	5,913	11,000	1,800	51,600	5,702		
Oysters, market:								
Public, spring	1,123,500	74,901	37,200	3,100	189,300	13,325		
Public, fall	1,313,600	97,956	164,000	11,565	459,200	34,233		
Private, spring					78,000	6,500		
Private, fall					132,000	11,000		
Total	4,882,600	252,522	405,100	26,200	1,771,400	91,631	294,400	17,427

Fisheries of Maryland, 1937—Continued

CATCH: BY COUNTIES—Continued

Species	Cecil		Charles		Dorchester		Hartford	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives.....	230,900	\$2,241	10,000	\$100	377,800	\$4,882	808,190	\$3,023
Black bass.....	31,400	4,021	1,500	140	600	67	4,900	412
Bluefish.....	.....	.....	.....	.....	4,500	417	.....	.....
Butterfish.....	.....	.....	.....	.....	3,000	144	.....	.....
Carp.....	46,000	3,160	23,700	1,748	4,800	165	37,600	2,921
Catfish and bullheads.....	116,700	3,334	105,700	2,353	18,800	623	36,000	1,105
Crappie.....	400	16	.....	.....	200	16	100	3
Croaker.....	.....	.....	1,800	90	106,600	2,098	.....	.....
Drum:	.....	.....	.....	.....	.....	.....	.....	.....
Black.....	.....	.....	.....	.....	600	6	.....	.....
Red or redfish.....	.....	.....	.....	.....	600	6	.....	.....
Eels, common.....	12,400	1,063	1,100	108	84,800	7,498	5,800	580
Flounders.....	.....	.....	.....	.....	10,200	528	.....	.....
Gizzard shad.....	2,800	38	17,600	297	24,800	312	800	4
Harvestfish or "starfish".....	.....	.....	.....	.....	800	36	.....	.....
Hickory shad.....	1,800	51	100	2	3,200	77	800	22
King whiting or "kingfish".....	.....	.....	.....	.....	200	6	.....	.....
Mullet.....	100	2	.....	.....	.....	.....	.....	.....
Pike or pickerel.....	17,400	2,413	2,000	325	400	34	11,000	2,187
Shad.....	18,400	1,800	11,500	1,326	65,000	5,321	16,300	1,583
Spanish mackerel.....	.....	.....	.....	.....	600	50	.....	.....
Spot.....	.....	.....	.....	.....	2,200	70	.....	.....
Squeteagues or "sea trout":	.....	.....	.....	.....	.....	.....	.....	.....
Gray.....	.....	.....	800	15	10,600	345	.....	.....
Spotted.....	.....	.....	.....	.....	3,700	228	.....	.....
Striped bass.....	21,800	1,763	109,000	7,197	183,000	16,320	43,600	3,887
Suckers.....	800	10	.....	.....	.....	.....	900	46
Sunfish.....	.....	.....	.....	.....	600	20	600	49
White perch.....	31,900	1,843	21,600	1,055	50,200	2,068	8,400	485
Yellow perch.....	66,700	4,283	6,000	356	2,800	172	17,300	1,073
Crabs:	.....	.....	.....	.....	.....	.....	.....	.....
Hard.....	.....	.....	557,900	22,428	6,856,900	137,138	.....	.....
Soft and peelers.....	.....	.....	6,700	1,097	171,000	13,686	.....	.....
Oysters, market:	.....	.....	.....	.....	.....	.....	.....	.....
Public, spring.....	.....	.....	142,200	12,178	1,012,100	72,825	.....	.....
Public, fall.....	.....	.....	243,100	20,836	1,970,900	144,547	.....	.....
Private, spring.....	.....	.....	41,400	3,848	.....	.....	.....	.....
Private, fall.....	.....	.....	172,800	13,132	.....	.....	.....	.....
Terrapin, diamond-back.....	.....	.....	.....	.....	1,300	840	.....	.....
Turtle, snapper.....	5,000	350	.....	.....	.....	.....	.....	.....
Total.....	602,900	25,893	1,485,500	88,161	10,971,500	410,530	495,200	17,333

Species	Kent		Prince Georges		Queen Annes		St. Marys	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives.....	99,300	\$936	.....	.....	5,100	\$64	528,800	\$5,708
Black bass.....	1,000	84	500	\$48	.....	.....	.....	.....
Bluefish.....	1,600	128	.....	.....	.....	.....	2,000	146
Butterfish.....	.....	.....	.....	.....	.....	.....	1,700	174
Carp.....	8,200	297	74,400	4,371	8,300	368	8,300	290
Catfish and bullheads.....	34,000	1,008	58,100	1,965	20,000	740	11,400	308
Crappie.....	.....	.....	1,000	74	.....	.....	.....	.....
Croaker.....	50,400	1,104	100	7	11,300	287	44,400	1,097
Drum:	.....	.....	.....	.....	.....	.....	.....	.....
Black.....	.....	.....	.....	.....	.....	.....	200	2
Red or redfish.....	.....	.....	.....	.....	.....	.....	100	3
Eels, common.....	10,400	862	1,300	112	17,800	1,354	1,100	88
Flounders.....	400	22	.....	.....	.....	.....	2,900	156
Gizzard shad.....	1,000	20	1,100	42	4,000	160	13,000	156
Hickory shad.....	800	25	100	3	.....	.....	7,000	138
Menhaden.....	.....	.....	.....	.....	.....	.....	3,000	50
Pike or pickerel.....	2,900	412	100	15	.....	.....	2,000	240
Shad.....	9,700	1,139	7,500	530	.....	.....	65,900	6,057
Spanish mackerel.....	1,300	109	.....	.....	.....	.....	2,400	263
Spot.....	6,800	357	.....	.....	.....	.....	2,500	131
Squeteagues or "sea trout":	.....	.....	.....	.....	.....	.....	.....	.....
Gray.....	123,500	5,391	200	23	500	20	28,100	1,262
Spotted.....	200	15	.....	.....	.....	.....	400	43
Striped bass.....	568,600	48,076	700	115	14,900	1,178	194,700	15,032
Suckers.....	.....	.....	1,000	74	.....	.....	500	10

Fisheries of Maryland, 1937—Continued

CATCH: BY COUNTIES—Continued

Species	Kent		Prince Georges		Queen Annes		St. Marys	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
White perch.....	30,700	\$1,147	1,600	\$169	8,100	\$379	7,700	\$383
Yellow perch.....	19,400	1,076	200	20	18,400	1,125	14,100	568
Crabs:								
Hard.....	281,000	9,835			433,500	15,173	1,347,300	33,232
Soft and peelers.....	11,100	2,243			8,500	1,100	74,500	9,080
Oysters, market:								
Public, spring.....	388,900	23,336			734,200	36,713	666,200	45,859
Public, fall.....	828,700	57,831			1,533,400	89,460	1,354,500	101,496
Private, spring.....							63,000	5,290
Private, fall.....							81,000	6,780
Total.....	2,479,900	155,443	147,900	7,568	2,818,000	148,111	4,528,700	233,956

Species	Somerset		Talbot		Wicomico		Worcester	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives.....	32,400	\$468	1,570,900	\$14,894	44,800	\$851	10,200	\$106
Bluefish.....	6,500	650	400	42			59,000	4,900
Bonito.....							16,500	775
Butterfish.....	2,500	91	100	10	9,000	360	75,000	3,527
Carp.....	800	12	4,900	241	800	88		
Catfish and bullheads.....	5,800	266	20,700	601	12,100	384		
Crappie.....					100	3		
Croaker.....	61,600	784	52,400	802	62,800	853	265,100	5,428
Drum:								
Black.....							30,000	360
Red or redfish.....	1,500	40						
Eels:								
Common.....	2,300	115	26,400	1,866	4,300	428	1,500	120
Conger.....							400	8
Flounders.....	2,700	257	100	12	1,500	144	8,100	454
Gizzard shad.....	2,300	23			9,700	169		
Hake.....							2,500	40
Harvestfish or "starfish".....							2,000	40
Hickory shad.....	800	15	6,600	168	100	2	3,000	60
Hogchoker.....	11,700	351			6,000	120		
King whiting or "kingfish".....					600	60	6,500	335
Mackerel.....							2,000	120
Mullet.....							2,000	80
Pike or pickerel.....			500	75				
Scup.....							26,000	590
Sea bass.....	100	4					15,000	900
Shad.....	13,800	1,368	107,700	10,245	30,500	3,638	14,300	1,495
Spanish mackerel.....			600	65			22,500	1,225
Spot.....			600	81	5,000	250	5,000	150
Squeteagues or "sea trout":								
Gray.....	5,000	195	49,500	2,288	41,300	1,408	456,200	9,992
Spotted.....					3,000	230		
Striped bass.....	15,500	986	182,200	9,730	118,900	9,162	5,000	435
Tautog.....							200	10
White perch.....	8,700	448	10,100	651	10,400	678	1,400	91
Yellow perch.....			15,900	1,273	1,300	88		
Crabs:								
Hard.....	2,000,700	54,757	1,805,800	54,174	25,000	500	1,372,600	30,877
Soft and peelers.....	2,035,700	162,257	13,600	2,087	1,200	110	73,300	5,121
Clams, hard, public.....							64,000	12,000
Oysters, market:								
Public, spring.....	858,000	64,308	912,100	43,578	159,500	15,966		
Public, fall.....	2,372,000	168,719	1,584,800	91,300	1,141,800	85,635		
Private, spring.....	54,000	4,050			24,000	1,800	324,700	69,445
Private, fall.....	179,500	13,463			108,000	8,100	312,600	66,979
Squid.....							73,000	1,120
Terrapin, diamond-back.....	2,200	750						
Total.....	7,675,400	474,377	6,295,800	234,119	1,818,700	130,965	3,279,600	217,773

VIRGINIA

Fisheries of Virginia, 1937

OPERATING UNITS: BY GEAR

Item	Purse seines, menhaden	Haul seines	Gill nets			Lines, hand
			Anchor	Drift	Stake	
Fishermen:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
On vessels.....	1,205					
On boats and shore:						
Regular.....		270	6	16	89	11
Casual.....		220		336	193	24
Total	1,205	490	6	352	282	35
Vessels:						
Steam:						
41 to 50 tons.....	1					
61 to 70 tons.....	1					
71 to 80 tons.....	2					
81 to 90 tons.....	4					
91 to 100 tons.....	5					
101 to 110 tons.....	3					
131 to 140 tons.....	2					
141 to 150 tons.....	1					
151 to 160 tons.....	2					
161 to 170 tons.....	1					
171 to 180 tons.....	2					
191 to 200 tons.....	1					
Total	25					
Net tonnage	2,833					
Motor:						
11 to 20 tons.....	1					
21 to 30 tons.....	1					
31 to 40 tons.....	1					
61 to 70 tons.....	1					
71 to 80 tons.....	3					
101 to 110 tons.....	1					
111 to 120 tons.....	1					
121 to 130 tons.....	1					
131 to 140 tons.....	1					
Total	11					
Net tonnage	844					
Total vessels	36					
Total net tonnage	3,667					
Boats:						
Motor.....		83	3	37	109	20
Other.....		159		193	169	3
Accessory boats	105					
Apparatus:						
Number.....	36	139	3	223	5,963	93
Length, yards.....	11,060	53,876				
Square yards.....			3,600	201,605	135,732	
Hooks, baits, or snoods.....						161

Fisheries of Virginia, 1937—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Lines—Continued		Pound nets	Crab pound nets	Stop nets	Fyke nets	Dip nets	Otter trawls
	Trot with baits or snoods	Trot with hooks						
Fishermen:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
On vessels.....								94
On boats and shore:								
Regular.....	1,479		1,531	69		60	695	
Casual.....	483	7	298	12	4	125	745	
Total.....	1,962	7	1,829	81	4	185	1,440	94
Vessels, motor:								
5 to 10 tons.....								6
11 to 20 tons.....								6
21 to 30 tons.....								3
31 to 40 tons.....								4
Total.....								19
Net tonnage.....								358
Boats:								
Motor.....	1,567	1	350	57	2	54	30	
Other.....	395	5	535	15		106	1,390	
Apparatus:								
Number.....	1,962	5	1,656	277	2	762	1,440	19
Square yards.....					1,300			
Yards at mouth.....								515
Hooks, baits, or snoods.....	1,023,610	2,550						

Item	Slat traps	Pots			Scrapes	Dredges		
		Crab	Eel	Fish		Crab	Oyster	Scallop
Fishermen:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
On vessels.....						308	112	4
On boats and shore:								
Regular.....		36	13	12	118			
Casual.....	2	23	15	21				
Total.....	2	59	28	33	118	308	112	4
Vessels, motor:								
5 to 10 tons.....						62	8	
11 to 20 tons.....						31	13	1
21 to 30 tons.....						6	2	
41 to 50 tons.....							2	
Total.....						99	25	1
Net tonnage.....						1,038	392	18
Boats:								
Motor.....		41	13	10	74			
Other.....	2	15	10	13				
Apparatus:								
Number.....	4	1,060	677	221	114	198	53	2
Yards at mouth.....					117	382	84	6

Fisheries of Virginia, 1937—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Tongs		Rakes, oyster	Picks	By hand		Total, ex- clusive of dupli- cation
	Oyster	Other			Oyster	Other	
	Number	Number	Number	Number	Number	Number	Number
Fishermen:							
On vessels.....							1,666
On boats and shore:							
Regular.....	2,407	332	495	375	100	310	4,851
Casual.....	680	36	20		25	75	8,070
Total.....	3,087	368	515	375	125	385	9,587
Vessels:							
Steam:							
41 to 50 tons.....							1
61 to 70 tons.....							1
71 to 80 tons.....							2
81 to 90 tons.....							4
91 to 100 tons.....							5
101 to 110 tons.....							3
131 to 140 tons.....							2
141 to 150 tons.....							1
151 to 160 tons.....							2
161 to 170 tons.....							1
171 to 180 tons.....							2
191 to 200 tons.....							1
Total.....							25
Net tonnage.....							2,833
Motor:							
5 to 10 tons.....							69
11 to 20 tons.....							43
21 to 30 tons.....							12
31 to 40 tons.....							5
41 to 50 tons.....							2
61 to 70 tons.....							1
71 to 80 tons.....							3
101 to 110 tons.....							1
111 to 120 tons.....							1
121 to 130 tons.....							1
131 to 140 tons.....							1
Total.....							139
Net tonnage.....							2,469
Total vessels.....							164
Total net tonnage.....							5,302
Boats:							
Motor.....	1,500	113	66	15			3,366
Other.....	271	199	423	310	50	75	3,004
Accessory boats.....							105
Apparatus, number.....	2,877	353	515	375			

CATCH: BY GEAR

Species	Purse seines		Haul seines		Gill nets			
					Anchor		Drift	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives.....			626,800	\$6,570			4,000	\$51
Bluefish.....			135,100	5,739	600	\$42	800	80
Bonito.....			400	17				
Butterfish.....			19,900	267				
Cabio or crab eater.....			700	28				
Carp.....			244,600	5,158			1,000	20
Catfish and bullheads.....			82,700	2,760				
Croaker.....			6,154,100	82,690	65,000	975	50,000	2,000
Drum, red or redfish.....			11,900	230				
Eels, common.....			1,800	95				
Flounders.....			34,800	1,529				
Gizzard shad.....			71,000	795			3,000	30
Harvestfish.....			13,900	278				
Hickory shad.....			6,500	124				
King whiting or "kingfish".....			43,900	1,317				

Fisheries of Virginia, 1937—Continued

CATCH: BY GEAR—Continued

Species	Purse seines		Haul seines		Gill nets			
					Anchor		Drift	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Mackerel.....			1,700	\$34				
Menhaden.....	119,763,000	\$478,923						
Mullet.....			6,800	114				
Pompano.....			400	40				
Shad.....			9,500	947			136,300	\$13,428
Skates.....			15,800	158				
Spanish mackerel.....			13,900	635				
Spot.....			1,180,000	22,646	18,000	\$540		
Squeteagues or "sea trout":								
Gray.....			255,400	4,823			400	20
Spotted.....			130,600	6,476				
Striped bass.....			99,400	6,896			24,600	1,715
Sturgeon.....							400	60
Suckers.....			300	6				
White perch.....			27,900	801	600	24		
Yellow perch.....			10,800	802				
Crabs, soft and peelers.....			31,200	3,160				
Total.....	119,763,000	478,923	8,230,800	154,885	84,200	1,581	220,400	17,404

Species	Gill nets—Continued		Lines					
	Stake		Hand		Trot with baits or snoods		Trot with hooks	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives.....	12,300	\$213						
Bluefish.....			42,100	\$4,437				
Bonito.....			100	8				
Catfish and bullheads.....							5,800	\$152
Croaker.....	13,000	164	16,300	765				
Flounders.....			4,000	348				
Gizzard shad.....	5,000	50						
King whiting or "kingfish".....			300	15				
Mackerel.....			200	20				
Mullet.....	2,000	60						
Soup.....			43,000	1,351				
Sea bass.....			70,400	2,112				
Shad.....	149,300	15,305						
Spanish mackerel.....			4,400	174				
Spot.....	9,500	143	1,700	34				
Squeteagues or "sea trout," gray.....	1,000	16	77,700	3,887				
Striped bass.....	202,600	16,185						
White perch.....	1,800	60						
Yellow perch.....	1,000	20						
Crabs:								
Hard.....					22,303,300	\$376,404		
Soft and peelers.....					30,500	8,025		
Turtles, snapper.....			1,600	22				
Total.....	397,600	32,215	260,700	13,173	22,333,800	379,429	5,800	162

Species	Pound nets		Crab pound nets		Stop nets		Fyke nets	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives.....	14,899,600	\$140,713					17,900	\$252
Bluefish.....	344,000	12,116						
Bonito.....	17,600	701						
Butterfish.....	1,866,000	26,876						
Cabio or crab eater.....	19,400	687						
Carp.....	66,500	1,303			25,400	\$508	56,200	1,088
Catfish and bullheads.....	159,200	4,759			1,800	52	239,800	8,270
Croaker.....	25,133,300	\$47,634					30,700	522
Drum:								
Black.....	16,600	190						
Red or redfish.....	19,900	361					100	2
Eels, common.....	68,400	7,985					5,200	383
Flounders.....	813,100	13,085					1,600	45
Gizzard shad.....	138,000	1,405					16,600	171
Harvestfish.....	1,076,600	19,524						

Fisheries of Virginia, 1937—Continued

CATCH: BY GEAR—Continued

Species	Pound nets		Crab pound nets		Stop nets		Fyke nets	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Hickory shad	78, 100	\$1, 622						
Hogfish	600	18						
King whiting or "kingfish"	29, 600	848						
Mackerel	98, 800	1, 977						
Menhaden	2, 202, 000	5, 981						
Mullet	3, 600	108						
Pike or pickerel							300	\$30
Pompano	10, 700	948						
Scup	20, 300	408						
Sea bass	5, 100	126						
Shad	2, 782, 400	242, 460					8, 000	870
Sharks	2, 000	60						
Sheepshead	100	2						
Skates	600	3						
Spanish mackerel	787, 200	17, 198						
Spot	1, 702, 000	29, 938						
Squeteagues or "sea trout":								
Gray	11, 108, 000	195, 848					9, 800	197
Spotted	9, 900	583						
Striped bass	624, 100	35, 097					53, 900	2, 864
Sturgeon	5, 600	656						
Swellfish	6, 700	67						
White perch	98, 900	2, 625					58, 700	1, 572
Yellow perch	3, 600	171					61, 200	2, 830
Crabs:								
Hard	115, 000	2, 300	82, 500	\$1, 468				
Soft and peelers			286, 800	29, 200				
Squid	85, 500	1, 641						
Total	63, 418, 600	1, 117, 732	369, 300	30, 668	26, 700	\$560	558, 500	19, 049

Species	Dip nets		Otter trawls		Slat traps		Pots	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives			200	\$2	3, 500	\$70		
Bluefish			5, 900	773				
Bonito			100	6				
Butterfish			70, 500	1, 866				
Catfish and bullheads					1, 700	85		
Cod			900	17				
Croaker			2, 650, 300	63, 413				
Drum, red or redfish			11, 400	175				
Eels, conger			400	7				
Flounders			146, 500	10, 883				
Gizzard shad					6, 000	120		
Grayfish			8, 400	170				
Hake			500	10				
King whiting or "kingfish"			62, 000	2, 016				
Scup			1, 868, 100	29, 249				
Sea bass			122, 000	6, 348				
Sea robin			2, 800	44				
Shad			300	33				
Sharks			4, 200	147				
Snappers, red			100	4				
Spot			67, 300	1, 358				
Squeteagues or "sea trout":								
Gray			1, 154, 400	28, 452				
Spotted			100	3				
Sturgeon			6, 700	639				
Swellfish			1, 700	50				
Tautog			300	11				
Tomcod			100	1				
White perch			7, 400	98				
Whiting			17, 200	194				
Crabs:								
Hard	12, 000	\$180					438, 000	\$8, 260
Soft and peelers	1, 346, 500	125, 910					61, 500	6, 120
Shrimp			1, 700	120				
Squid			26, 400	460				
Total	1, 358, 500	126, 090	6, 234, 900	146, 539	11, 200	275	489, 500	13, 380

Fisheries of Virginia, 1937—Continued

CATCH: BY GEAR—Continued

Species	Pots—Continued				Scrapes		Dredges	
	Eel		Fish		Pounds	Value	Pounds	Value
	Pounds	Value	Pounds	Value				
Catfish and bullheads	5,000	\$300	112,100	\$5,090				
Eels, common	43,600	2,366	6,500	355				
White perch			100	3				
Crabs:								
Hard					74,000	\$1,480	4,902,700	\$174,960
Soft and peelers					455,000	36,400		
Oysters, market:							256,800	22,830
Private, spring							2,545,400	192,560
Private, fall							10,800	1,426
Scallops, sea								
Total	48,600	2,666	118,700	5,448	529,000	37,880	7,715,700	391,776

Species	Tongs		Rakes		Picks		By hand	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Crabs, soft and peelers							273,800	\$22,100
Clams:								
Hard, public	1,089,100	\$173,742			277,000	\$49,200	258,000	46,090
Hard, private	7,000	1,750						
Mussels, sea							27,700	788
Oysters, market:								
Public, spring	1,276,800	87,875					7,800	585
Public, fall	2,104,800	144,670						
Private, spring	1,320,000	94,150	750,000	\$51,400			21,000	1,330
Private, fall	1,579,400	107,830	1,082,000	75,300			42,000	2,700
Total	7,377,100	609,917	1,832,000	126,700	277,000	49,200	630,300	73,613

OPERATING UNITS: BY COUNTIES

Item	Acco- mac	Arling- ton	Caro- line	Charles City	Ches- terfield	Din- widdle	Eliza- beth City	Essex
Fishermen:	Number	Number	Number	Number	Number	Number	Number	Number
On vessels	32						97	
On boats and shore:								
Regular	1,005						138	47
Casual	264	56	4	89	39	6	14	44
Total	1,301	56	4	89	39	6	249	91
Vessels, motor:								
5 to 10 tons	1						9	
11 to 20 tons	1						10	
21 to 30 tons	1						3	
31 to 40 tons							1	
Total	3						23	
Net tonnage	47						320	
Boats:								
Motor	666	10		1	2		56	24
Other	611	22	2	60	20	4	28	22
Apparatus:								
Purse seines, menhaden	1							
Length, yards	280							
Haulseines	19	6		2	5			8
Length, yards	9,595	1,600		350	1,550			2,360
Gill nets:								
Drift	4	14	1	60	10	1		
Square yards	8,000	20,580	1,200	67,825	6,000	600		
Stake		20		20	65			5
Square yards		360		400	1,800			3,100
Lines:								
Hand	60							
Hooks	120							
Trot with baits or snoods	378						35	7
Baits or snoods	233,600						17,600	1,600

Fisheries of Virginia, 1937—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Acco- mac	Arling- ton	Caro- line	Charles City	Ches- terfield	Din- widdle	Eliza- beth City	Essex
	Number	Number	Number	Number	Number	Number	Number	Number
Apparatus—Continued.								
Pound nets.....	203						155	2
Fyke nets.....	9	28	2	17	3		8	10
Dip nets.....	300							
Otter trawls.....							5	
Yards at mouth.....							143	
Slat traps.....						4		
Pots:								
Eel.....		12				5		
Fish.....				40	20			
Scrapes.....	108							
Yards at mouth.....	111							
Dredges:								
Crab.....	6						30	
Yards at mouth.....	12						58	
Oyster.....							16	
Yards at mouth.....							24	
Scallop.....							2	
Yards at mouth.....							6	
Tongs:								
Oyster.....	576							47
Other.....	197						5	
Rakes, oyster.....	215							
Picks.....	178							

Item	Fair- fax	Glou- cester	Henrico	Iale of Wight	James City	King and Queen	King George	King Wil- liam
	Number	Number	Number	Number	Number	Number	Number	Number
Fishermen:								
On vessels.....		48						
On boats and shore:								
Regular.....		435		298	11		26	
Casual.....	38	57	27	75	84	34	80	71
Total.....	38	540	27	373	45	34	106	71
Vessels, motor:								
5 to 10 tons.....		5						
11 to 20 tons.....		10						
Total.....		15						
Net tonnage.....		179						
Boats:								
Motor.....	12	239		178	11	9	38	11
Other.....	21	77	16	64	25	25	45	33
Apparatus:								
Haul seines.....		1	6		4		5	1
Length, yards.....		700	1,100		1,200		1,460	90
Gill nets:								
Drift.....	11		8		18	6	10	39
Square yards.....	16,400		4,700		10,800	2,000	4,400	22,400
Stake.....		150		179	555	420	975	260
Square yards.....		3,432		5,370	17,700	10,400	17,400	3,440
Lines:								
Hand.....					25			
Hooks.....					25			
Trot with baits or smoods.....		53		74			21	10
Baits or smoods.....		31,800		51,800			10,500	3,000
Trot with hooks.....			2					
Hooks.....			500					
Pound nets.....		93			8		36	
Crab pound nets.....		13						
Fyke nets.....	208	28		44	33		75	
Pots:								
Crab.....		60						
Eel.....	50						15	
Fish.....					3			
Dredges:								
Crab.....		24						
Yards at mouth.....		46						
Oyster.....		6						
Yards at mouth.....		9						
Tongs:								
Oyster.....	303			242	3	2		9
Other.....	37							

Fisheries of Virginia, 1937—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Lan-caster	Math-ews	Mid-dlesex	Nanse-mond	New Kent	Nor-folk	Nor-thamp-ton	Nor-thum-berland
Fishermen:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
On vessels.....	421	58	9			46	4	770
On boats and shores:								
Regular.....	434	384	299	121	4	69	541	468
Casual.....	482	302	182	13	30	42	103	442
Total.....	1,337	744	490	134	34	157	648	1,675
Vessels:								
Steam:								
41 to 50 tons.....								1
61 to 70 tons.....	1							8
71 to 80 tons.....	1							3
81 to 90 tons.....	1							2
91 to 100 tons.....	3							8
101 to 110 tons.....								1
131 to 140 tons.....	1							1
141 to 150 tons.....	1							1
151 to 160 tons.....	1							2
161 to 170 tons.....								1
171 to 180 tons.....								2
191 to 200 tons.....								1
Total.....	9							16
Net tonnage.....	966							1,877
Motor:								
5 to 10 tons.....	1	7	1			1	1	
11 to 20 tons.....	1	7	2			2	1	
21 to 30 tons.....	1	4				1		1
31 to 40 tons.....								1
41 to 50 tons.....						2		
61 to 70 tons.....	1							
71 to 80 tons.....	3							1
101 to 110 tons.....								1
111 to 120 tons.....								1
121 to 130 tons.....								1
131 to 140 tons.....								1
Total.....	7	18	3			7	2	6
Net tonnage.....	343	247	48			185	18	536
Total vessels.....	16	18	5			7	2	22
Total net tonnage.....	1,299	247	48			185	18	2,413
Boats:								
Motor.....	333	199	293	54	2	37	264	488
Other.....	370	224	108	28	27	40	247	580
Accessory boats.....	39							66
Apparatus:								
Purse seines, menhaden.....	13							22
Length, yards.....	3,970							6,800
Haul seines.....	8	3	3		1	4	4	10
Length, yards.....	3,200	2,800	2,800		225	1,500	1,800	510
Gill nets:								
Drift.....						19		
Square yards.....						16,100		
Stake.....		100		125		120		
Square yards.....		3,000		4,050		3,300		
Lines:								
Hand.....								8
Hooks.....								16
Trot with baits or smoods.....	335	92	68	25	2	57	171	282
Baits or smoods.....	167,500	46,000	34,000	12,500	600	17,100	78,660	141,000
Trot with hooks.....					1			
Hooks.....					50			
Pound nets.....	162	399	13			31	99	269
Crab pound nets.....	80	51	13					90
Fyke nets.....				41	16			
Dip nets.....	350	75	85				170	430
Otter trawls.....		1						
Yards at mouth.....		30				60		
Pots:								
Crab.....								1,000
Eel.....					15			40
Fish.....					14			

Fisheries of Virginia, 1937—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Lan- caster	Math- ews	Mid- dlesex	Nanse- mond	New Kent	Nor- folk	Nor- thamp- ton	Nor- thum- berland
Apparatus—Continued.	Number	Number	Number	Number	Number	Number	Number	Number
Scrapes							6	6
Yards at mouth							6	6
Dredges:								
Crab	2	34	4			2	2	
Yards at mouth	3	66	8			4	4	
Oyster	4	4	2			14	1	
Yards at mouth	5	6	3			27	1	
Tongs:								
Oyster	309	73	378	100			193	169
Other		12					58	
Rakes, oyster							300	
Picks							200	

Item	Prince George	Prin- cess Anne	Prince Wil- lam	Rich- mond	Staf- ford	Surry	War- wick	West- more- land	York
Fishermen:	Number	Number	Number	Number	Number	Number	Number	Number	Number
On vessels							8		173
On boats and shore:									
Regular		32		46	26	6	91	201	174
Casual	33	69	48	60	30	7	10	263	22
Total	33	101	48	106	56	13	109	464	369
Vessels, motor:									
5 to 10 tons							1		42
11 to 20 tons							1		8
21 to 30 tons									1
31 to 40 tons									2
Total							2		53
Net tonnage							28		523
Boats:									
Motor	4	34	12	21	15	5	42	239	117
Other	17	28	19	35	32	5	16	110	46
Apparatus:									
Haul seines	3	10	5	1	11	2		4	14
Length, yards	671	2,260	950	375	2,400	700		1,200	12,500
Gill nets:									
Anchor									3
Square yards									3,600
Drift	14		8						
Square yards	11,500		9,100						
Stake			414	720	1,020	240	500	25	
Square yards			8,180	10,800	20,400	7,200	15,000	400	
Lines:									
Trot with balts or snoods		41	1	12	4		12	228	54
Balts or snoods		14,350	300	3,600	1,600		4,800	114,000	37,800
Trot with hooks			2						
Hooks			2,000						
Pound nets		7		33	13		42	58	33
Crab pound nets								80	
Stop nets	2								
Square yards	1,300								
Fyke nets	14		105	8	56	22	20	8	7
Dip nets								50	
Otter trawls							1		10
Yards at mouth							25		257
Pots:									
Eel					210		100	230	
Fish	55					29	60		
Dredges:									
Crab							2		92
Yards at mouth							4		177
Oyster									6
Yards at mouth									9
Tongs:									
Oyster		4		34			60	258	117
Other		4					30		10

Fisheries of Virginia, 1937—Continued

CATCH: BY COUNTIES

Species	Accomac		Arlington		Caroline		Charles City	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives.....	1,327,900	\$10,821					1,500	\$30
Bluefish.....	64,200	5,913						
Bonito.....	4,300	216						
Butterfish.....	227,800	4,556						
Carp.....			79,000	\$1,580			18,200	367
Catfish and bullheads.....			9,500	285	100	\$3	128,200	6,230
Croaker.....	2,565,700	39,103						
Drum:								
Black.....	9,200	120						
Red or redfish.....	10,100	237						
Eels, common.....	20,400	2,719	1,600	80			3,500	175
Flounders.....	36,600	2,228						
Gizzard shad.....							5,100	75
Harvestfish.....	4,000	80						
Hickory shad.....	800	14					400	16
King whiting or "kingfish".....	3,600	112						
Menhaden.....	631,000	2,417						
Scup.....	53,200	1,541						
Sea bass.....	67,200	2,016						
Shad.....	100,000	9,194	5,800	633	200	25	33,000	2,554
Sharks.....	2,000	60						
Skates.....	800	3						
Spanish mackerel.....	15,600	471						
Spot.....	312,500	6,150						
Squeteague or "sea trout":								
Gray.....	1,485,600	37,214						
Spotted.....	16,800	840						
Striped bass.....	58,800	2,940	2,200	198			8,800	440
Sturgeon.....	200	30					100	15
Suckers.....			300	6				
White perch.....	3,700	74	1,800	38	300	18	3,900	195
Yellow perch.....			1,500	60			800	40
Crabs:								
Hard.....	4,313,500	78,561						
Soft and peelers.....	1,075,600	86,040						
Clams, hard, public.....	673,500	122,065						
Mussels, sea.....	27,700	788						
Oysters, market:								
Public, spring.....	129,600	9,970						
Public, fall.....	720,000	50,050						
Private, spring.....	276,000	21,200						
Private, fall.....	488,400	37,380						
Squid.....	13,800	207						
Total.....	14,742,700	535,330	101,700	2,878	1,100	64	201,500	10,137

Species	Chesterfield		Dinwiddle		Elizabeth City		Essex	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives.....	18,200	\$273	3,500	\$70	653,800	\$6,538	9,000	\$180
Bluefish.....					74,100	2,310		
Bonito.....					1,200	50		
Butterfish.....					164,200	2,759		
Cable or crab eater.....					5,000	200		
Carp.....	19,300	712					6,600	198
Catfish and bullheads.....	10,100	504	6,700	385	500	15	4,000	200
Cod.....					200	4		
Croaker.....					3,928,500	63,005		
Drum:								
Black.....					3,900	39		
Red or redfish.....					6,900	77		
Eels:								
Common.....	200	16	300	18	1,000	50	1,400	70
Conger.....					200	3		
Flounders.....					88,800	5,045		
Gizzard shad.....	1,600	15	6,000	120	18,300	208	11,900	119
Hake.....					100	2		
Harvestfish.....					299,200	4,038		
Hickory shad.....	2,200	38			16,100	322		
King whiting or "kingfish".....					20,900	670		
Pompano.....					5,600	560		

Fisheries of Virginia, 1937—Continued

CATCH: BY COUNTIES—Continued

Species	Chesterfield		Dinwiddie		Elizabeth City		Essex	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Soup					773,000	\$11,552		
Sea bass					55,400	2,984		
Sea robbin					200	3		
Shad	7,500	\$771	200	\$24	259,500	22,148	1,400	\$168
Sharks					2,400	81		
Spanish mackerel					106,400	2,168		
Spot					249,800	4,939		
Squeteagues or "sea trout,"								
gray					1,863,300	29,922		
Striped bass	100	7			82,200	5,310	1,200	120
Sturgeon	300	45			5,900	564		
Swellfish					5,800	58		
Tautog					100	2		
White perch	1,400	42			12,200	244	7,600	380
Whiting					1,600	22		
Yellow perch	200	8					200	14
Crabs, hard					1,165,400	33,728	24,500	785
Clams, hard, public					6,000	1,000		
Oysters, market:								
Public, spring							24,000	1,900
Public, fall							36,000	2,700
Private, spring					23,900	2,642	60,000	4,500
Private, fall					780,900	59,039	72,000	5,400
Scallops, sea					10,800	1,426		
Squid					11,600	170		
Total	61,000	2,426	16,700	617	10,654,900	263,897	259,800	16,584

Species	Fairfax		Gloucester		Henrico		Isle of Wight	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives			320,000	\$3,200	1,100	\$13	5,800	\$87
Bluefish			19,600	774				
Butterfish			213,200	2,650				
Cabio or crab eater			2,600	104				
Carp	5,000	\$100			22,500	345	8,000	120
Catfish and bullheads	65,800	1,959	800	24	5,000	132	17,800	346
Croaker			5,567,100	83,506			12,500	247
Drum								
Black			1,000	10				
Red or redfish			500	10				
Eels, common	4,500	225						
Flounders			28,400	1,126				
Gizzard shad			1,200	12	7,500	75	2,000	20
Hickory shad			2,000	25				
King whiting or "kingfish"			1,500	45				
Mullet			600	18				
Pompano			500	50				
Shad	28,400	2,575	98,600	8,874	7,300	568	32,200	3,540
Spanish mackerel			40,000	900				
Spot			193,300	3,866				
Squeteagues or "sea trout":								
Gray			874,900	13,126			2,000	40
Spotted			1,000	50				
Striped bass	3,000	270	14,200	710	4,300	301	12,400	620
White perch	15,600	812	4,500	135	1,100	33		
Yellow perch	26,800	1,340					5,400	118
Crabs:								
Hard			1,179,900	31,073			600,000	12,000
Soft and peelers			11,300	900				
Clams, hard, public			652,700	97,905				
Oysters, market:								
Public, spring			132,000	8,800			57,000	3,840
Public, fall			84,000	5,600			84,000	5,600
Private, spring			150,000	10,000			132,000	9,900
Private, fall			210,000	14,000			48,000	3,600
Total	143,600	6,781	9,805,400	287,498	48,800	1,467	1,013,600	40,078

Fisheries of Virginia, 1937—Continued

CATCH: BY COUNTIES—Continued

Species	James City		King and Queen		King George		King William	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives			300	\$6	4,700	\$47	9,200	\$94
Carp	22,000	\$465			27,800	556		
Catfish and bullheads	39,800	1,154			53,200	1,584	100	4
Eels, common	1,200	42			4,100	211		
Gizzard shad	13,000	170			56,900	569		
Hickory shad							100	2
Pike or pickerel					300	30		
Shad	43,800	4,633	25,600	2,816	19,300	1,600	15,700	1,787
Squeteagues or "sea trout," gray					1,300	26		
Striped bass	15,100	756			93,100	7,447	800	64
White perch	3,200	97			18,300	525		
Yellow perch	800	15			8,300	332		
Crabs, hard					160,000	4,000	70,000	1,400
Oysters, market:								
Public, spring	1,200	80					6,000	400
Public, fall	4,800	320	3,000	200			9,000	600
Turtles, snapper	1,500	22						
Total	145,900	7,654	28,900	3,022	447,300	16,927	110,900	4,331

Species	Lancaster		Mathews		Middlesex		Nansemond	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives	1,852,600	\$18,526	3,311,200	\$33,111	2,100	\$21		
Bluefish	17,400	522	116,600	3,498	22,100	1,326		
Bonito			7,100	213				
Butterfish	62,600	1,252	263,100	3,950				
Cabio or crab eater			10,000	300				
Carp	600	0			23,500	320		
Catfish and bullheads					5,900	148		
Croaker	530,500	7,957	11,505,300	143,846	895,900	14,939	10,000	\$150
Drum:								
Black			600	5				
Red or redfish			1,200	12				
Eels, common	500	40			100	10		
Flounders	5,900	177	67,800	2,894	2,900	201		
Gizzard shad	5,500	55	2,800	28	1,400	14	5,200	53
Harvestfish			112,300	1,685				
Hickory shad	2,000	40	15,800	806				
Hogfish			600	18				
King whiting or "kingfish"			2,600	78	2,300	69		
Monhaden	52,770,000	210,323	1,188,000	3,000				
Mullet			4,090	120				
Scup			35,600	873				
Sea bass			1,000	50				
Shad	338,800	32,676	1,183,000	102,361	400	60	2,100	227
Skates					15,800	158		
Spanish mackerel	8,500	255	365,500	7,310				
Spot	70,200	1,404	619,000	9,286	44,000	880		
Squeteagues or "sea trout":								
Gray	226,800	4,548	2,737,000	41,077	17,800	356	2,400	48
Spotted	5,800	275	20,200	1,212	10,500	735		
Striped bass	50,000	3,135	35,600	1,780	34,200	2,047	5,000	250
Sturgeon			2,100	131				
White perch	2,600	39	11,800	354	4,800	212		
Whiting			1,200	12			2,100	42
Yellow perch								
Crabs:								
Hard	3,420,000	52,500	1,719,100	44,743	1,251,700	23,511	87,500	1,780
Soft and peelers	236,000	28,600	92,500	9,250	103,200	10,865		
Clams, hard, public			4,000	800				
Oysters, market:								
Public, spring	222,000	14,800	10,800	720	318,000	21,200	5,000	400
Public, fall	330,000	22,000	6,000	400	246,000	16,400	5,000	400
Private, spring	258,000	20,400	43,100	3,180	228,000	15,200	75,000	5,000
Private, fall	342,000	22,800	119,400	8,603	186,000	12,400	75,000	5,000
Squid			1,900	39				
Total	60,757,500	442,431	23,617,800	424,745	3,116,600	121,073	274,300	15,319

Fisheries of Virginia, 1937—Continued

CATCH: BY COUNTIES—Continued

Species	New Kent		Norfolk		Northampton		Northumberland	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives	41,700	\$637	73,000	\$730	307,600	\$3,078	6,630,900	\$66,309
Bluefish			16,900	1,379	41,000	1,193	19,100	762
Bonito			2,800	130	500	30	400	36
Butterfish			309,700	3,611	183,000	3,660	14,800	296
Cable or crab eater					1,100	55		
Carp	800	12					16,800	483
Catfish and bullheads	22,700	896					200	10
Croaker			1,479,100	32,673	1,092,300	10,276	633,000	7,429
Drum:								
Black					900	9		
Red or redfish			3,100	76	3,200	49	4,500	50
Eels:								
Common	1,300	92			28,500	4,275	8,600	522
Conger			200	4				
Flounders	100	8	37,500	2,639	109,700	4,412	17,300	681
Gizzard shad	8,000	80					9,700	97
Grayfish			5,400	170				
Hake			300	7				
Harvestfish			11,500	230	649,000	12,980	5,000	100
Hickory shad			8,600	170			26,800	536
King whiting or "kingfish"			19,800	644	5,400	217		
Mackerel					98,600	1,989		
Menhaden					5,000	49	67,321,000	268,915
Mullet			1,000	30	4,000	60		
Pompano			300	36	300	30		
Scup			604,300	9,321	5,500	186		
Sea bass			25,000	1,306	8,100	212		
Sea robin			2,600	41				
Shad	17,100	1,824	60,600	6,061	3,900	335	588,300	62,946
Snapper, red			100	4				
Spanish mackerel			175,200	4,390	34,000	685	18,900	548
Spot			288,600	5,789	252,600	3,902	17,200	344
Squeteagues or "sea trout":								
Gray	200	7	513,100	11,464	3,253,000	65,065	384,900	6,867
Spotted			2,700	162	6,000	300	4,000	210
Striped bass	10,900	1,083	300	24	17,600	901	211,600	11,678
Sturgeon			1,800	266			200	30
Swilfish			1,700	23				
White perch	2,100	156	4,200	109	2,000	30	6,300	68
Whiting			3,700	52				
Yellow perch	200	16						
Crabs:								
Hard	5,900	295	282,100	5,883	1,630,000	27,555	6,501,900	102,268
Soft and peelers					382,600	30,800	524,200	52,460
Clams, hard, public					168,200	23,430		
Oysters, market:								
Public, spring							60,000	4,000
Public, fall							108,000	7,200
Private, spring			178,300	16,028	593,500	38,380	234,000	15,000
Private, fall			1,188,600	89,231	889,000	57,150	270,000	18,000
Squid			9,600	190	71,700	1,434		
Total	111,000	5,105	5,311,200	192,633	9,735,700	298,723	83,537,300	618,345

Species	Prince George		Princess Anne		Prince William	
	Pounds	Value	Pounds	Value	Pounds	Value
Alewives	2,400	\$48	3,500	\$46		
Bluefish			47,300	2,342		
Bonito			1,500	33		
Butterfish			482,800	5,187		
Carp	43,600	872			30,000	\$600
Catfish and bullheads	52,800	2,112			27,900	729
Croaker			517,300	8,420		
Drum, red or redfish			9,200	183		
Eels, common	3,000	180			800	40
Flounders			5,800	426		
Gizzard shad	3,600	72			3,000	80
Harvestfish			14,000	304		
Hickory shad			400	8		
King whiting or "kingfish"			43,400	1,262		
Mackerel			2,100	43		
Mullet			1,800	54		
Pompano			3,200	192		
Scup			100	2		
Shad	7,300	730	2,600	262	6,300	615
Sheepshead			100	2		

Fisheries of Virginia, 1937—Continued

CATCH: BY COUNTIES—Continued

Species	Prince George		Princess Anne		Prince William	
	Pounds	Value	Pounds	Value	Pounds	Value
Spanish mackerel			33,500	\$1,095		
Spot			582,400	10,889		
Squeteagues or "sea trout":						
Gray			264,000	3,706		
Spotted			10,100	707		
Striped bass	2,500	\$125	3,000	240	53,400	\$3,738
White perch	1,300	39	1,700	51	13,900	280
Yellow perch	200	8			4,700	235
Crabs, hard			328,000	5,740	5,000	175
Clams, hard, private			7,000	1,750		
Oysters, market, private, fall			14,000	1,000		
Total	116,700	4,186	2,378,700	43,944	145,000	6,442

Species	Richmond		Stafford		Surry	
	Pounds	Value	Pounds	Value	Pounds	Value
Alewives	20,200	\$202	2,000	\$20		
Carp	7,000	140	38,700	774	4,500	\$65
Catfish and bullheads	22,400	672	61,100	1,833	21,200	574
Croaker	2,900	58			300	6
Eels, common	6,200	310	32,000	1,605		
Flounders	200	10				
Gizzard shad	20,900	209	25,700	257	2,300	23
Hickory shad	1,800	36				
Shad	12,400	1,180	25,500	2,800	4,400	485
Spot	1,000	20				
Squeteagues or "sea trout," gray	3,400	68			1,100	22
Striped bass	15,400	924	87,000	7,866	10,100	505
White perch	11,700	351	16,500	330	1,500	40
Yellow perch	1,200	60	24,700	1,235		
Crabs, hard	30,000	750	28,000	1,120		
Oysters, market:						
Public, spring	54,000	4,050				
Public, fall	84,000	6,300				
Private, spring	36,000	2,700				
Private, fall	60,000	4,500				
Total	390,700	22,540	341,200	17,840	45,400	1,720

Species	Warwick		Westmoreland		York	
	Pounds	Value	Pounds	Value	Pounds	Value
Alewives	69,600	\$696	383,500	\$3,000	9,000	\$90
Bluefish	7,700	308	11,800	472	70,700	2,388
Bonito					600	24
Butterfish	7,700	153	500	10	27,000	715
Cable or crab eater					1,400	56
Carp	5,300	53	14,700	253		
Catfish and bullheads	30,700	921	23,200	734		
Cod					700	13
Croaker	251,200	5,507	76,500	1,148	4,443,600	73,994
Drum:						
Black	1,000	7				
Red or redfish	1,700	19			2,900	55
Eels, common	1,200	96	5,100	408		
Flounders	14,500	710	100	4	84,400	5,432
Gizzard shad	5,600	56	21,500	215		
Hake					100	1
Harvestfish	25,000	375	500	10		
Hickory shad	4,800	144	2,900	87	500	7
King whiting or "kingfish"	3,500	105			32,800	992
Menhaden	50,000	200				
Ompano	1,200	120				
Scup	102,700	1,731			294,000	6,302
Sea bass	8,500	387			32,300	1,631
Shad	74,900	1,550	40,000	3,409	44,900	3,772
Sharks					1,800	66
Spanish mackerel	1,500	45	2,500	75	4,000	75
Spot	10,600	206	12,900	252	324,800	6,752
Squeteagues or "sea trout":						
Gray	77,600	1,523	319,500	4,793	579,400	13,372
Spotted					63,800	2,551
Striped bass	85,200	2,760	98,700	5,012	17,800	1,456

Fisheries of Virginia, 1937—Continued

CATCH: BY COUNTIES—continued

Species	Warwick		Westmoreland		York	
	Pounds	Value	Pounds	Value	Pounds	Value
Sturgeon.....	600				1,500	\$205
Swellfish.....					900	36
Tautog.....					200	9
Tomcod.....					100	1
White perch.....	7,500	112	27,400	\$822	6,500	99
Whiting.....	3,400	34			7,300	74
Crabs:						
Hard.....	153,000	2,355	1,648,000	28,805	3,426,000	106,055
Soft and peelers.....			50,000	6,000		
Shrimp.....					1,700	120
Clams, hard, public.....	25,000	4,800			106,700	19,082
Oysters, market:						
Public, spring.....	30,000	2,400	210,000	14,000	25,000	2,000
Public, fall.....	35,000	2,800	300,000	20,000	50,000	4,000
Private, spring.....			60,000	4,000		
Private, fall.....			30,000	2,000		
Squid.....					495,500	37,287
					3,300	61
Total.....	1,126,200	30,242	8,837,000	95,509	10,161,200	288,723

SEED OYSTER FISHERY: BY GEAR

Item	Tongs	
OPERATING UNITS		
Fishermen:	Number	
On vessels.....	37	
On boats and shore:		
Regular.....	1,051	
Casual.....	182	
Total.....	1,220	
Vessels, motor.....	13	
Net tonnage.....	69	
Boats:		
Motor.....	433	
Other.....	33	
Apparatus, number.....	910	
CATCH		
Oysters, seed:	Bushels	Value
Public, spring.....	249,900	\$62,479
Public, fall.....	544,200	136,006
Private, fall.....	2,400	600
Total.....	796,500	199,085

SEED OYSTER FISHERY: BY COUNTIES

Item	Elizabeth City		Gloucester		Isle of Wight		Mathews	
OPERATING UNITS								
Fishermen:	Number		Number		Number		Number	
On vessels.....			16					
On boats and shore:								
Regular.....	28		275		250		15	
Casual.....					42			
Total.....	28		291		292		15	
Vessels, motor.....			6					
Net tonnage.....			31					
Boats:								
Motor.....	9		87		114		5	
Other.....					15			
Apparatus, tongs.....	19		187		242		10	
CATCH								
Oysters, seed:	Bushels	Value	Bushels	Value	Bushels	Value	Bushels	Value
Public, spring.....	3,300	\$817	34,900	\$8,725	80,300	\$20,086	1,700	\$480
Public, fall.....	7,000	1,752	71,800	17,943	177,400	44,346	3,700	922
Total.....	10,300	2,569	106,700	26,668	257,700	64,432	5,400	1,352

Fisheries of Virginia, 1937—Continued

SEED OYSTER FISHERY: BY COUNTIES—Continued

Item	Nansemond		Norfolk		Warwick		York	
OPERATING UNITS								
Fishermen:	Number		Number		Number		Number	
On vessels.....	21							
On boats and shore:								
Regular.....	153		28		170		132	
Casual.....	20				50		20	
Total.....	194		28		220		152	
Vessels, motor.....	7							
Net tonnage.....	38							
Boats:								
Motor.....	65		12		85		56	
Other.....	5						13	
Apparatus, tongs.....	142		23		170		117	
CATCH								
Oysters, seed:	Bushels	Value	Bushels	Value	Bushels	Value	Bushels	Value
Public, spring.....	47,400	\$11,854	4,000	\$989	56,400	\$14,110	21,900	\$5,468
Public, fall.....	101,200	25,263	8,500	2,121	124,600	31,152	50,000	12,507
Private, fall.....	2,400	600						
Total.....	151,000	37,717	12,500	3,110	181,000	45,262	71,900	17,975

NOTE.—Of the total number of persons fishing for seed oysters, 815 are duplicated among those fishing for market oysters or other species. Similarly, the following craft and gear are duplicated: 295 motorboats, 21 other boats, and 606 tongs.

SHAD AND ALEWIFE FISHERIES OF THE POTOMAC RIVER

The catch of shad in the Potomac River in 1937 amounted to 164,093 in number, 434,900 pounds in weight, and their total value to the fishermen was \$40,332. The catch of alewives for the same season amounted to 7,567,500 in number, with a total weight of 3,025,200 pounds, and a value to the fishermen of \$29,143. These figures show an increase of 21 percent in the weight and 14 percent in the value of shad as compared with 1936, and a decrease of 33 percent in weight and 21 percent in the value of alewives.

Approximately 79 percent of the shad, in weight, were taken with pound nets, and 21 percent with gill nets. More than 99 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 the 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, 1937

Item	Maryland			Virginia			Total		
	Number	Pounds	Value	Number	Pounds	Value	Number	Pounds	Value
Fishermen on boats and shore:									
Regular.....	32			160			192		
Casual.....	39			221			260		
Total.....	71			381			452		
Boats:									
Motor.....	25			118			143		
Other.....	17			149			166		
Apparatus:									
Gill nets:									
Drift.....	7			38					
Square yards.....	10,229			46,080					
Stake.....	618			2,454					
Square yards.....	48,970			46,740					
Pound nets.....	33			228			261		

Shad and Alewife fisheries of the Potomac River, 1937—Continued

Item	Maryland			Virginia			Total		
	Number	Pounds	Value	Number	Pounds	Value	Number	Pounds	Value
Shad caught:									
With drift gill nets.....	4,802	13,200	\$1,101	10,860	30,100	\$3,280	15,662	43,300	\$4,381
With stake gill nets.....	1,694	5,100	684	16,267	42,000	4,392	17,961	47,100	5,076
With pound nets.....	9,240	25,200	2,319	121,230	319,300	28,556	130,470	344,500	30,875
Total.....	15,736	43,500	4,104	148,357	391,400	36,228	164,093	434,900	40,332
Alewives caught:									
With stake gill nets.....				5,000	2,000	20	5,000	2,000	20
With pound nets.....	519,750	207,900	1,805	7,042,750	2,815,300	27,318	7,562,500	3,023,200	29,123
Total.....	519,750	207,900	1,805	7,047,750	2,817,300	27,338	7,567,500	3,025,200	29,143

TRADE IN FISHERY PRODUCTS IN WASHINGTON, D. C.

The municipal 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, 2 have stalls in the Center Market, located at Fifth and K Streets NW., and 3 are located in other parts of the city. Altogether there are 23 firms which employ 156 persons who received \$141,327 in salaries and wages during 1937. These firms conduct mainly a wholesale business although some retail trade is carried on. In 1937 manufactured products produced by firms in Washington, D. C., consisted of smoked fish and shucked oysters. The total value of these products amounted to \$10,225.

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.

FISHERIES OF THE SOUTH ATLANTIC AND GULF STATES

(South Atlantic, Area XXIV; Gulf, Area XXV) *

The yield of the commercial fisheries of the marine areas of the South Atlantic and Gulf States (North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, and Texas) during 1937 amounted to 546,751,000 pounds, valued at \$14,226,370 to the fishermen, representing a decrease of 2 percent in quantity, but an increase of 5 percent in value as compared with the catch of the previous year. These fisheries provided employment for 30,244 fishermen as compared with 29,006 in 1936.

There were 725 fishery wholesale and manufacturing establishments in these States in 1937, which was 22 more than indicated by the survey in 1936. In 1937 these establishments employed 18,534 persons, paid \$3,863,777 in salaries and wages, and produced manufactured products (canned, cured, packaged, and byproducts) valued at

* These are the numbers given to these areas by the North American Council on Fishery Investigations. The catch of 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."

\$15,110,653. In 1936 wholesale and manufacturing firms employed 17,095 persons, paid \$3,296,241 in salaries and wages and produced manufactured products valued at \$11,445,674.

Fisheries of the South Atlantic and Gulf States, 1937

SUMMARY OF CATCH

Product	North Carolina		South Carolina		Georgia	
	Pounds	Value	Pounds	Value	Pounds	Value
Fish.....	102,749,300	\$1,300,512	1,905,700	\$106,347	10,431,800	\$73,414
Shellfish, etc.....	10,005,700	357,779	5,259,900	161,361	12,010,800	332,162
Total.....	112,755,000	1,658,291	7,165,600	267,708	22,442,600	405,576

Product	Florida		Alabama		Mississippi	
	Pounds	Value	Pounds	Value	Pounds	Value
Fish.....	210,253,900	\$3,153,575	5,812,800	\$244,974	1,190,600	\$66,097
Shellfish, etc.....	21,916,500	1,897,405	5,104,300	216,396	37,889,300	1,665,118
Total.....	232,170,400	5,050,980	10,917,100	461,370	39,079,900	1,731,215

Product	Louisiana		Texas		Total	
	Pounds	Value	Pounds	Value	Pounds	Value
Fish.....	5,131,300	\$319,961	6,159,000	\$383,433	343,659,400	\$5,648,313
Shellfish, etc.....	91,879,100	3,281,224	19,016,000	666,612	203,081,600	8,578,067
Total.....	97,010,400	3,601,185	25,205,000	1,050,045	546,751,000	14,226,370

OPERATING UNITS: BY STATES

Item	North Carolina	South Carolina	Georgia	Florida	Alabama	Mississippi	Louisiana	Texas	Total
Fishermen:									
On vessels.....	900	52	187	1,369	168	983	502	161	4,322
On boats and shore:									
Regular.....	3,759	635	702	5,853	653	1,670	5,565	1,382	20,219
Casual.....	1,960	613	543	1,372	110	116	693	296	5,708
Total.....	6,619	1,300	1,432	8,494	931	2,769	6,760	1,839	30,214
Vessels:									
Motor.....	153	14	68	261	38	233	206	53	1,026
Net tonnage.....	1,549	168	572	1,307	494	2,831	1,567	535	12,013
Sail.....	61	1	-----	-----	-----	7	-----	-----	69
Net tonnage.....	549	12	-----	-----	-----	84	-----	-----	615
Total vessels.....	214	15	68	261	38	240	206	53	1,095
Total net tonnage.....	2,098	170	572	4,307	494	2,915	1,567	535	12,638
Boats:									
Motor.....	1,339	55	227	2,331	264	605	2,468	624	7,913
Other.....	1,818	668	548	3,196	412	633	1,712	294	9,281
Accessory boats.....	122	12	6	61	-----	-----	15	-----	216
Apparatus:									
Purse seines:									
Menhaden.....	24	-----	2	20	-----	-----	-----	-----	46
Length, yards.....	5,857	-----	600	5,670	-----	-----	-----	-----	12,127
Other.....	2	-----	-----	-----	-----	-----	-----	-----	2
Length, yards.....	400	-----	-----	-----	-----	-----	-----	-----	400
Haul seines:									
Common.....	585	39	11	277	6	12	131	44	1,106
Length, yards.....	111,425	5,920	992	156,745	3,500	4,800	27,570	15,150	326,102
Long.....	81	-----	-----	-----	-----	-----	-----	-----	81
Length, yards.....	80,600	-----	-----	-----	-----	-----	-----	-----	80,500

Fisheries of the South Atlantic and Gulf States, 1937—Continued

OPERATING UNITS: BY STATES—Continued

Item	North Carolina	South Carolina	Georgia	Florida	Alabama	Mississippi	Louisiana	Texas	Total
	Number	Number	Number	Number	Number	Number	Number	Number	Number
Apparatus—Continued.									
Gill nets:									
Anchor.....	2,047	195	34	26					2,302
Square yards.....	1,010,040	139,900	1,530	22,380					1,173,850
Drift.....	123	33	159	83					413
Square yards.....	152,340	40,060	75,015	139,400					406,805
Runaround.....	565	51	34	2,161			1	131	2,943
Square yards.....	380,110	22,730	13,200	2,233,076			550	32,650	2,682,316
Stake.....	5,094	17	216	8	12			352	6,599
Square yards.....	429,930	11,304	21,904	7,600	2,525			84,090	557,353
Trammel nets.....				566	166	59	57	106	954
Square yards.....				557,400	82,400	29,850	12,760	57,700	740,110
Lines:									
Hand.....	117	123	310	1,889	124	120	332	362	3,377
Hooks and baits.....	134	222	310	2,522	203	149	347	441	4,328
Trawl.....				15					15
Hooks.....				800					800
Troll.....	32			993		6		7	1,038
Hooks.....	32			993		6		7	1,038
Trot with baits or snoods.....	673	98	232	212	102	173	876	49	2,415
Baits or snoods.....	442,900	49,200	99,250	95,900	29,900	101,600	220,550	14,700	1,064,000
Trot with hooks.....	15		91	237	279		560	77	1,249
Hooks.....	2,450		10,900	81,850	83,100		235,800	64,500	478,600
Pound nets.....	3,083			21					3,104
Wheels.....	10								10
Fyke nets.....	557			8	90		428		1,083
Dip nets:									
Common.....	469			83			65	34	651
Drop.....				26			8,925		8,951
Cast nets.....		25		232		41	160		458
Otter trawls:									
Fish.....	1	1		6					7
Yards at mouth.....	20	23		122					165
Shrimp.....	194	39	245	318	177	695	2,096	430	4,194
Yards at mouth.....	3,247	795	4,686	6,163	2,639	10,637	26,976	6,677	61,820
Traps, brush.....							28,300		28,300
Pots:									
Crab.....			655	5,783				800	7,238
Eel.....	1,412			90					1,502
Fish.....	54	76	84	4,920	655				5,789
Sea crawfish.....				2,075					2,075
Turtle.....	68								68
Spears.....	317	95		84	54	45		134	729
Dredges:									
Clam.....				1					1
Oyster.....	296	1		3	25	385	129	58	897
Yards at mouth.....	286	2		3	25	388	129	60	893
Scallop.....				37					37
Yards at mouth.....				27					27
Tongs, oyster.....	120		27	315	244	621	827	110	2,264
Rakes:									
Oyster.....				1					1
Other.....	1,108								1,108
Forks:									
Grabs.....		135	35	9					9
Coquina scoops.....				11					181
Hooks:				2					2
Conch.....				3					3
Sponge.....				256					256
Diving outfits.....				72					72

Fisheries of the South Atlantic and Gulf States, 1937—Continued

CATCH: BY STATES

Species	North Carolina		South Carolina		Georgia	
	Pounds	Value	Pounds	Value	Pounds	Value
FISH						
Alewives.....	5,817,700	\$58,461				
Bluefish.....	1,067,000	82,011	29,800	\$2,363		
Bonito.....	900	14				
Bowfin.....	3,100	38				
Butterfish.....	13,400	370	200	6		
Carp.....	324,200	6,923			90,500	\$4,675
Catfish and bullheads.....	653,300	18,478	51,000	1,865		
Cero.....	200	8				
Croaker.....	9,987,900	118,349	900	18	3,000	120
Drum:						
Black.....	34,600	952	34,000	1,280	7,000	280
Red or redfish.....	441,200	14,777	118,500	6,255	37,500	1,960
Eels, common.....	91,100	2,539			4,000	480
Flounders.....	403,800	20,190	57,700	5,173	14,100	705
Gizzard shad.....	37,700	377				
Grunts.....			5,000	150		
Harvestfish or "starfish".....	640,900	10,368				
Hickory shad.....	161,300	4,320	5,300	102	13,400	392
Hogfish.....	10,200	102				
King whiting or "kingfish".....	722,100	21,596	106,400	3,892	101,600	1,515
Menhaden.....	61,706,000	219,531			9,864,000	23,330
Mullet.....	3,973,900	134,043	627,000	22,250	18,000	440
Pigfish.....	80,400	947				
Pike or pickerel.....	400	14				
Pinfish or sailors choice.....	37,400	559				
Pompano.....	50,600	5,167				
Porgies.....			1,900	32		
Sea bass.....	117,700	5,735	234,000	13,180		
Sea catfish.....			120,000	3,600		
Shad.....	698,400	106,151	137,600	29,760	193,100	32,043
Sharks.....	231,600	772	15,000	150		
Sheepshead, salt-water.....	13,800	441	5,000	100	8,000	240
Spadefish.....	40,400	1,161				
Spanish mackerel.....	218,600	10,930				
Spot.....	5,269,700	91,195	245,000	6,655	5,000	75
Squeteagues or "sea trout":						
Gray.....	7,525,100	214,029	5,700	271		
Spotted.....	901,100	73,701	81,000	7,230	65,000	5,850
Striped bass.....	712,900	69,424				
Sturgeon.....	600	60	24,700	2,027	7,600	1,309
Suckers.....	3,000	36				
White perch.....	161,400	6,481				
Yellow perch.....	6,700	262				
Total.....	102,749,300	1,300,512	1,905,700	106,347	10,431,800	73,414
SHELLFISH, ETC.						
Crabs:						
Hard ¹	3,245,600	51,538	1,229,500	18,408	2,257,900	34,421
Soft and peelers.....	141,800	22,600	8,300	1,230		
Shrimp.....	4,184,000	125,502	1,200,700	36,021	9,603,900	284,065
Clams, hard, public ¹	430,000	34,343	7,900	491		
Oysters, market: ²						
Public, spring.....	655,900	36,067				
Public, fall.....	1,218,700	72,380				
Private, spring.....	24,800	1,222	1,498,100	55,117	134,300	7,085
Private, fall.....	41,600	2,382	1,313,500	49,601	104,700	5,491
Scallops, bay.....	61,900	11,680				
Terrapin, diamond-back.....			4,900	493	10,000	1,100
Turtles: Snapper.....	1,500	65				
Total.....	10,005,700	357,779	5,259,900	161,361	12,010,800	332,162
Grand total.....	112,755,000	1,658,291	7,165,600	267,708	22,442,600	405,576

See footnotes at end of table.

Fisheries of the South Atlantic and Gulf States, 1937—Continued

CATCH: BY STATES—Continued

Species	Florida		Alabama		Mississippi	
	Pounds	Value	Pounds	Value	Pounds	Value
FISH						
Alewives.....	400,000	\$1,999				
Amberjack.....	50,600	1,118				
Angelfish.....	9,000	240				
Bluefish.....	3,578,700	171,110	28,300	\$1,722		
Blue runner or hardtail.....	769,300	8,875	14,300	351		
Buffalofish.....			29,000	1,650		
Cable or crab eater.....	1,800	52				
Catfish and bullheads.....	4,497,000	174,153	116,600	8,761		
Cigarfish.....	16,800	341				
Crapple.....	524,100	17,346				
Crevalle.....	195,900	3,576				
Croaker.....	35,900	596	31,000	701	7,600	\$233
Dolphin.....	3,000	150				
Drum.....						
Black.....	84,800	1,912	7,700	270	11,300	362
Red or redbfish.....	1,029,900	36,463	66,700	5,002	123,200	6,160
Eels, common.....	8,600	215				
Flounders.....	292,500	17,713	37,300	3,560	27,600	2,472
Groupers.....	5,173,000	162,668	219,200	7,670	128,600	3,857
Grunts.....	54,200	1,108				
Hickory shad.....	51,000	1,520				
Hogfish.....	11,200	248				
Jewfish.....	655,300	2,370				
Kingfish or "king mackerel".....	3,355,700	123,933				
King whiting or "kingfish".....	751,400	11,564	7,200	210	8,400	262
Menhaden.....	139,788,000	372,970				
Mojarra.....	349,000	6,654				
Moonfish.....	5,400	159				
Mullet.....	27,679,600	927,430	3,733,400	108,020	161,100	4,835
Muttonfish.....	233,200	14,446				
Paddletail or spoonbill eat.....			21,300	1,495		
Permit.....	11,800	277				
Pigfish.....	36,600	640				
Pinfish or sailors choice.....	32,500	474				
Pompano.....	641,500	132,419	1,800	338	100	15
Porgies.....	48,500	1,435				
Sea bass.....	42,000	1,940				
Sea catfish.....	70,200	1,324	25,600	590	10,800	216
Shad.....	288,400	23,606				
Sharks.....	2,310,000	13,598				
Sheepshead:						
Fresh-water.....			13,500	675		
Salt-water.....	819,300	21,523	41,400	2,070	33,100	1,824
Skates.....	3,000	15				
Snapper:						
Mangrove.....	194,700	6,895				
Red.....	4,760,900	319,359	1,166,200	83,867	303,800	21,251
Snook or sergeantfish.....	524,000	20,800				
Spadefish.....	10,800	222				
Spanish mackerel.....	6,150,000	276,192	23,300	2,016	700	84
Spot.....	293,900	5,563	35,500	799	1,200	39
Squeteagues or "sea trout":						
Gray.....	400	4				
Spotted.....	3,335,800	214,303	145,500	13,850	210,600	18,955
White.....	89,100	4,020	22,500	726	162,300	6,032
Sturgeon.....	33,500	3,331	3,100	233		
Sunfish.....	980,700	28,536				
Tenpounder.....	434,300	7,986	20,400	408		
Tripletail.....	23,200	357				
Yellowtail.....	109,200	7,808				
Total.....	210,258,900	3,153,575	5,812,800	244,974	1,190,600	66,097
SHELLFISH, ETC.						
Crabs:						
Hard.....	4,526,100	73,806	756,000	11,336	1,434,800	25,201
Soft and peelers.....	1,500	89			1,800	306
Stone.....	46,100	9,316				
Sea crawfish or spiny lobster.....	292,500	21,621				
Shrimp.....	14,037,400	431,812	3,103,800	137,985	23,558,000	1,060,224
Clams:						
Coquina.....	3,700	450				
Hard, public.....	748,100	49,172				
Conchs.....	7,400	553				
Oysters, market:						
Public, spring.....	550,900	31,606	926,100	41,583	12,339,900	542,798
Public, fall.....	380,600	28,379	197,400	15,572	554,200	36,541
Private, spring.....	205,100	9,757	48,800	3,077		
Private, fall.....	143,300	6,993	62,900	5,913		
Scallops, bay.....	118,600	9,499				

See footnotes at end of table.

Fisheries of the South Atlantic and Gulf States, 1937—Continued

CATCH: BY STATES—Continued

Species	Florida		Alabama		Mississippi	
	Pounds	Value	Pounds	Value \$930	Pounds	Value \$48
SHELLFISH, ETC.—continued						
Terrapin, diamond-back			9,300		600	
Turtles:						
Green	10,000	\$400				
Soft-shell	213,800	4,247				
Sponges:						
Grass	21,700	14,003				
Sheepswool	444,000	1,089,367				
Wire	16,200	12,382				
Yellow	149,500	103,953				
Total	21,916,600	1,897,405	5,104,300	216,396	37,889,800	1,665,118
Grand total	232,175,400	5,050,980	10,917,100	461,370	39,079,900	1,731,215

Species	Louisiana		Texas		Total	
	Pounds	Value	Pounds	Value	Pounds	Value
FISH						
Alwolves					6,217,700	\$60,400
Amberjack					60,000	1,118
Angelfish					9,000	240
Bluefish					5,293,800	287,206
Blue runner or hardtail					783,600	9,226
Bonito					3,100	14
Bowfin					8,100	88
Buffalofish	683,600	\$34,782	3,400	\$204	715,900	\$6,636
Butterfish					18,600	376
Cable or crab eater	200	4			2,000	56
Carp					324,200	6,923
Catfish and bullheads	1,592,300	122,370	66,600	3,325	7,067,800	533,617
Cero					200	8
Cigarfish					16,800	341
Crappie					524,100	17,346
Crevalle					195,900	3,576
Croaker	136,600	3,877	82,600	2,181	10,285,500	126,072
Dolphin					3,000	150
Drum:						
Black	165,100	4,620	1,549,000	39,930	1,893,500	49,606
Red or redfish	449,600	28,823	954,500	64,666	3,221,100	164,106
Eels, common					103,700	3,234
Flounders	58,900	4,395	110,600	10,170	997,700	64,378
Garfish	6,200	124			6,200	124
Gizzard shad			19,600	638	37,700	377
Groupers	6,100	244			5,548,500	175,072
Grunts					59,200	1,268
Harvestfish or "starfish"					640,900	10,398
Hickory shad					280,000	6,334
Hogfish					21,400	350
Jewfish	17,000	765	2,700	91	85,000	3,226
Kingfish or "king mackerel"			3,000	107	3,358,700	124,040
King whiting or "kingfish"	25,800	864	3,000	65	1,725,900	39,968
Menhaden					211,358,000	499,251
Mojarra					349,000	6,664
Moonfish					5,400	169
Mullet	10,700	821	6,600	169	36,210,300	1,107,498
Muttonfish					283,200	14,445
Paddlefish or spoonbill cat	49,400	2,834			70,700	4,329
Permit					11,900	277
Pigfish					117,000	1,567
Pike or pickerel					400	14
Pinfish or sailors choice					69,900	1,033
Pompano	800	195	4,600	888	699,800	139,022
Porgies					50,400	1,467
Sea bass					393,700	20,855
Sea catfish	18,800	279	31,300	984	271,700	6,993
Shad					1,817,600	191,550
Sharks					2,556,600	14,520
Sheepshead:						
Fresh-water	590,200	16,183			608,700	16,858
Salt-water	187,000	10,074	41,100	1,241	1,148,700	37,013
Skates					3,000	15
Snapper:						
Mangrove					194,700	6,696
Red	148,100	12,068	1,141,200	78,781	7,522,300	516,326
Snook or sergeantfish			9,200	554	933,200	21,354
Spadefish					61,200	1,383
Spanish mackerel	2,000	200	38,800	2,811	6,433,400	291,933
Spot	3,700	79	12,000	240	5,865,700	104,676

See footnotes at end of table.

Fisheries of the South Atlantic and Gulf States, 1937—Continued

CATCH: BY STATES—Continued

Species	Louisiana		Texas		Total	
	Pounds	Value	Pounds	Value	Pounds	Value
FISH—continued						
Squeteague or "sea trout":						
Gray					7,531,200	\$214,304
Spotted	787,700	\$68,567	2,089,800	\$175,146	7,616,500	577,602
White	199,600	8,193	19,500	552	493,000	19,523
Striped bass					712,900	69,424
Sturgeon					69,500	6,960
Suckers					3,000	36
Sunfish					980,700	28,536
Tenpounder					454,700	8,394
Tripletail	2,000	100			25,200	457
White perch					161,400	6,481
Yellow perch					6,700	262
Yellowtail					109,200	7,308
Total	5,131,300	319,961	6,189,000	383,433	343,669,400	5,648,313
SHELLFISH, ETC.						
Crabs:						
Hard ¹	14,717,100	194,811	921,600	24,577	29,085,600	434,098
Soft and peelers	329,300	50,957			482,700	75,182
Stone					46,100	9,316
Sea crawfish or spiny lobster					292,600	21,621
Shrimp	68,780,900	2,382,540	16,904,800	551,404	141,273,500	5,009,553
Clams:						
Coquina					3,700	450
Hard, public ²					1,186,000	84,006
Conchs					7,400	553
Oysters, market: ³						
Public, spring	1,395,800	78,225	618,000	44,697	16,486,000	772,976
Public, fall	62,900	6,160	571,600	45,934	2,968,400	204,966
Private, spring	4,234,400	325,688			6,145,500	401,946
Private, fall	2,355,000	244,443			4,020,900	314,823
Scallops, bay					180,500	21,179
Terrapin, diamond-back	3,700	400			28,500	2,971
Turtles:						
Green					10,000	400
Snapper					1,500	65
Soft-shell					213,900	4,247
Sponges:						
Grass					21,700	14,003
Sheepswool					444,000	1,089,367
Wire					16,200	12,382
Yellow					149,500	109,953
Total	91,879,100	3,281,224	19,016,000	666,612	203,081,600	8,578,057
Grand total	97,010,400	3,601,185	25,205,000	1,050,045	546,751,000	14,226,370

¹ Statistics on hard crabs used in this table are based on yields of 4.07 pounds per dozen in North Carolina; 6 pounds in South Carolina; 5.71 pounds in Georgia and Alabama; 5.77 pounds in Florida; 5.74 pounds in Mississippi; 5.56 pounds in Louisiana; and 6.12 pounds in Texas.

² Statistics on hard clams used in this table are based on yields of 8 pounds of meats per bushel.

³ Statistics on oysters used in this table are based on yields of 5.52 pounds of meats per bushel in North Carolina; 5.87 pounds in South Carolina; 6.21 pounds in Georgia; 5.49 pounds in Florida; 5.13 pounds in Alabama; 4.95 pounds in Mississippi; 4.09 pounds in Louisiana; and 5.64 pounds in Texas.

NOTE.—The catch for Mississippi includes the following products taken by Mississippi craft in Louisiana waters: Shrimp, 19,064,700 pounds, valued at \$858,027; oysters, market, spring, 8,173,000 pounds of meats, valued at \$351,784; and oysters, market, fall, 219,400 pounds of meats, valued at \$14,315. The seed oyster fishery was prosecuted in this section only in North Carolina where 17 fishermen using 8 sail boats and 14 dredges took 8,000 bushels of seed oysters, valued at \$1,780 from public beds. All of the persons and gear engaged in the seed oyster fishery are duplicated among those fishing for market oysters or other species.

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

Product	North Carolina		South Carolina		Georgia	
	Quantity	Value	Quantity	Value	Quantity	Value
Crabs:						
Hard.....number	9,569,337	\$51,538	2,453,000	\$18,408	4,745,149	\$34,421
Soft and peelers.....do	992,600	22,600	24,900	1,230		
Clams, hard, public.....bushels	53,750	34,343	988	491		
Oysters, market:						
Public, spring.....do	118,822	36,067				
Public, fall.....do	220,779	72,380				
Private, spring.....do	4,493	1,222	255,213	55,117	21,626	7,085
Private, fall.....do	7,618	2,382	223,765	49,601	16,860	5,491
Scallops, bay.....do	8,060	11,680				

Fisheries of the South Atlantic and Gulf States, 1937—Continued

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

Product	Florida		Alabama		Mississippi	
	Quantity	Value	Quantity	Value	Quantity	Value
Crabs:						
Hard.....number.....	9,413,033	\$73,806	1,588,792	\$11,336	2,999,582	\$25,201
Soft and peelers.....do.....	4,600	89			5,400	306
Clams, hard, public.....bushels.....	93,612	49,172				
Oysters, market:						
Public, spring.....do.....	100,346	31,606	180,526	41,583	2,492,909	542,798
Public, fall.....do.....	69,326	28,379	38,480	15,572	111,960	36,541
Private, spring.....do.....	37,359	9,737	9,513	3,077		
Private, fall.....do.....	28,102	6,993	12,261	5,913		
Scallops, bay.....do.....	28,441	9,499				

Product	Louisiana		Texas		Total	
	Quantity	Value	Quantity	Value	Quantity	Value
Crabs:						
Hard.....number.....	31,763,525	\$194,811	1,807,059	\$24,577	64,339,477	\$434,098
Soft and peelers.....do.....	974,728	60,957			2,002,128	75,182
Clams, hard, public.....bushels.....					148,250	84,006
Oysters, market:						
Public, spring.....do.....	341,271	76,225	109,574	44,697	3,343,448	772,976
Public, fall.....do.....	15,379	6,160	101,348	45,934	557,272	204,966
Private, spring.....do.....	1,035,306	325,688			1,363,510	401,946
Private, fall.....do.....	575,795	244,443			862,301	314,823
Scallops, bay.....do.....					36,501	21,179

Industries related to the fisheries of the South Atlantic and Gulf States, 1937

OPERATING UNITS, SALARIES, AND WAGES

Item	North Carolina	South Carolina	Georgia	Florida	Alabama	Mississippi	Louisiana	Texas	Total
Transporting:									
Persons engaged:	Number	Number	Number	Number	Number	Number	Number	Number	Number
On vessels.....	73	111		52	6	6	96		344
On boats.....	4	5		83			116		208
Total.....	77	116		135	6	6	212		552
Vessels:									
Motor.....	43	11		29	3	3	48		137
Net tonnage.....	361	144		357	37	54	423		1,376
Sail.....	1	33							34
Net tonnage.....	6	320							326
Total ves-									
sels.....	44	44		29	3	3	48		171
Total net									
tonnage.....	367	464		357	37	54	423		1,702
Boats.....	2	5		82			58		147
Wholesale and manu-									
facturing:									
Establishments.....	110	21	24	337	25	41	117	50	725
Persons engaged:									
Proprietors.....	119	13	18	370	22	24	102	57	725
Salaried em-									
ployees.....	44	20	30	186	18	63	141	30	532
Wage earners:									
Average for									
season.....	1,828	1,124	1,825	2,457	619	2,564	5,394	1,466	17,277
Average for									
year.....	492	274	422	1,115	179	1,189	1,702	384	5,757
Paid to salaried em-									
ployees.....	\$57,274	\$36,900	\$52,873	\$244,393	\$23,617	\$94,335	\$205,359	\$35,840	\$750,591
Paid to wage earn-									
ers.....	\$274,860	\$113,160	\$174,233	\$657,781	\$94,821	\$523,122	\$1,055,790	\$219,420	\$3,113,186
Total salaries and									
wages.....	\$332,134	\$150,060	\$227,106	\$902,174	\$118,438	\$617,457	\$1,261,139	\$255,260	\$3,863,777
Fishermen manufactur-									
ing.....	628	24	23	433	90	108	40	130	1,476

Industries related to the fisheries of the South Atlantic and Gulf States, 1937—Con.

PRODUCTS MANUFACTURED

Item	North Carolina		South Carolina		Georgia		Florida	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
By manufacturing establishments:								
Alewives:								
Corned.....pounds	3,231,200	\$48,034						
Roe, salted.....do	26,800	795						
Roe, canned, standard cases	12,670	84,931						
Blue runner, salted.....pounds							360,000	\$12,590
Groupers:								
Fresh fillets.....do							128,801	23,756
Fresh steaks.....do							425,900	65,940
Menhaden products:								
Acid scrap.....tons	10,731	208,371			(1)	(1)	8,633	158,394
Dry scrap.....do	3,493	147,510					3,374	148,161
Meal.....do	2,548	108,802					4,639	216,070
Oil.....gallons	839,598	294,443			(1)	(1)	146,806	55,803
Mullet:								
Salted.....pounds	449,500	27,983					654,000	35,290
Roe, salted.....do							30,350	7,338
Snapper, red:								
Fresh fillets.....do							72,000	21,850
Fresh steaks.....do							15,475	3,417
Spanish mackerel, salted.....do	(1)	(1)					80,000	4,630
Spot, salted.....do	63,400	2,536						
Crab meat, packaged, fresh-cooked.....pounds	366,610	121,598	129,143	\$46,709	261,453	\$93,559	556,021	219,633
Sea crawfish meat, packaged, fresh-cooked.....pounds							92,800	36,620
Shrimp:								
Cooked and peeled.....do	(1)	(1)			(1)	(1)		
Canned.....standard cases					118,506	704,489	47,429	302,784
Clams, hard, fresh-shucked.....gallons	23,075	34,622						75,749
Marine-shell novelties								
Oysters:								
Fresh-shucked.....gallons	137,083	125,483	44,371	37,434	10,980	11,945	39,037	49,727
Canned.....standard cases	(1)	(1)	98,872	428,562	(1)	(1)	14,536	60,890
Shell products:								
Poultry feed.....tons			(1)	(1)			(1)	(1)
Lime and dust.....do	645	1,612					(1)	(1)
Scallops, bay, fresh-shucked.....gallons							7,633	17,142
Unclassified products:								
Packaged, fresh and frozen.....pounds	(1)	(1)					434,800	48,590
Salted and smoked.....do	* 31,127	* 3,152					* 25,100	* 1,435
Canned.....standard cases	(1)	(1)			(1)	(1)	723,732	149,050
Miscellaneous.....do	* 231,214	* 67,826			* 151,322	* 95,101	10 51,478	10 250,033
Total.....		1,277,698		512,705		905,094		1,924,882
By fishermen:								
Amberjack, smoked.....pounds							900	225
Alewives, corned.....do	428,500	6,520					200	50
Drum, red, smoked.....do							1,050	237
King whiting, fresh fillets.....do								
Mullet:								
Salted.....do	310,000	18,600	10,000	1,200			358,500	18,060
Smoked.....do							31,450	5,324
Roe, salted.....do							5,000	1,080
Salifish, smoked.....do							10,000	2,200
Shark products:								
Skins.....do							63,408	4,020
Fins.....do							12,100	4,231
Liver oil.....gallons							10,568	4,227
Spanish mackerel, smoked.....pounds							200	75
Spot, salted.....do	150,000	6,000	5,000	350			650	163
Squeteagues, smoked.....do								
Sturgeon roe, salted.....do			54	54	115	115		
Crab meat, packaged, fresh-cooked.....pounds							1,200	468
Clams, hard, fresh-shucked.....gallons	9,800	15,900	740	822			110	165
Oysters, fresh-shucked.....do	1,125	1,125	3,434	3,380	11,239	8,991	36,588	27,101
Scallops:								
Bay, fresh-shucked.....do	7,085	11,680					8,550	6,248
Total.....		59,826		5,807		9,106		83,874
Grand total.....		1,337,523		518,512		914,200		2,008,756

See footnotes at end of table.

Industries related to the fisheries of the South Atlantic and Gulf States, 1937—Con.

PRODUCTS MANUFACTURED—Continued

Item	Alabama		Mississippi		Louisiana		Texas	
	Quantity (¹)	Value (¹)	Quantity (¹)	Value (¹)	Quantity (¹)	Value (¹)	Quantity (¹)	Value (¹)
By manufacturing establishments:								
Groupers:								
Fresh filets..... pounds.....	(¹)	(¹)	(¹)	(¹)				
Fresh steaks..... do.....	(¹)	(¹)						
Mullet:								
Salted..... do.....	918,500	\$47,310	(¹)	(¹)				
Roe, salted..... do.....	5,500	1,210						
Snapper, red:								
Fresh filets..... do.....	(¹)	(¹)	(¹)	(¹)				
Fresh steaks..... do.....	(¹)	(¹)						
Squeteagues, salted..... do.....					20,800	\$3,120		
Crab meat, packaged, fresh-cooked..... pounds.....	71,500	15,958	201,771	\$55,154	1,304,303	368,074	34,680	\$9,056
Shrimp:								
Cooked and peeled								
pounds.....	(¹)	(¹)	473,055	139,584	218,069	71,382	(¹)	(¹)
Canned standard cases.....	45,153	242,911	312,151	1,663,951	702,817	3,862,353	60,295	353,963
Meal..... tons.....					1,334	30,573		
Sun-dried..... pounds.....					1,366,805	250,077		
Oysters:								
Fresh-shucked gallons.....	25,904	34,994	40,412	65,211	259,800	391,306	98,237	138,395
Canned standard cases.....	31,561	132,256	321,964	1,316,064	116,266	462,760		
Shell products:								
Poultry feed..... tons.....	(¹)	(¹)	17,045	62,397	(¹)	(¹)	(¹)	(¹)
Lime and dust..... do.....	(¹)	(¹)	2,945	4,274	(¹)	(¹)	(¹)	(¹)
Unclassified products:								
Packaged, fresh and frozen..... pounds.....	(²)	(²)	(²)	(²)				
Salted and smoked..... do.....			(²)	(²)				
Canned standard cases.....					(²)	(²)		
Miscellaneous.....	74,500	31,315	53,312	8,340	117,484	358,306	75,800	128,478
Total.....		508,954		3,318,575		5,797,951		629,892
By fishermen:								
Crab meat, packaged, fresh-cooked..... pounds.....	35,400	7,780	29,460	7,660			37,268	7,928
Shrimp, sun-dried..... do.....					9,500	1,570		
Oysters, fresh-shucked gallons.....	11,430	11,677	16,810	19,322	1,400	1,616	20,859	24,748
Total.....		19,457		26,982		3,186		32,671
Grand total.....		528,411		3,345,557		5,801,131		662,563

¹ This item has been included under "Unclassified products."
² A small production of oyster-shell poultry feed manufactured in South Carolina has been included with the production of miscellaneous products in Georgia.
³ This item has been included under "Miscellaneous."
⁴ Includes fresh filets of king mackerel, muttonfish, snook, Spanish mackerel, and squeteagues; fresh steaks of cabio and snook; and fresh pan-dressed red drum.
⁵ Includes smoked alewives, and salted bluefish, king whiting roe, and Spanish mackerel filets.
⁶ Includes salted bluefish and tenpounder, and smoked mullet.
⁷ Includes canned hard-clam products, coquina-clam broth, and frog and turtle products.
⁸ Includes fresh filets of croaker, red drum, flounders, sea bass, Spanish mackerel, and squeteagues; frozen filets of bluefish, king whiting, Spanish mackerel, spot, and squeteagues; fresh pan-dressed croaker, red drum, flounders, sea bass, Spanish mackerel, scup, and squeteagues; cooked and peeled shrimp; canned oysters; alewife scrap and oil; and shark hides, fins, and liver oil.
⁹ Includes canned oysters and terrapin products; cooked and peeled shrimp; menhaden acid scrap and oil; and a small quantity of oyster-shell poultry feed which was produced in South Carolina.
¹⁰ Includes oyster-shell poultry feed and lime; and shark dry scrap.
¹¹ Includes fresh filets of groupers, red snapper, Spanish mackerel, and squeteagues; fresh steaks of groupers and red snapper; cooked and peeled shrimp; and oyster-shell poultry feed and lime.
¹² Includes fresh filets of groupers and red snapper; salted mullet; and canned crab and shrimp gumbo.
¹³ Includes canned soft crabs, crab and shrimp gumbo, terrapin products, turtle meat, fish bouillon, crawfish soup, and frog products; and oyster-shell poultry feed and lime.
¹⁴ Includes cooked and peeled shrimp, and oyster-shell poultry feed and lime.

NOTE.—The total value of manufactured products in the South Atlantic and Gulf States was as follows: By manufacturing establishments, \$18,110,658; and by fishermen, \$240,902. 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 except 13 of the persons engaged in the preparation of fishermen's manufactured products have also been included as fishermen, and 312 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.

U. S. BUREAU OF FISHERIES

NORTH CAROLINA

Fisheries of North Carolina, 1937

OPERATING UNITS: BY GEAR

Item	Purse seines		Haul seines		Gill nets				Lines
	Men-haden	Other	Common	Long	Anchor	Drift	Run-around	Stake	Hand
Fishermen:	Number	Number	Number	Number	Number	Number	Number	Number	Number
On vessels.....	347		34	140	173		50		23
On boats and shore:									
Regular.....		12	1,903	322	445	48	686	317	44
Casual.....			339		202	210	100	58	
Total.....	347	12	2,276	462	820	258	836	375	67
Vessels, motor:									
5 to 10 tons.....	5		8	47	58		18		4
11 to 20 tons.....	6								1
21 to 30 tons.....	3								
31 to 40 tons.....	2								
41 to 50 tons.....	3								
51 to 60 tons.....	4								
61 to 70 tons.....	1								
Total.....	24		8	47	58		18		5
Net tonnage.....	700		50	316	357		112		44
Boats:									
Motor.....		4	209	115	250	61	268	182	17
Other.....		2	553	115	88	67	480	95	
Accessory boats.....	61		5	47			9		4
Apparatus:									
Number.....	24	2	585	81	2,047	128	565	5,994	117
Length, yards.....	5,887	400	111,425	80,500	1,010,040	182,340	380,110	429,930	
Square yards.....									
Hooks, baits, or snoods.....									134

Item	Lines—Continued			Pound nets	Wheels	Fyke nets	Dip nets	Otter trawls	
	Troll	Trot with baits or snoods	Trot with hooks					Fish	Shrimp
Fishermen:	Number	Number	Number	Number	Number	Number	Number	Number	Number
On vessels.....								3	127
On boats and shore:									
Regular.....	32	997		456		13	310		301
Casual.....		160	31	211	10	35	189		
Total.....	32	1,057	31	667	10	48	499	3	428
Vessels, motor:									
5 to 10 tons.....								1	47
11 to 20 tons.....									2
Total.....								1	49
Net tonnage.....								17	306
Boats:									
Motor.....	16	141	6	320	2	25			145
Other.....		422	9	109	4	8	170		
Apparatus:									
Number.....	32	673	15	3,083	10	557	460	1	194
Yards at mouth.....								20	3,247
Hooks, baits, or snoods.....	32	442,900	2,450						

Fisheries of North Carolina, 1937—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Pots			Spears	Dredges, oyster	Tongs, oyster	Rakes, other than for oysters	By hand, oyster	Total, exclu- sive of dupli- cation
	Eel	Fish	Turtle						
	Number	Number	Number	Number	Number	Number	Number	Number	Number
Fishermen:					171	4			900
On vessels									
On boats and shore:				237	204	116	691	108	3,759
Regular	22			80	8		417	10	1,980
Casual	24	12	4						
Total	46	12	4	317	383	120	1,108	118	6,619
Vessels:									
Motor:									
5 to 10 tons					1	1			130
11 to 20 tons									10
21 to 30 tons									3
31 to 40 tons									2
41 to 50 tons									3
51 to 60 tons									14
61 to 70 tons									1
Total					1	1			153
Net tonnage					6	6			1,549
Sail:									
5 to 10 tons					47				47
11 to 20 tons					12				12
21 to 30 tons					2				2
Total					61				61
Net tonnage					549				549
Total vessels					62	1			214
Total net tonnage					555	6			2,098
Boats:									
Motor	35		2		79	4			1,359
Other	5	12		279	32	112	461	69	1,818
Accessory boats									122
Apparatus:									
Number	1,412	54	68	317	296	120	1,108		
Yards at mouth					286				

CATCH: BY GEAR

Species	Purse seines				Haul seines			
	Menhaden		Other		Common		Long	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives					518,200	\$5,199		
Bluefish					264,200	13,210	331,500	\$16,878
Bonito					900	14		
Bowfin					1,200	12		
Butterfish					3,600	107		
Carp					88,000	1,760		
Catfish and bullheads					52,800	1,097		
Cero					200	8		
Croaker					766,700	9,133	3,422,200	37,457
Drum:								
Black					27,400	876		4,900
Red or redfish					333,300	12,696		48,600
Eels, common					400	9		
Flounders					76,200	3,810	18,400	920
Gizzard shad					21,300	213		
Harvestfish or "starfish"					102,400	1,789	27,400	417
Hickory shad					30,500	847		60
Hogfish								2,000
King whiting or "kingfish"					79,900	2,307		155,400
Menhaden	61,326,000	\$218,147					358,000	1,399
Mullet			8,000	\$240	1,868,900	67,147	8,600	198
Pigfish					48,100	624	14,000	140
Pinfish or sailors choice					37,000	555	400	4
Pompano					31,700	3,227	100	15
Shad					68,300	10,405	1,000	150

Fisheries of North Carolina, 1937—Continued

CATCH: BY GEAR—Continued

Species	Purse seines				Haul seines			
	Menhaden		Other		Common		Long	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Sheepshead					12, 600	\$393	1, 000	\$40
Spadefish					37, 300	1, 100	3, 100	61
Spanish mackerel					23, 200	1, 160		
Spot					2, 829, 800	53, 763	1, 066, 400	13, 947
Squeteagues or "sea trout":								
Gray					305, 200	7, 938	1, 825, 600	53, 503
Spotted					345, 300	28, 710	323, 900	25, 881
Striped bass			55, 000	\$5, 500	139, 300	13, 472	59, 000	5, 900
Sturgeon							400	40
White perch					72, 400	2, 825		
Yellow perch					2, 200	88		
Crabs, soft and peelers					92, 800	14, 632		
Shrimp					2, 000	60		
Total	61, 326, 000	\$218, 147	63, 000	5, 740	8, 283, 800	259, 476	7, 699, 900	162, 068

Species	Gill nets							
	Anchor		Drift		Runaround		Stake	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives			47, 000	\$470			41, 800	\$452
Bluefish	34, 500	1, 725			670, 200	\$33, 510	311, 100	15, 055
Bowfin	300	3			200		200	2
Carp	11, 500	230	300	6	2, 200	44	42, 600	852
Croaker	2, 358, 600	33, 533			29, 500	295	874, 500	11, 701
Drum:								
Black							200	6
Red or redfish					23, 300	466	8, 900	356
Hickory shad	6, 100	61					1, 200	12
Hickory shad	29, 300	878	1, 000	30			29, 800	822
King whiting or "kingfish"	400, 500	11, 945					2, 600	78
Mullet	6, 300	189			2, 056, 800	65, 450	24, 300	729
Piefish					700	7		
Pompano					18, 500	1, 880		
Shad	130, 100	19, 803	34, 600	5, 218			102, 500	15, 008
Sharks	231, 600	772						
Spanish mackerel					135, 500	6, 775	5, 500	275
Spot					884, 800	16, 768	441, 300	6, 012
Squeteagues or "sea trout":								
Gray	2, 055, 900	75, 814					358, 000	13, 289
Spotted	23, 200	2, 008			124, 500	10, 600	34, 300	2, 751
Striped bass	96, 200	9, 358	1, 100	110			56, 200	5, 538
Sturgeon	100	10					100	10
Suckers	800	4					800	4
White perch	18, 600	747	3, 000	120			18, 700	751
Total	5, 634, 700	159, 427	87, 000	5, 954	3, 946, 000	135, 795	2, 354, 600	74, 283

Species	Lines							
	Hand		Troll		Trot with baits or snoods		Trot with hooks	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Catfish and bullheads							26, 000	\$560
Sea bass	117, 700	\$5, 735						
Spanish mackerel			6, 400	\$320				
Crabs, hard					3, 229, 400	\$51, 395		
Total	117, 700	5, 735	6, 400	320	3, 229, 400	51, 395	26, 000	560

Fisheries of North Carolina, 1937—Continued

CATCH: BY GEAR—Continued

Species	Pound nets		Wheels		Fyke nets		Dip nets	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives.....	4, 876, 900	\$48, 960	30, 500	\$305	53, 200	\$538	19, 000	\$190
Bluefish.....	45, 500	1, 936						
Bowfin.....	200	2			1, 200	19		
Butterfish.....	9, 800	263						
Carp.....	73, 600	1, 491			105, 200	2, 524		
Catfish and bullheads.....	294, 500	8, 387			289, 700	8, 228		
Croaker.....	2, 508, 500	25, 800						
Drum:								
Black.....	2, 100	21						
Red or redfish.....	26, 600	532						
Eels, common.....	500	24			200	4		
Flounders.....	133, 900	6, 695						
Gizzard shad.....	6, 700	67			2, 400	24		
Harvestfish or "starfish".....	511, 100	8, 162						
Hickory shad.....	66, 900	1, 650			800	24		
Hogfish.....	8, 200	82						
King whiting or "kingfish".....	9, 300	240						
Menhaden.....	24, 000	85						
Mullet.....	3, 000	90						
Pigfish.....	17, 600	176						
Pike or pickerel.....	200	6			200	8		
Pompano.....	300	45						
Shad.....	361, 900	54, 967						
Sheepshead.....	200	8						
Spanish mackerel.....	48, 000	2, 400						
Spot.....	47, 400	705						
Squeteagues or "sea trout":								
Gray.....	2, 972, 400	63, 185						
Spotted.....	49, 900	3, 751						
Striped bass.....	288, 700	27, 826			17, 400	1, 720		
Suckers.....	300	6			1, 100	22		
White perch.....	18, 900	854	1, 800	72	10, 000	390		
Yellow perch.....	700	28			3, 800	148		
Crabs, soft and peelers.....							49, 000	7, 768
Shrimp.....	41, 500	1, 245						
Total.....	12, 448, 200	259, 707	32, 300	377	465, 200	13, 649	68, 000	7, 958

Species	Otter trawls		Pots		Spears	
	Pounds	Value	Pounds	Value	Pounds	Value
Carp.....			800	\$16		
Catfish and bullheads.....		1	10, 300	206		
Croaker.....	28, 000	\$430				
Eels, common.....			90, 000	2, 502	95, 000	\$4, 760
Flounders.....	80, 300	4, 015				
King whiting or "kingfish".....	75, 400	2, 262				
Squeteagues or "sea trout," gray.....	8, 000	320				
White perch.....	16, 200	143	18, 000	720		
Crabs, hard.....						
Shrimp.....	4, 140, 500	124, 197	1, 500	65		
Turtles, snapper.....						
Total.....	4, 348, 400	131, 367	120, 600	3, 509	95, 000	4, 760

Species	Dredges		Tongs		Rakes		By hand	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Clams, hard, public.....					430, 000	\$34, 243		
Oysters, market:								
Public, spring.....	590, 700	\$32, 222	43, 700	\$2, 665			21, 500	\$1, 180
Public, fall.....	1, 104, 000	64, 687	85, 700	6, 322			29, 000	1, 371
Private, spring.....	11, 500	431	13, 300	791				
Private, fall.....	20, 100	780	21, 400	1, 602				
Scallops, bay.....					61, 900	11, 680		
Total.....	1, 26, 800	98, 120	164, 100	11, 380	491, 900	46, 023	50, 500	2, 551

Fisheries of North Carolina, 1937—Continued

OPERATING UNITS: BY COUNTIES

Item	Beaufort	Bertie	Brunswick	Camden	Currituck	Chowan	Craven
	Number	Number	Number	Number	Number	Number	Number
Fishermen:							
On vessels.....	106		122		527		
On boats and shore:							
Regular.....	160		433		1,302		39
Casual.....	70	45	94	17	544	162	16
Total.....	336	45	649	17	2,373	162	55
Vessels:							
Motor:							
5 to 10 tons.....	1		21		75		
11 to 20 tons.....			2		7		
21 to 30 tons.....					3		
31 to 40 tons.....					2		
41 to 50 tons.....			2		1		
51 to 60 tons.....					4		
61 to 70 tons.....			1				
Total.....	1		26		92		
Net tonnage.....	9		326		992		
Sail:							
5 to 10 tons.....	30				4		
11 to 20 tons.....	7				3		
21 to 30 tons.....	2						
Total.....	39				7		
Net tonnage.....	355				78		
Total vessels.....	40		26		99		
Total net tonnage.....	364		326		1,070		
Boats:							
Motor.....	52	13	78	3	329	67	11
Other.....	69	2	151	12	692	7	15
Accessory boats.....	1		9		91		
Apparatus:							
Purse seines, menhaden.....			3		21		
Length, yards.....			850		5,007		
Haul seines:							
Common.....	6	2	24		342	1	8
Length, yards.....	1,200	2,000	5,000		42,575	360	1,600
Long.....	4				30		
Length, yards.....	3,800				30,000		
Gill nets:							
Anchor.....			30	50	115	206	
Square yards.....			8,400	5,000	250,500	72,100	
Drift.....			11				
Square yards.....			4,400				
Runaround.....	44		111		92		6
Square yards.....	16,600		29,400		67,250		5,800
Stake.....	272			82	1,491		540
Square yards.....	14,700			5,740	105,650		32,400
Lines:							
Hand.....					17		
Hooks.....					34		
Troll.....					32		
Hooks.....					32		
Trot with baits or snoods.....	124		44		160		
Baits or snoods.....	89,500		16,600		125,200		
Pound nets.....	77	150			105	920	19
Fyke nets.....				30			
Dip nets.....					425		
Otter trawls, shrimp.....	4		61		115		
Yards at mouth.....	38		1,197		1,787		
Pots, eel.....	55						
Spears.....			95		37		
Dredges, oyster.....	102				16		
Yards at mouth.....	117				17		
Tongs, oyster.....					43		
Rakes, other than for oysters.....			6		1,090		

Fisheries of North Carolina, 1937—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Currituck	Dare	Gates	Hertford	Hyde	Martin	New Hanover
	Number	Number	Number	Number	Number	Number	Number
Fishermen:							
On vessels.....		46			9		
On boats and shore:							
Regular.....	110	723			201		182
Casual.....	84	2	8	38		123	246
Total.....	194	771	8	38	210	123	428
Vessels:							
Motor, 5 to 10 tons.....		16			1		
Net tonnage.....		96			5		
Sail, 5 to 10 tons.....					2		
Net tonnage.....					14		
Total vessels.....		16			3		
Total net tonnage.....		96			19		
Boats:							
Motor.....	70	281	3	10	81	17	43
Other.....	65	187	3	6	56	42	185
Accessory boats.....		8					
Apparatus:							
Purse seines, other than for men-							
haden.....		2					
Length, yards.....		400					
Haul seines:							
Common.....	47	54		6	6	2	24
Length, yards.....	14,810	25,000		1,200	1,650	1,200	3,060
Long.....		21					
Length, yards.....		21,000					
Gill nets:							
Anchor.....	165	544	3	2	6		
Square yards.....	25,300	211,940	600	600	12,800		
Drift.....			2	7		9	92
Square yards.....			400	1,400		9,200	128,800
Runaround.....		50			19		88
Square yards.....		139,000			16,000		17,300
Stake.....	60	2,170			462		68
Square yards.....	4,800	129,400			48,400		5,440
Lines:							
Hand.....							24
Hooks.....							24
Trot with baits or snoods.....	6	7			38		77
Baits or snoods.....	0,000	7,000			24,800		25,500
Trot with hooks.....						12	3
Hooks.....						650	1,800
Pound nets.....	11	1,198	14	32	195		
Wheels.....						10	
Fyke nets.....	265					30	
Dip nets.....	10						
Pots:							
Eel.....	1,185	120					
Fish.....						54	
Turtle.....	68						80
Spears.....		30			10		
Dredges, oyster.....					37		
Yards at mouth.....					39		
Tongs, oyster.....					3		
Rakes, other than for oysters.....							12

Fisheries of North Carolina, 1937—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Onslow	Pamlico	Pasquotank	Pender	Perquimans	Tyrrell	Washington
Fishermen:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
On vessels.....	14	73	3				
On boats and shore:							
Regular.....	180	257	23	127	8	14	
Casual.....	138		32	45	75	108	110
Total	332	330	58	172	83	122	110
Vessels:							
Motor:							
5 to 10 tons.....	4	12					
11 to 20 tons.....			1				
Total	4	12	1				
Net tonnage.....	28	76	17				
Sail:							
5 to 10 tons.....		11					
11 to 20 tons.....		2					
Total		13					
Net tonnage.....		102					
Total vessels.....	4	25	1				
Total net tonnage.....	28	178	17				
Boats:							
Motor.....	33	113	16	2	30	53	34
Other.....	128	54	5	52	25	43	18
Accessory boats.....	2	11					
Apparatus:							
Haul seines:							
Common.....	31	6	5	17	2		2
Length, yards.....	4,610	1,200	1,100	3,040	200		1,600
Long.....		26					
Length, yards.....		25,700					
Gill nets:							
Anchor.....	15		180		415	106	200
Square yards.....	30,200		55,000		186,000	63,600	88,000
Drift.....						3	4
Square yards.....						4,500	2,600
Runaround.....	109	24	1	21			
Square yards.....	54,560	28,800	2,200	3,200			
Stake.....		405	32		12	400	
Square yards.....		32,400	2,400		1,200	48,400	
Lines:							
Hand.....	76						
Hooks.....	76						
Trot with baits or snoods.....	115	60		12			
Baits or snoods.....	60,700	81,600		6,000			
Pound nets.....		102	10		96	78	76
Fyke nets.....			44		42	176	
Dip nets.....							4
Otter trawls:							
Fish.....			1	20			
Yards at mouth.....							
Shrimp.....	1	13					
Yards at mouth.....	14	211					
Pots, eel.....			15		22		15
Spears.....	25			40			
Dredges, oyster.....		141					
Yards at mouth.....		113					
Tongs, oyster.....	60	14					

CATCH: BY COUNTIES

Species	Beaufort		Bertie		Brunswick		Camden	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives.....	49,700	\$497	1,108,000	\$11,080			9,300	\$144
Bluefish.....					68,000	\$3,400		
Bowfin.....							400	4
Carp.....	68,200	1,364					4,400	88
Catfish and bullheads.....	21,700	217	17,100	342			4,500	180
Croaker.....	143,100	1,431			34,100	341		
Drum, red or redfish.....	3,300	44			1,300	26		
Eels, common.....	15,600	468						
Flounders.....	9,700	485			46,600	2,330		
Gizzard shad.....							1,200	12

Fisheries of North Carolina, 1937—Continued

CATCH: BY COUNTIES—Continued

Species	Beaufort		Bertie		Brunswick		Camden	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Harvestfish or "starfish".....	47, 100	\$706						
Hickory shad.....	2, 100	42					2, 400	\$72
King whiting or "kingfish".....					42, 700	\$1, 281		
Menhaden.....					15, 135, 000	54, 864		
Mullet.....	87, 300	2, 920			858, 200	31, 688	3, 000	90
Shad.....	24, 500	3, 920	14, 800	\$2, 220	7, 300	1, 168	1, 200	184
Spadefish.....	200	3						
Spanish mackerel.....	3, 000	150						
Spot.....	3, 000	45			472, 000	11, 800		
Squeteagues or "sea trout":								
Gray.....	298, 400	9, 252						
Spotted.....	46, 200	3, 696			3, 800	342		
Striped bass.....	59, 500	4, 780	11, 500	1, 150			8, 800	714
Suckers.....							1, 600	8
White perch.....	10, 900	436	8, 100	338			1, 100	55
Yellow perch.....							100	5
Crabs, hard.....	1, 140, 000	17, 100			132, 000	2, 640		
Shrimp.....	63, 600	1, 908			2, 061, 600	61, 713		
Clams, hard, public.....					3, 200	364		
Oysters, market:								
Public, spring.....	273, 900	16, 529			4, 400	345		
Public, fall.....	527, 100	32, 010						
Total.....	2, 898, 100	98, 003	1, 159, 500	15, 125	18, 870, 200	172, 302	38, 000	1, 586

Species	Carteret		Chowan		Craven		Currituck	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives.....	3, 000	\$30	3, 318, 200	\$33, 182	3, 800	\$57	6, 200	\$94
Bluefish.....	1, 071, 000	53, 550						
Bonito.....	900	14					1, 100	11
Bowfin.....								
Butterfish.....	200	4						
Caro.....			3, 200	63	3, 400	68	111, 800	2, 236
Catfish and bullheads.....	300	12	47, 300	946	2, 000	40	25, 800	878
Cero.....	200	8						
Croaker.....	2, 789, 300	42, 714			192, 700	2, 879	2, 200	33
Drum								
Black.....	27, 400	876						
Red or redfish.....	293, 800	11, 696						
Eels, common.....							64, 200	1, 664
Flounders.....	52, 000	2, 600					2, 100	105
Gizzard shad.....							23, 000	280
Harvestfish or "starfish".....	46, 600	932						
Hickory shad.....	34, 800	696	8, 000	240	7, 200	144	500	15
King whiting or "kingfish".....	487, 300	14, 622					8, 000	160
Menhaden.....	46, 541, 000	164, 551						
Mullet.....	1, 560, 000	46, 800			46, 600	1, 864	1, 100	33
Pinfish.....	17, 600	263						
Pinfish or sailors choice.....	37, 000	555						
Pompano.....	26, 600	2, 662						
Sea bass.....	54, 500	2, 575						
Shad.....	4, 200	630	43, 100	6, 350	600	90	24, 800	3, 835
Sharks.....	231, 600	772						
Sheepshead.....	11, 100	333						
Spadefish.....	35, 400	1, 062						
Spanish mackerel.....	128, 600	6, 430						
Spot.....	1, 748, 200	26, 218						
Squeteagues or "sea trout":								
Gray.....	2, 683, 200	103, 358					2, 000	60
Spotted.....	132, 000	11, 880			22, 200	1, 776	200	18
Striped bass.....			9, 800	980	1, 100	110	83, 500	8, 532
White perch.....	1, 600	24	3, 300	165			48, 900	1, 920
Yellow perch.....							3, 400	136
Crabs:								
Hard.....	602, 100	9, 329					94, 800	1, 213
Soft and peelers.....	132, 600	21, 220					9, 200	1, 390
Shrimp.....	1, 956, 000	58, 677						
Clams, hard, public.....	424, 400	33, 799						
Oysters, market:								
Public, spring.....	87, 500	3, 497						
Public, fall.....	156, 000	6, 494						
Private, spring.....	11, 500	431						
Private, fall.....	20, 100	780						
Scallops, bay.....	61, 900	11, 680						
Turtles, snapper.....							1, 500	65
Total.....	61, 871, 500	641, 774	3, 432, 900	41, 926	279, 600	7, 028	513, 800	22, 618

Fisheries of North Carolina, 1937—Continued

CATCH: BY COUNTIES—Continued

Species	Dare		Gates		Hertford		Hyde	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alewives	82,500	\$987	110,000	\$1,100	300,000	\$3,000		
Bluefish	336,200	16,471					93,000	\$4,150
Bowfin	200	2						
Butterfish	10,100	304						
Carp	53,200	1,064						
Catfish and bullheads	8,900	288			5,000	100		
Croaker	3,294,000	35,476					1,081,400	10,814
Drum:								
Black	7,000	70						
Red or redfish	75,700	1,544					5,000	100
Eels, common	8,100	328						
Flounders	122,200	6,110					10,200	510
Gizzard shad	222,400	4						
Harvestfish or "starfish"	222,600	3,860					141,000	2,116
Hickory shad	70,100	2,103						
Hogfish	10,200	102						
King whiting or "kingfish"	89,800	2,704						
Menhaden	30,000	116						
Mullet	99,400	2,979					37,500	1,125
Pigfish	14,100	197						
Pinfish or sailors choice	400	4						
Pompano	20,700	2,175						
Shad	382,800	58,573	3,300	495	7,100	1,065	3,500	560
Sheepshead	1,500	60						
Spadefish	4,800	96						
Spanish mackerel	57,400	2,870					15,300	765
Spot	325,000	4,875					60,600	908
Squeteagues or "sea trout":								
Gray	2,336,800	54,385					1,005,500	20,290
Spotted	428,600	36,051					19,200	1,536
Striped bass	367,100	36,697	2,000	200	3,500	350	1,500	120
Sturgeon	600	60						
Suckers	300	6						
White perch	23,100	949	800	40				
Yellow perch					200	6		
Crabs, hard	56,800	849					360,000	5,249
Shrimp	33,400	1,002					4,700	141
Oysters, market:								
Public, spring							43,700	2,622
Public, fall							62,600	3,906
Total	8,573,800	273,381	116,100	1,835	315,800	4,521	2,934,700	54,912

Species	Martin		New Hanover		Onslow	
	Pounds	Value	Pounds	Value	Pounds	Value
Alewives	109,500	\$1,095				
Bluefish			1,000	\$50		
Carp	1,400	28				
Catfish and bullheads	34,300	686	2,000	80		
Croaker			12,000	120	38,900	\$369
Drum, red or redfish					6,600	132
Flounders			16,000	800	38,100	1,905
King whiting or "kingfish"					76,100	2,283
Mullet			257,600	10,304	408,300	12,249
Sea bass			12,200	610	51,000	2,550
Shad	1,200	180	27,200	4,080		
Spot			709,600	17,730	602,500	9,036
Squeteagues or "sea trout":						
Gray					30,000	900
Spotted					72,800	5,824
Striped bass	1,000	80				
White perch	25,300	1,012				
Crabs, hard			120,100	2,402	240,300	4,806
Shrimp					12,000	480
Clams, hard, public			2,400	180		
Oysters, market:						
Public, spring			9,600	360	37,600	2,264
Public, fall			20,000	771	60,400	4,528
Private, spring					13,300	791
Private, fall					21,400	1,602
Total	172,700	3,081	1,189,700	37,487	1,707,300	49,719

Fisheries of North Carolina, 1937—Continued

CATCH: BY COUNTIES—Continued

Species	Pamlico		Pasquotank		Pender	
	Pounds	Value	Pounds	Value	Pounds	Value
Alewives.....	4,000	\$60	8,500	\$85	-----	-----
Bluefish.....	87,800	4,390	-----	-----	-----	-----
Bowfin.....	-----	-----	500	5	-----	-----
Butterfish.....	3,100	62	-----	-----	-----	-----
Carp.....	-----	-----	6,000	120	-----	-----
Catfish and bullheads.....	-----	-----	169,400	5,082	-----	-----
Croaker.....	2,362,600	23,626	39,600	546	-----	-----
Drum:	-----	-----	-----	-----	-----	-----
Black.....	-----	-----	200	6	-----	-----
Red or redfish.....	25,300	253	8,900	356	21,300	\$626
Eels, common.....	-----	-----	900	21	-----	-----
Flounders.....	44,800	2,240	30,200	1,510	22,200	1,110
Gizzard shad.....	-----	-----	6,300	63	-----	-----
Harvestfish or "starfish".....	183,600	2,754	-----	-----	-----	-----
Hickory shad.....	-----	-----	8,000	239	4,700	94
King whiting or "kingfish".....	4,600	138	13,600	408	-----	-----
Mullet.....	49,200	1,476	2,400	72	554,400	22,176
Pigfish.....	14,000	140	30,500	305	-----	-----
Pike or pickerel.....	-----	-----	200	8	-----	-----
Pompano.....	3,300	330	-----	-----	-----	-----
Shad.....	12,200	1,830	44,000	6,600	-----	-----
Sheepshead.....	1,200	48	-----	-----	-----	-----
Spanish mackerel.....	14,300	715	-----	-----	-----	-----
Spot.....	657,100	6,771	4,400	66	687,300	13,746
Squeteagues or "sea trout":	-----	-----	-----	-----	-----	-----
Gray.....	1,248,400	24,968	19,200	768	-----	-----
Spotted.....	154,000	10,780	1,500	150	19,700	1,576
Striped bass.....	-----	-----	28,800	2,592	-----	-----
Suckers.....	-----	-----	1,100	22	-----	-----
White perch.....	-----	-----	500	25	-----	-----
Crabs, hard.....	450,000	6,750	-----	-----	60,000	1,200
Shrimp.....	50,700	1,521	-----	-----	2,000	60
Oysters, market:	-----	-----	-----	-----	-----	-----
Public, spring.....	194,200	10,150	-----	-----	5,000	300
Public, fall.....	388,600	24,421	-----	-----	4,000	250
Total.....	5,953,000	123,423	424,700	19,049	1,380,600	41,188

Species	Perquimans		Tyrrell		Washington	
	Pounds	Value	Pounds	Value	Pounds	Value
Alewives.....	136,000	\$1,360	181,000	\$1,810	388,000	\$3,880
Bowfin.....	700	14	200	2	-----	-----
Carp.....	6,900	118	48,000	1,380	18,700	394
Catfish and bullheads.....	202,100	6,563	85,900	2,504	27,000	590
Eels, common.....	1,100	22	-----	-----	1,200	36
Flounders.....	9,500	475	200	10	-----	-----
Gizzard shad.....	4,400	44	2,400	24	-----	-----
Hickory shad.....	7,500	225	1,800	54	13,200	396
Mullet.....	8,200	246	700	21	-----	-----
Pigfish.....	-----	-----	4,200	42	-----	-----
Pike or pickerel.....	200	6	-----	-----	-----	-----
Shad.....	49,200	7,245	22,400	3,360	25,200	3,766
Squeteagues or "sea trout":	-----	-----	-----	-----	-----	-----
Gray.....	-----	-----	1,600	48	-----	-----
Spotted.....	-----	-----	900	72	-----	-----
Striped bass.....	29,100	2,549	82,300	8,230	23,400	2,340
White perch.....	2,500	125	20,300	797	15,000	600
Yellow perch.....	-----	-----	2,500	95	500	20
Total.....	456,400	18,992	454,400	18,449	512,200	11,992

SEED OYSTER FISHERY: BY GEAR

Item	Oyster dredges	
OPERATING UNITS		
Fishermen, on boats and shore, regular.....	Number	
Boats, sail.....	17	
Apparatus, number.....	8	
Yards at mouth.....	14	
CATCH		
Oysters, seed, public, spring.....	Bushels	Value
	8,000	\$1,760

NOTE.—Of the persons and gear employed in the seed oyster fishery all fishermen and boats are duplicated among those in the market oyster fishery or fisheries for other species. The seed oyster fishery in North Carolina is confined to Hyde County.

SOUTH CAROLINA

Fisheries of South Carolina, 1937

OPERATING UNITS: BY GEAR

Item	Haul seines	Gill nets				Lines		Cast nets
		Anchor	Drift	Run-around	Stake	Hand	Trot with baits or snoods	
Fishermen:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
On vessels.....						24		
On boats and shore:						46		
Regular.....	70			60		28	161	23
Casual.....	76	255	64	30	34	29	12	2
Total	146	255	64	90	34	99	178	25
Vessels:								
Motor, 5 to 10 tons.....						3		
Net tonnage.....						26		
Sail, 11 to 20 tons.....						1		
Net tonnage.....						12		
Total vessels						4		
Total net tonnage						38		
Boats:								
Motor.....		2		13		11		
Other.....	37	150	33	51	17	17	98	20
Accessory boats.....						12		
Apparatus:								
Number.....	39	195	33	51	17	123	98	25
Length, yards.....	5,920							
Square yards.....		139,900	40,060	22,730	11,304			
Hooks, baits, or snoods.....						222	49,200	

Item	Otter trawls		Pots, fish	Spears	Dredges, oyster	Grabs	By hand		Total, exclusive of duplication
	Fish	Shrimp					Oyster	Other	
Fishermen:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
On vessels.....	3	27			3				52
On boats and shore:									
Regular.....		62		70		135	238	5	635
Casual.....			12	25			87	26	613
Total	3	89	12	95	3	135	325	31	1,300
Vessels, motor:									
5 to 10 tons.....	1	7			1				11
11 to 20 tons.....		1							1
21 to 30 tons.....		2							2
Total	1	10			1				14
Net tonnage.....	10	126			6				158
Sail, 11-20 tons.....									1
Net tonnage.....									12
Total vessels	1	10			1				15
Total net tonnage	10	126			6				170
Boats:									
Motor.....		29							55
Other.....			6	70		135	147	11	668
Accessory boats.....									12
Apparatus:									
Number.....	1	39	76	95	1	135			
Yards at mouth.....	23	795			2				

Fisheries of South Carolina, 1937—Continued

CATCH: BY GEAR

Species	Haul seines		Gill nets							
			Anchor		Drift		Runaround			
			Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Bluefish.....	1,500	\$120					1,200	\$96		
Drum:										
Black.....	28,000	1,000						6,000	280	
Red or reddfish.....	70,000	3,120						48,500	3,135	
Flounders.....							1,200	\$18		
Hickory shad.....										
King whiting or "kingfish".....	61,000	1,740								
Mullet.....	462,000	16,250						166,000	6,000	
Shad.....	800	150	68,800	\$16,652	20,900	4,920				
Sheepshead.....								5,000	100	
Spot.....	208,500	5,515						36,500	1,140	
Squeteagues or "sea trout":										
Gray.....	51,000	4,570						3,500	245	
Spotted.....								17,500	1,660	
Sturgeon.....					24,700	2,027				
Terrapin, diamond-back.....	4,900	493								
Total.....	885,700	\$2,958	68,800	16,652	46,800	6,965	287,700	12,806		

Species	Gill nets—Continued		Lines				Cast nets		
	Stake		Hand		Trot with baita or snoods				
	Pounds	Value	Pounds	Value	Pounds	Value			Pounds	Value
Bluefish.....			27,100	\$2,147					
Grunts.....			5,000	150					
Hickory shad.....	4,100	\$84							
King whiting or "kingfish".....			42,000	2,100					
Sea bass.....			233,200	13,100					
Sea catfish.....			120,000	3,600					
Shad.....	47,100	8,028							
Sharks.....			15,000	150					
Squeteagues or "sea trout,"									
spotted.....			12,500	1,000					
Crabs, hard.....					1,226,500	\$18,408			
Shrimp.....							49,000	\$1,470	
Total.....	51,200	8,112	454,800	22,247	1,226,500	18,408	49,000	1,470	

Species	Otter trawls		Pots		Spears	
	Pounds	Value	Pounds	Value	Pounds	Value
Butterfish.....	200	\$5				
Catfish and bullheads.....			51,000	\$1,865		
Croaker.....	900	16				
Flounders.....	19,900	2,055			35,300	\$2,968
King whiting or "kingfish".....	3,400	52				
Porgies.....	1,900	32				
Sea bass.....	800	80				
Squeteagues or "sea trout," gray.....	2,200	26				
Shrimp.....	1,151,700	\$4,551				
Total.....	1,181,000	36,818	51,000	1,865	35,300	2,968

Species	Dredges		Grabs		By hand	
	Pounds	Value	Pounds	Value	Pounds	Value
Crabs, soft and peelers.....					8,300	\$1,230
Clams, hard, public.....					7,900	491
Oysters, market:						
Private, spring.....	25,300	\$949	860,800	\$32,471	612,000	21,697
Private, fall.....	17,800	670	751,600	28,337	544,100	20,594
Total.....	43,100	1,619	1,612,400	\$60,808	1,172,300	44,012

Fisheries of South Carolina, 1937—Continued

OPERATING UNITS: BY COUNTIES

Item	Beaufort	Charleston	Colleton	Georgetown	Horry	Jasper
Fishermen:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
On vessels.....	5	45		2		
On boats and shore:						
Regular.....	295	209			34	27
Casual.....	103	117	66	256	71	
Total.....	403	371	66	328	105	27
Vessels:						
Motor:						
5 to 10 tons.....	2	8		1		
11 to 20 tons.....		1				
21 to 30 tons.....		2				
Total.....	2	11		1		
Net tonnage.....	15	134		9		
Sail, 11 to 20 tons.....		1				
Net tonnage.....		12				
Total vessels.....	2	12		1		
Total net tonnage.....	15	146		9		
Boats:						
Motor.....	13	21		18	2	1
Other.....	242	181	33	148	45	16
Accessory boats.....		12				
Apparatus:						
Haul seines.....	2	5		17	15	
Length, yards.....	400	600		2,140	2,780	
Gill nets:						
Anchor.....	49	52	53	41		
Square yards.....	7,350	34,550	34,800	63,200		
Drift.....			4	29		
Square yards.....			2,350	37,700		
Runaround.....	1	4		33	12	1
Square yards.....	600	1,370		17,160	3,000	600
Stake.....				9	8	
Square yards.....				9,064	2,220	
Lines:						
Hand.....		99		9	15	
Hooks.....		150		27	45	
Trot with baits or snoods.....	58	40				
Baits or snoods.....	30,400	18,800				
Cast nets.....		25				
Otter trawls:						
Fish.....	1					
Yards at mouth.....	23					
Shrimp.....	14	18		7		
Yards at mouth.....	280	386		129		
Pots, fish.....	50			26		
Spears.....	35	10		45	5	
Dredges, oyster.....		1				
Yards at mouth.....		2				
Grabs.....	78	57				

Fisheries of South Carolina, 1937—Continued

CATCH: BY COUNTIES

Species	Beaufort		Charleston		Colleton	
	Pounds	Value	Pounds	Value	Pounds	Value
Bluefish			27,100	\$2,147		
Butterfish	200	\$6				
Catfish and bullheads	16,000	640				
Croaker	900	16				
Drum:						
Black	20,000	600	2,000	80		
Red or redfish	51,000	2,050	30,000	2,100		
Flounders	31,900	3,135	4,600	270		
Grunts			5,000	180		
King whiting or "kingfish"	38,400	752	42,000	2,100		
Mullet	26,000	820	12,000	480		
Porgies	1,900	32				
Sea bass	800	80	214,200	11,310		
Sea catfish			120,000	3,600		
Shad	4,000	800	15,800	3,150	16,200	\$3,240
Sharks			15,000	150		
Sheepshead			5,000	100		
Spot	6,000	130	1,600	30		
Squeteagues or "sea trout":						
Gray	2,200	26				
Spotted	43,500	3,940	18,500	1,600	1,700	187
Sturgeon						
Crabs:						
Hard	838,500	12,574	388,000	5,834		
Soft and peelers			8,300	1,230		
Shrimp	400,600	12,018	678,400	20,352		
Clams, hard, public			1,800	114		
Oysters, market:						
Private, spring	883,000	32,049	587,400	21,280		
Private, fall	670,100	25,468	607,200	22,775		
Terrapin, diamond-back			4,900	493		
Total	3,015,000	95,136	2,788,600	99,345	17,900	3,427

Species	Georgetown		Horry		Jasper	
	Pounds	Value	Pounds	Value	Pounds	Value
Bluefish	2,700	\$216				
Catfish and bullheads	35,000	1,225				
Drum:						
Black	12,000	600			2,000	\$100
Red or redfish	35,500	2,005				
Flounders	20,000	1,690	1,300	\$78		
Hickory shad	3,800	57	1,500	45		
King whiting or "kingfish"			26,000	1,040		
Mullet	412,000	14,730	171,000	5,980	6,000	240
Sea bass	8,000	800	11,000	990		
Shad	94,800	21,220	6,700	1,340		
Spot	152,000	4,240	83,500	2,195	2,000	60
Squeteagues or "sea trout":						
Gray	3,500	245				
Spotted	15,000	1,350	3,000	240	1,000	100
Sturgeon	23,000	1,840				
Shrimp	121,700	3,651				
Clams, hard, public			6,100	377		
Oysters, market:						
Private, spring	10,600	396			37,100	1,390
Private, fall	2,800	105			33,400	1,253
Total	952,500	54,372	310,100	12,285	81,600	3,143

Fisheries of Georgia, 1937—Continued

CATCH: BY GEAR

Species	Purse seines		Haul seines		Gill nets			
					Anchor		Drift	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Hickory shad.....							12,900	\$375
Menhaden.....	9,864,000	\$23,330						
Mullet.....			2,000	\$40				
Shad.....					6,000	\$1,050	156,600	25,488
Spot.....			2,000	30				
Squeteagues or "sea trout," spotted.....			5,000	450				
Sturgeon.....							7,600	1,800
Terrapin, diamond-back.....			7,500	775				
Total.....	9,864,000	23,330	16,500	1,295	6,000	1,050	177,100	27,172

Species	Gill nets—Continued				Lines			
	Runaround		Stake		Hand		Trot with baits or sneeds	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Croaker.....	3,000	\$120						
Drum:								
Black.....	7,000	280						
Red or redfish.....	37,600	1,900						
Hickory shad.....			500	\$17				
King whiting or "kingfish".....	6,000	90						
Mullet.....	16,000	400						
Shad.....			30,500	5,505				
Sheepshead.....	8,000	240						
Spot.....	3,000	45						
Squeteagues or "sea trout," spotted.....	60,000	5,400						
Crabs, hard.....					141,400	\$2,121	1,711,000	\$26,215
Total.....	140,600	8,535	31,000	5,522	141,400	2,121	1,711,000	26,215

Species	Lines—Continued		Otter trawls		Pots	
	Trot with hooks					
	Pounds	Value	Pounds	Value	Pounds	Value
Catfish and bullheads.....	22,500	\$1,275			65,000	\$3,400
Eels, common.....					4,000	480
Flounders.....			14,100	\$705		
King whiting or "kingfish".....			95,900	1,425		
Crabs, hard.....			12,500	188	393,000	5,897
Shrimp.....			9,503,900	284,065		
Total.....	22,500	1,275	9,626,100	286,383	465,000	9,777

Species	Tongs		Grabs		By hand	
	Pounds	Value	Pounds	Value	Pounds	Value
Oysters, market:						
Private, spring.....	42,900	\$2,284	43,200	\$2,472	48,200	\$2,329
Private, fall.....	28,900	1,495	35,000	2,000	40,800	1,996
Terrapin, diamond-back.....					2,500	325
Total.....	71,800	3,779	78,200	4,472	91,500	4,650

Fisheries of Georgia, 1937—Continued

OPERATING UNITS: BY COUNTIES

Item	Bryan	Bullock	Camden	Charlton	Chatham	Effingham
Fishermen:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
On vessels.....			64		52	
On boats and shore:						
Regular.....			102		141	
Casual.....	52	24	20	12	188	14
Total	52	24	186	12	381	14
Vessels, motor:						
5 to 10 tons.....			6		22	
11 to 20 tons.....			2		1	
21 to 30 tons.....			1			
61 to 70 tons.....			1			
Total			10		23	
Net tonnage.....			163		177	
Boats:						
Motor.....			22		56	
Other.....	26	12	70	6	146	7
Accessory boats			6			
Apparatus:						
Purse seines, menhaden:						
Length, yards.....			2			
Haul seines:			600		6	
Length, yards.....					492	
Gill nets:						
Anchor.....						34
Square yards.....						1,530
Drift.....	19		8		64	
Square yards.....	8,550		4,490		18,460	
Runaround.....					14	
Square yards.....					7,000	
Stake.....	34	120	6	6		
Square yards.....	4,000	4,800	7,200	3,390		
Lines:						
Hand.....					310	
Hooks.....					310	
Trot with baits or snoods.....			55		24	
Baits or snoods.....			27,500		7,200	
Trot with hooks.....		25				
Hooks.....		2,500				
Otter trawls, shrimp.....			28		72	
Yards at mouth.....			522		1,445	
Pots, crab.....			50		180	
Tongs, oyster.....					19	

Item	Glynn	Liberty	Long	McIntosh	Scriven	Tattnall	Wayne
Fishermen:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
On vessels.....	67			4			
On boats and shore:							
Regular.....	190	49		220			
Casual.....	67	15	8	70	12	42	19
Total	324	64	8	294	12	42	19
Vessels, motor:							
5 to 10 tons.....	31			2			
11 to 20 tons.....	2						
Total	33			2			
Net tonnage.....	220			12			
Boats:							
Motor.....	71			69		7	2
Other.....	87	39	5	115	12	14	9
Apparatus:							
Haul seines:							
Length, yards.....	5						
500.....							
Gill nets:							
Drift.....	29		3	24		15	7
Square yards.....	21,050		400	16,390		5,125	560
Runaround.....	20						
Square yards.....	6,200						
Stake.....			8		24	16	2
Square yards.....			480		1,200	800	64

Fisheries of Georgia, 1937—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Glynn	Liberty	Long	McIntosh	Screven	Tattnall	Wayne
Apparatus—Continued							
Lines:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Trot with baits or snoods	82	45		56			
Baits or snoods	28,800	13,500		22,250			
Trot with hooks			6		8	40	12
Hooks			600		600	6,000	1,200
Otter trawls, shrimp yards at mouth	84			61			
Pots:	1,549			1,170			
Crab	280	60		85			
Fish				84			
Tongs, oyster	4			4			
Grabs				35			

CATCH: BY COUNTIES

Species	Bryan		Bullock		Camden		Charlton	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Catfish and bullheads			2,000	\$100				
Menhaden					9,864,000	\$23,330		
Shad	27,000	\$4,950	3,300	690	17,900	2,685	7,500	\$1,125
Sturgeon					1,200	120		
Crabs, hard					300,000	4,800		
Shrimp					1,479,800	44,412		
Total	27,000	4,950	5,300	780	11,662,900	75,047	7,500	1,125

Species	Chatham		Effingham		Glynn		Liberty	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Croaker					3,000	\$120		
Drum:								
Black					7,000	280		
Red or redbfish	8,500	\$510			29,000	1,450		
Flounders	9,300	465			4,800	240		
Hickory shad	5,000	150			4,000	80		
King whiting or "kingfish"	65,300	940			26,300	535		
Mullet	8,000	240			10,000	200		
Shad	72,300	12,300	6,000	\$1,050	33,400	3,890		
Sheepshead					8,000	240		
Spot	3,000	46			2,000	30		
Squeteagues or "sea trout," spotted	40,000	3,600			25,000	2,250		
Sturgeon	300	22						
Crabs, hard	464,300	6,817			759,800	12,397	183,800	\$2,757
Shrimp	3,067,100	91,913			2,904,600	86,168		
Oysters, market:								
Private, spring	65,700	3,287			5,000	293	6,900	262
Private, fall	61,600	3,081			4,500	275	3,600	135
Terrapin, diamond-back	5,000	650			5,000	450		
Total	3,875,400	124,060	6,000	1,050	3,841,400	108,898	194,300	3,154

Species	Long		McIntosh		Screven		Tattnall		Wayne	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Catfish and bullheads	1,500	\$100	68,000	\$3,400	1,500	\$90	10,000	\$500	7,500	\$485
Eels, common			4,000	480						
Hickory shad	200	4	800	23					3,400	135
Shad	2,000	400	8,100	1,863	3,300	600	6,500	1,300	5,800	1,220
Sturgeon			6,000	1,140					100	27
Crabs, hard			550,000	7,950						
Shrimp			2,052,400	61,572						
Oysters, market:										
Private, spring			56,700	3,243						
Private, fall			35,000	2,000						
Total	3,700	504	2,781,000	81,671	4,800	690	16,500	1,800	16,800	1,867

FLORIDA

Fisheries of Florida, 1937

OPERATING UNITS: BY GEAR

Item	Purse seines, menhaden	Haul seines	Gill nets				Trammel nets	Lines	
			Anchor	Drift	Run-around	Stake		Hand	Line
	Number	Number	Number	Number	Number	Number	Number	Number	Number
Fishermen:	412		2		3			503	
On vessels									
On boats and shore:		1,010	31	134	2,439	2	781	786	
Regular				12	112	12	26	587	
Casual									
Total	412	1,183	33	146	2,554	14	807	1,876	
Vessels, motor:									
5 to 10 tons					1				23
11 to 20 tons			1						16
21 to 30 tons									4
31 to 40 tons	11								6
41 to 50 tons	4								3
51 to 60 tons	2								10
61 to 70 tons	1								4
71 to 80 tons	1								4
81 to 90 tons	1								1
91 to 100 tons									1
Total	20		1		1				66
Net tonnage	905		15		10				2,033
Boats:									
Motor		275	15	59	1,090	2	325	598	
Other		311	15	72	1,871	6	421	219	
Accessory boats	60							1	
Apparatus:									
Number	20	277	26	93	2,161	8	566	1,899	
Length, yards	5,670	156,745							
Square yards			22,380	189,400	2,233,076	7,600	557,400		
Hooks, baits, or snoods									2,522

Item	Lines-Continued				Pound nets	Fyke nets	Dip nets		Cast nets	Otter trawls	
	Trawl	Troll	Trot with baits or snoods	Trot with hooks			Common	Drop		Fish	Line
	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number
Fishermen:	2										11
On vessels											
On boats and shore:											
Regular	12	626	176	189	12	2	50		196		2
Casual		227	27	48			46	4	36		
Total	14	853	203	237	12	2	96	4	232		13
Vessels, motor:											
5 to 10 tons											2
11 to 20 tons	1										2
Total	1										4
Net tonnage	15										47
Boats:											
Motor	6	419	102	91	9	1	13		10		1
Other		1	74	146	1		29	1	89		
Apparatus:											
Number	15	993	212	237	21	8	83	26	232		5
Yards at mouth											122
Hooks, baits, or snoods	800	993	95,900	81,660							

Fisheries of Florida, 1937—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Otter trawls— Contd.	Pots				Spears	Dredges			Tongs, oyster
	Shrimp	Crab	Eel	Flah	Sea craw- fish		Clam	Oyster	Scallop	
Fishermen:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
On vessels.....	413									
On boats and shore:										
Regular.....	292	85	3	48	43	39	12	9	27	301
Casual.....	10	17			1	45				78
Total.....	715	102	3	48	44	84	12	9	27	379
Vessels, motor:										
5 to 10 tons.....	149									
11 to 20 tons.....	19									
21 to 30 tons.....	1									
Total.....	169									
Net tonnage	1,305									
Boats:										
Motor.....	149	53	3	21	33			3	17	88
Other.....		5		26		18			6	190
Apparatus:										
Number.....	818	5,783	90	4,920	2,075	84	1	3	37	315
Yards at mouth.....	6,163							3	27	

Item	Rakes, oyster	Forks	Grabs	Coqui- na scoops	Hooks		Diving outfits	By hand		Total exclu- sive of dupli- cation
					Sponge	Conch		Oys- ters	Other	
Fishermen:	<i>Num- ber</i>	<i>Num- ber</i>	<i>Num- ber</i>	<i>Num- ber</i>	<i>Num- ber</i>	<i>Num- ber</i>	<i>Num- ber</i>	<i>Num- ber</i>	<i>Num- ber</i>	<i>Num- ber</i>
On vessels.....				2			49			1,369
On boats and shore:										
Regular.....		5	14		380	2	520	34	28	5,853
Casual.....	1	7	2	3		1		9	44	1,372
Total.....	1	12	18	3	380	3	560	43	72	8,594
Vessels, motor:										
5 to 10 tons.....			1				4			173
11 to 20 tons.....							3			38
21 to 30 tons.....										5
31 to 40 tons.....										11
41 to 50 tons.....										10
51 to 60 tons.....										5
61 to 70 tons.....										11
71 to 80 tons.....										5
81 to 90 tons.....										2
91 to 100 tons.....										1
Total.....			1				7			281
Net tonnage..			6				75			4,307
Boats:										
Motor.....			6				65			2,331
Other.....	1		8		256	3		39		3,196
Accessory boats										
Apparatus, number.	1	9	11	2	256	3	72			61

Fisheries of Florida, 1937—Continued

CATCH: BY GEAR

Species	Purse seines		Haul seines		Gill nets			
	Pounds	Value	Pounds	Value	Anchor		Drift	
					Pounds	Value	Pounds	Value
Alewives			400,000	\$1,999				
Amberjack			2,000	45				
Bluefish			582,200	18,493			18,500	\$1,070
Blue runner or hardtail			633,000	6,434				
Catfish and bullheads			2,820,600	105,601				
Cigarfish			16,800	341				
Crapple			350,100	11,849				
Crevalle			72,900	1,088				
Croaker			23,400	370				
Drum:								
Black			50,600	1,096				
Red or redfish			173,500	6,177				
Flounders			32,500	1,331				
Groupers			500	15				
Grunts			3,000	60				
Hickory shad			51,000	1,520				
Jewfish			11,400	341				
Kingfish or "king mackerel"			42,900	858				
King whiting or "kingfish"			81,400	1,235				
Menhaden	139,679,000	\$371,298	109,000	1,672				
Mojarra			87,600	1,779				
Mullet			6,622,600	211,423				
Permit			3,600	103				
Pigfish			26,200	407				
Pinfish or sailors choice			2,000	30				
Pompano			51,200	10,825				
Sea catfish			11,700	170				
Shad			170,100	11,746	6,300	\$693	105,400	10,441
Sharks					670,000	4,374		
Sheepshead			165,700	4,227				
Skates			3,000	15				
Snapper, mangrove			36,000	1,139				
Snook or sergeantfish			96,400	3,783				
Spadefish			1,800	42				
Spanish mackerel			810,100	27,282			11,500	513
Spot			68,400	1,169				
Squeteagues or "sea trout":								
Spotted			469,000	29,328				
White			37,500	1,782				
Sturgeon					12,000	1,200	19,200	1,921
Sunfish			823,300	23,622				
Tenpounder			418,400	7,620				
Tripletail			22,200	335				
Turtles:								
Green					10,000	400		
Soft-shell			105,900	2,089				
Total	139,679,000	371,298	15,489,500	499,443	698,300	6,667	154,600	13,95

Species	Gill nets—Continued				Trammel nets		Lines	
	Runaround		Stake		Pounds	Value	Hand	
	Pounds	Value	Pounds	Value			Pounds	Value
Amberjack							19,500	\$297
Angelfish	400	\$14			2,900	\$101	1,700	45
Bluefish	2,825,900	142,500			25,700	1,330	113,300	5,842
Blue runner or hardtail	51,300	1,067			52,400	673	4,600	111
Cable or crab eater	300	7					1,500	45
Catfish and bullheads	1,000	35						
Crevalle	93,700	1,719			10,300	354	4,900	124
Croaker	7,900	130					2,000	60
Drum:								
Black	28,800	695			100	3	5,300	118
Red or redfish	392,300	13,619			281,300	9,691	202,800	6,976
Flounders	30,700	1,158			18,200	734		
Groupers	12,800	562					5,129,400	160,322
Grunts							32,700	673
Hogfish							4,000	94
Jewfish	1,400	40					50,000	1,914

Fisheries of Florida, 1937—Continued

CATCH: BY GEAR—Continued

Species	Gill nets—Continued				Trammel nets		Lines	
	Runaround		Stake				Hand	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Kingfish or "king mackerel".....	57,900	\$1,737						
King whiting or "kingfish".....	29,000	576			2,100	\$63		
Mojarra.....	239,400	4,344			1,200	25	500	\$15
Moonfish.....	4,100	120					1,300	39
Mullet.....	18,585,000	632,911			2,334,600	78,366	194,100	11,776
Muttonfish.....	30,000	1,942						
Permit.....	7,200	149			1,000	25		
Pigfish.....	8,200	161			2,200	72		
Pinfish or sailors choice.....	30,500	444						
Pompano.....	92,800	19,802			487,100	99,653	10,400	2,139
Porgies.....	6,800	241					38,900	1,161
Sea bass.....							40,900	1,873
Sea catfish.....								
Shad.....			6,600	\$726	3,700	58		
Sheepshead.....	372,200	9,583			108,600	3,677	158,600	3,752
Snapper.....								
Mangrove.....	39,200	1,166			2,500	86	116,700	4,494
Red.....							4,760,900	319,359
Snook or sergeantfish.....	60,100	2,470			18,600	734	348,900	13,813
Spadefish.....	9,000	180						
Spanish mackerel.....	6,050,300	234,609			40,700	1,763	35,400	1,715
Spot.....	168,500	2,752			56,500	1,668	200	4
Squeteagues or "sea trout":.....								
Spotted.....	1,458,100	93,532			393,000	26,071	1,010,600	65,035
White.....	28,200	1,299			800	27	22,100	897
Sturgeon.....			2,300	210				
Tenpounder.....	9,600	208			4,300	108		
Tripletail.....							1,000	22
Yellowtail.....							109,200	7,806
Sea crawfish or spiny lobster.....	4,400	220						
Total.....	29,737,000	1,169,992	8,900	936	3,827,800	225,282	12,421,400	610,523

Species	Lines—Continued							
	Trawl		Troll		Trot with baits or snoods		Trot with hooks	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Amberjack.....			29,100	\$776				
Bluefish.....			30,100	1,665				
Catfish and bullheads.....							1,401,300	\$57,223
Dolphin.....			3,000	150				
Groupers.....			1,800	54				
Kingfish or "king mackerel".....			3,254,900	121,338				
Sea catfish.....	1,640,000	\$9,224					54,800	1,096
Sharks.....			196,500	9,920				
Spanish mackerel.....								
Squeteagues or "sea trout," spotted.....			4,100	267				
Crabs.....								
Hard.....					2,939,900	\$46,531		
Soft and peelers.....					1,500	89		
Turtles, soft-shell.....							107,900	2,158
Total.....	1,640,000	9,224	3,519,500	134,170	2,941,400	46,620	1,564,000	60,477

Fisheries of Florida, 1937—Continued

CATCH: BY GEAR—Continued

Species	Pound nets		Fyke nets		Dip nets			
					Common		Drop	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Bluefish	3,000	\$210						
Blue runner or hardtail	2,000	70						
Catfish and bullheads	187,400	7,498	15,000	\$800				
Crevalle	600	21						
Flounders	100	4						
Snapper, mangrove	300	10						
Spanish mackerel	5,500	385						
Squeteagues or "sea trout," spotted	1,000	70						
Tenpounder	2,000	50						
Crabs, hard					55,300	\$1,088	4,500	\$178
Sea crawfish or spiny lobster					79,800	4,737		
Shrimp					125,000	5,750		
Scallops, bay					13,400	1,372		
Total	201,900	8,318	15,000	600	274,500	15,947	4,500	178

Species	Cast nets		Otter trawls		Pots		Spears	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Angelfish					4,000	\$80		
Blue runner or hardtail					26,000	520		
Catfish and bullheads					71,700	3,196		
Crappie					174,000	5,497		
Crevalle					13,500	270		
Croaker			2,600	\$35				
Eels, common					8,600	215		
Flounders			162,800	12,068			48,200	\$2,398
Groupers					28,500	1,710		
Grunts					18,500	370		
Hogfish					7,200	154		
Jewfish					2,500	75		
King whiting or "kingfish"			638,900	9,690				
Mojarra	13,300	\$316			7,000	175		
Mullet	137,400	4,728						
Muttonfish					9,100	728		
Porgies			2,800	33				
Sea bass			1,100	67				
Sheepshead					14,200	284		
Squeteagues or "sea trout":								
Gray			400	4				
White			500	15				
Sunfish					187,400	4,914		
Crabs:								
Hard			55,000	825	1,470,400	25,184		
Stone					43,200	8,691		
Sea crawfish or spiny lobster					190,300	15,224		
Shrimp	153,500	4,774	13,738,900	418,288				
Total	304,200	9,818	14,623,000	441,045	2,246,100	67,187	48,200	2,398

Species	Dredges		Tongs		Rakes	
	Pounds	Value	Pounds	Value	Pounds	Value
Clams, hard, public	701,000	\$43,911				
Oysters, market:						
Public, spring	154,900	7,193	278,300	\$19,070		
Public, fall			363,800	27,382	2,000	\$125
Private, spring			55,200	2,580		
Private, fall			123,000	5,933		
Scallops, bay	67,300	5,530				
Total	923,200	56,634	820,300	55,965	2,000	125

Fisheries of Florida, 1937—Continued

CATCH: BY GEAR—Continued

Species	Forks		Grabs		Coquina scoops	
	Pounds	Value	Pounds	Value	Pounds	Value
Sea crawfish or spiny lobster.....			18,000	\$1,440		
Clams:						
Coquina.....					3,700	\$450
Hard, public.....	4,700	\$702	8,800	1,350		
Total.....	4,700	702	26,800	2,790	3,700	450

Species	Hooks				Diving outfits		By hand	
	Sponge		Conch		Pounds	Value	Pounds	Value
	Pounds	Value	Pounds	Value				
Crabs, stone.....						2,900	\$725	
Clams, hard, public.....						33,600	3,209	
Conchs.....			7,400	\$553				
Oysters, market:								
Public, spring.....						117,700	5,343	
Public, fall.....						14,800	872	
Private, spring.....						149,900	6,177	
Private, fall.....						20,300	1,060	
Scallops, bay.....						37,900	2,597	
Sponges:								
Grass.....	21,700	\$14,003						
Sheepswool.....	91,300	222,881			352,700	\$866,496		
Wire.....					16,200	12,382		
Yellow.....	46,700	28,147			102,800	75,806		
Total.....	159,700	265,031	7,400	553	471,700	954,674	377,100 19,983	

OPERATING UNITS: BY COUNTIES

Item	Bay	Brevard	Broward	Charlotte	Citrus	Clay	Collier	Dade
Fishermen:	Number	Number	Number	Number	Number	Number	Number	Number
On vessels.....	109	2					3	2
On boats and shore:								
Regular.....	221	147	20	170	152	35	297	220
Casual.....	44	26	26	27	31	4	109	39
Total.....	374	175	46	197	183	39	409	261
Vessels, motor:								
5 to 10 tons.....	5						1	1
11 to 20 tons.....	7	1						
21 to 30 tons.....	3							
61 to 70 tons.....	1							
Total.....	16	1					1	1
Net tonnage.....	253	15					10	6
Boats:								
Motor.....	46	86	19	58	74	13	165	143
Other.....	43	90	5	104	166	24	189	57
Accessory boats.....								1
Apparatus:								
Haul seines.....	17		1	12		7	6	1
Length, yards.....	5,800		400	14,220		12,150	2,450	400
Gill nets:								
Anchor.....		1						
Square yards.....		980						
Runaround.....	21	96	6	82	144		205	60
Square yards.....	14,400	72,300	8,600	106,300	78,410		235,600	126,000
Trammel nets.....	1			10	30		44	16
Square yards.....	750			25,300	18,800		96,000	64,600
Lines:								
Hand.....	182	6	24	35	42		148	59
Hooks.....	304	6	24	35	42		148	59
Trawl.....		2						
Hooks.....		100						
Troll.....			8	8	8		56	78
Hooks.....			8	8	8		56	78

Fisheries of Florida, 1937—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Bay	Brevard	Broward	Charlotte	Citrus	Clay	Collier	Dade
Apparatus—Continued								
Lines—Continued	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Trot, with baits and snoods		44						
Baits and snoods		41,400						
Trot, with hooks						10		
Hooks						5,900		
Dip nets, common	16	3						12
Cast nets			2	34			10	
Pots:								
Crab		2,910				240		170
Fish								320
Sea crawfish			260					1,815
Spears	12							
Dredges:								
Clam							1	
Scallop	15							
Yards at mouth	12							
Tongs, oyster	40				13			
Grabs								9
Hooks, sponge					2			
Item	Dixie	Duval	Escambia	Franklin	Glades	Gulf	Hendry	Hernando
	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Fishermen:								
On vessels		164	241	80		56		
On boats and shore:								
Regular	51	262	83	356	30	46	10	8
Casual	17	90	17	24		6		
Total	68	516	341	430	30	108	10	8
Vessels, motor:								
5 to 10 tons		16	2	13				
11 to 20 tons		2						
31 to 40 tons		2				1		
41 to 50 tons		3	6					
51 to 60 tons		1	3			1		
61 to 70 tons			9					
71 to 80 tons			4					
81 to 90 tons			1					
91 to 100 tons			1					
Total		24	26	13		2		
Net tonnage		397	1,526	84		93		
Boats:								
Motor	21	122	49	120	18	7	5	2
Other	73	158	30	97	24	18	8	8
Accessory boats		18				6		
Apparatus:								
Purse seines, menhaden		6				2		
Length, yards		1,650				520		
Haul seines		10	1	13	8	4	2	
Length, yards		6,950	400	6,300	7,200	1,700	1,800	
Gill nets:								
Anchor	15	5						
Square yards	4,500	10,500						
Drift	15	37		13				
Square yards	9,000	95,300		10,700				
Runaround	54	24	14	55		9		8
Square yards	24,100	16,450	31,000	38,900		5,600		5,300
Trammel nets		35	25					
Square yards	15,900		28,000					
Lines:								
Hand	39	56	256	61				
Hooks	39	60	502	99				
Troll		15		2				
Hooks		15		2				
Trot with baits and snoods		47		23				
Baits and snoods		16,500		7,300				
Trot with hooks		84		26	1		2	
Hooks		26,300		2,800	200		1,000	

U. S. BUREAU OF FISHERIES

Fisheries of Florida, 1937—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Oka- loosa	Okee- chobee	Palm Beach	Pasco	Pinellas	Put- man	St. Johns	St. Lucie
Fishermen:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
On vessels.....	14			5	65		261	
On boats and shore:								
Regular.....	178	67	289	111	977	142	63	137
Casual.....	5		138		188	3	9	3
Total	197	67	427	116	1,230	145	333	160
Vessels, motor:								
5 to 10 tons.....	1				4		86	
11 to 20 tons.....				1	5		15	
21 to 30 tons.....	1						1	
Total	2			1	9		102	
Net tonnage	28			19	103		836	
Boats:								
Motor.....	36	25	157	20	201	79	19	79
Other.....	26	54	99	92	282	111	36	21
Apparatus:								
Haul seines.....	14	8	4		21	45	10	
Length, yards.....	5,300	7,100	1,950		9,200	29,600	740	
Gill nets:								
Drift.....					4	5		
Square yards.....					3,700	3,600		
Runaround.....	4		77	73	193			86
Square yards.....	2,400		184,800	44,100	202,926			158,300
Stake.....	2							
Square yards.....	1,600							
Trammel nets.....	28				5			
Square yards.....	32,200				4,450			
Lines:								
Hand.....	49		152		170		25	55
Hooks.....	93		152		193		37	55
Troll.....			222		154		2	134
Hooks.....			222		154		2	134
Trot with baits and snoods.....							6	
Baits and snoods.....							2,400	
Trot with hooks.....		40	3			44		
Hooks.....		19,250	1,000			18,450		
Pound nets.....						20		
Fyke nets.....						8		
Cast nets.....			21				6	
Otter trawls:								
Fish.....								5
Yards at mouth.....							122	
Shrimp.....							113	
Yards at mouth.....							2,753	
Pots:								
Crab.....					293			
Eel.....						90		
Fish.....		1,550	400					
Dredges, scallop.....					8			
Yards at mouth.....					8			
Tongs, oyster.....	3				10		1	3
Grabs.....					2			
Hooks, sponge.....				19	76			
Diving outfits.....				1	71			

Fisheries of Florida, 1937—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Santa Rosa	Sarasota	Seminole	Taylor	Volusia	Wakulla	Walton
Fishermen:	Number	Number	Number	Number	Number	Number	Number
On vessels					6		
On boats and shore:							
Regular	16	130	21	125	116	138	6
Casual	5	77	24	30	28	134	16
Total	21	207	45	155	150	272	22
Vessels, motor, 5 to 10 tons					3		
Net tonnage					20		
Boats:							
Motor	9	76	17	46	50	56	4
Other	14	109	19	140	106	108	11
Apparatus:							
Haul seines		11	6		16	14	
Length, yards		5,800	2,000		8,835	4,200	
Gill nets, runaround		103		79	26	102	
Square yards		138,900		34,400	22,850	49,400	
Trammel nets	14	17		59		108	6
Square yards	4,500	39,700		25,700		50,000	3,000
Lines:							
Hand		33		49	28	38	
Hooks		33		49	28	38	
Troll		47		8		25	
Hooks		47		8		25	
Trot with baits and snoods					14		
Baits and snoods					5,400		
Trot with hooks			27				
Hooks			6,950				
Dip nets:							
Common					15	4	
Drop						6	
Cast nets		25			12		
Otter trawls, shrimp					6		
Yards at mouth					135		
Pots, crab						1,300	
Spears	6				18	17	8
Tongs, oyster	9	5			31	7	11
Rakes, oyster					1		
Hooks, sponge				27			

CATCH: BY COUNTIES

Species	Bay		Brevard		Broward		Charlotte	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Bluefish	437,900	\$13,139	6,000	\$302	7,500	\$487		
Blue runner or hardtail	371,800	3,718					9,200	\$460
Cigarfish	3,000	65					1,500	23
Crevalle			4,500	67				
Croaker	700	21						
Drum:								
Black	700	21	7,900	188			500	12
Red or redfish	3,900	117	10,300	340			103,900	3,637
Flounders	4,600	231					1,600	64
Groupers	1,476,200	47,090			8,400	420	2,200	66
Jewfish							1,000	22
Kingfish or "king mackerel"	26,000	520			45,100	2,255	4,500	180
King whiting or "kingfish"	600	18	8,200	123			1,800	42
Menhaden	2,000	30						
Mojarra							48,000	1,033
Mullet	1,507,600	45,533	798,900	23,967	17,000	510	1,920,500	60,500
Muttonfish					7,400	666		
Permit							1,000	20
Pigfish							1,500	34
Pinfish or sailors choice			23,000	332				
Pompano	14,200	2,580	17,900	4,117	4,200	966	43,800	8,780
Porgies	10,000	300						
Sharks			520,000	3,113				
Sheepshead	1,600	48	15,600	234			79,000	1,866
Snapper:								
Mangrove							22,000	709
Red	798,800	55,136						

Fisheries of Florida, 1937—Continued

CATCH: BY COUNTIES—Continued

Species	Bay		Brevard		Broward		Charlotte	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Snook or sergeantfish.....			5,600	\$223			35,400	\$1,416
Spadefish.....	600	\$18						
Spanish mackerel.....	599,600	20,039			9,800	\$490	176,000	7,445
Spot.....	1,800	43	23,600	353			2,600	62
Squeteagues or "sea trout":								
Spotted.....	80,600	5,198	226,300	15,870			251,000	15,650
White.....	2,000	60					5,000	250
Tenpounder.....	256,000	5,120						
Tripletail.....							1,000	22
Crabs:								
Hard.....	1,400	45	1,247,400	22,453				
Stone.....							500	120
Sea crawfish or spiny lobster.....					35,000	2,800		
Oysters, market:								
Public, spring.....	34,000	2,540						
Public, fall.....	31,400	2,958						
Scallops, bay.....	34,000	2,950						
Total.....	5,701,000	207,558	2,915,200	71,682	134,400	8,594	2,713,500	102,393

Species	Citrus		Clay		Collier		Dade	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Angelfish.....							4,600	\$92
Bluefish.....	10,600	\$633			22,200	\$1,066	75,300	4,518
Blue runner or hardtail.....					400	8	30,200	604
Catfish and bullheads.....			253,500	\$11,406				
Crappie.....			1,300	62				
Crevalle.....					14,100	290	20,500	410
Dolphin.....							3,000	150
Drum:								
Black.....					1,600	36	800	24
Red or redfish.....	92,600	3,704			128,200	4,571	1,000	30
Flounders.....	6,000	240			2,600	66		
Groupers.....	3,600	108			15,600	420	167,800	9,978
Grunts.....							31,000	620
Hogfish.....							7,200	184
Jewfish.....					2,900	67	13,800	414
Kingfish or "king mackerel".....	400	16			133,700	5,633	234,100	11,705
King whiting or "kingfish".....					300	6		
Mojarra.....					58,000	1,180	17,500	437
Mullet.....	1,167,900	54,282			3,123,000	100,381	620,800	18,618
Muttonfish.....							114,400	9,102
Permit.....					8,200	174		
Pigfish.....	200	8						
Pompano.....	800	160			185,100	36,920	65,500	15,065
Shad.....			1,000	70				
Sheepshead.....	22,500	900			57,500	1,174	25,700	514
Snapper, mangrove.....	5,600	224			86,000	1,162	14,000	750
Snook or sergeantfish.....					204,400	8,076	31,000	1,240
Spadefish.....					9,000	180		
Spanish mackerel.....	2,500	150			1,009,600	48,655	662,400	33,120
Spot.....					400	8		
Squeteagues or "sea trout":								
Spotted.....	132,000	7,920			224,600	14,956	25,900	1,813
White.....					2,500	74		
Sunfish.....			26,600	1,064				
Yellowtail.....							25,900	2,027
Crabs:								
Hard.....			188,900	2,833				
Stone.....							7,700	2,541
Sea crawfish or spiny lobster.....							185,300	14,824
Clams, hard, public.....					701,000	43,911		
Oysters, market:								
Public, spring.....	4,300	241						
Public, fall.....	4,300	243						
Private, spring.....	8,100	457						
Private, fall.....	10,400	585						
Sponges:								
Grass.....	300	209						
Sheepswool.....	800	2,002						
Yellow.....	500	356						
Total.....	1,473,400	72,438	471,300	15,427	5,940,600	269,014	2,385,400	128,750

Fisheries of Florida, 1937—Continued

CATCH: BY COUNTIES—Continued

Species	Dixie		Duval		Escambia		Franklin	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Angelfish.....	200	\$6						
Bluefish.....	1,600	96	11,400	\$688	26,800	\$804	14,200	\$548
Blue runner or hardtail.....	1,600	45			4,600	70	7,900	158
Catfish and bullheads.....			705,200	28,210			89,300	4,016
Crappie.....			22,000	1,320				
Crevalle.....	2,600	78	8,600	129				
Croaker.....			2,800	46				
Drum:								
Black.....			4,300	129				
Red or redfish.....	25,000	750	2,900	148	3,700	111	19,900	701
Flounders.....	2,200	66	8,400	420	4,100	142	30,600	1,398
Groupers.....			1,800	69	1,555,000	43,314	846,300	16,887
Grunts.....							300	9
Kingfish or "king mackerel".....							700	14
King whiting or "kingfish".....			143,600	2,140	2,100	63	2,300	123
Menhaden.....			51,609,000	136,346			24,000	652
Mullet.....	203,000	7,602	244,300	9,216	208,200	7,547	1,592,200	55,632
Pompano.....	1,200	240	2,200	440	28,500	5,700	1,500	294
Porgies.....					5,000	150	1,700	21
Sea bass.....			21,900	1,303				
Sea catfish.....					5,000	100	64,800	1,096
Shad.....			89,000	9,043				
Sheepshead.....	25,500	765			2,100	63	3,500	89
Snapper:								
Mangrove.....	300	9						
Red.....			58,100	4,522	2,757,200	180,413	214,900	14,387
Spanish mackerel.....	4,900	294	10,600	636	428,200	12,847	84,100	3,342
Spot.....			14,600	235	1,200	18	24,300	612
Squetagees of "sea-trout":								
Spotted.....	50,000	3,000	43,400	3,140	31,900	2,233	87,000	5,330
White.....					500	15	800	24
Sturgeon.....	25,000	2,600					6,200	621
Sunfish.....			27,900	1,395			24,500	490
Tenpounder.....					4,000	160	431,200	4,313
Crabs, hard.....			1,841,000	29,001	134,000	5,360	1,356,700	44,222
Shrimp.....			2,017,600	60,803				
Oysters, market:								
Public, spring.....					14,000	1,404	346,300	18,687
Public, fall.....	700	62	2,800	173	5,900	768	252,100	16,745
Private, spring.....			6,800	321				
Private, fall.....			43,400	1,790				
Total.....	343,700	15,513	56,943,500	291,663	5,222,000	261,282	5,216,300	190,411

Species	Glades		Gulf		Henry		Hernando	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value \$20
Bluefish.....			19,000	\$570			400	
Blue runner or hardtail.....			3,000	80				
Catfish and bullheads.....	339,000	\$10,170			39,000	\$1,360		
Crappie.....	189,700	5,690			32,000	960		
Drum:								
Black.....			100	3				
Red or redfish.....			3,600	108			1,500	45
Flounders.....			1,700	87			100	3
King whiting or "kingfish".....			200	6				
Menhaden.....			6,192,000	14,706				
Mullet.....			421,100	12,633			42,200	1,480
Pompano.....			3,100	558				
Sheepshead.....			3,400	12			1,600	48
Snapper, mangrove.....							100	3
Spanish mackerel.....			81,400	2,442			200	8
Squetagees or "sea-trout," spotted.....			14,500	818	52,000	1,300	3,100	202
Sunfish.....	225,700	6,771						
Oysters, market:								
Public, spring.....			10,600	1,090				
Public, fall.....			28,800	2,600				
Private, fall.....			2,400	120				
Scallops, bay.....					20,000	400		
Turtles, soft-shell.....	41,500	830						
Total.....	795,900	23,461	6,781,900	35,783	143,000	4,020	49,200	1,809

Fisheries of Florida, 1937—Continued

CATCH: BY COUNTIES—Continued

Species	Hillsborough		Indian River		Lee		Levy	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Amberjack					2,000	\$45		
Angelfish							2,500	\$88
Bluefish	900	\$46	89,500	\$4,474	16,800	840	20,300	1,421
Blue runner or hardtail	400	4					7,000	244
Catfish and bullheads							1,000	35
Crevalle	3,600	36	7,200	98	1,000	24	14,800	519
Drum:								
Black	1,100	22	13,500	325	6,200	155		
Red or redfish	46,200	1,860	21,100	632	150,200	5,258	82,500	2,887
Flounders	2,900	145			4,300	172	3,900	137
Groupers	409,300	12,443	1,100	48	10,400	312	7,000	210
Jewfish					4,900	118	2,000	70
Kingfish or "king mackerel"	8,200	246			23,300	932	265,200	7,960
King whiting or "kingfish"			2,000	30	3,600	109		
Mojarra	81,900	888	21,600	315	34,500	807		
Moonfish					500	12		
Mullet	850,800	34,056	592,000	14,900	3,044,000	102,836	891,300	31,210
Pinfish					3,000			90
Pinfish or sailors choice			7,500	112				
Pompano	1,800	405	4,200	966	122,800	24,560	5,100	1,020
Sheepshead	12,900	516	17,800	273	165,000	3,962	79,400	2,779
Snapper:								
Mangrove	200	9	10,100	202	36,500	1,242	3,800	133
Red	393,700	25,148						
Snook or sergeantfish	7,800	274	24,500	1,169	85,400	3,363		
Spanish mackerel	21,400	1,070	60,900	2,936	290,500	12,448	16,500	1,155
Spot	15,100	151	70,300	1,058	6,100	145		
Squeteagues or "sea trout":								
Spotted	64,900	4,041	220,600	13,355	361,900	22,387	214,100	14,982
White	17,300	563			5,800	290		
Tenpounder							9,500	238
Crabs:								
Hard	26,400	528	111,200	2,000	148,100	3,351		
Soft and peelers					1,500	89		
Clams:								
Coquina					3,700	450		
Hard, public					900	132		
Oysters, market:								
Public, spring			2,700	227			800	71
Public, fall							6,900	619
Scallops, bay					30,600	2,560	10,000	400
Turtles, green								
Total	1,966,800	82,451	1,277,800	43,120	4,580,500	186,589	1,646,600	66,268

Species	Manatee		Martin		Monroe		Nassau	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Amberjack					1,000	\$20		
Bluefish	25,300	\$1,265	391,600	\$19,580	6,300	441	500	\$30
Blue runner or hardtail	500	5			1,200	18		
Cabo or crab eater	300	7						
Crevalle	1,300	13	68,900	1,033				
Croaker	1,400	28	24,300	364				
Drum:								
Black			32,100	622	3,200	64	800	24
Red or redfish	67,800	2,339	23,600	472	3,400	102	1,200	60
Flounders	5,100	264	2,500	75			22,300	1,140
Groupers	26,400	802	17,200	773	91,300	3,510		
Grunts	100	2			18,100	362		
Hogfish					4,000	94		
Jewfish			13,800	414	22,000	1,150		
Kingfish or "king mackerel"								
King whiting or "kingfish"	5,600	224	6,900	344	561,400	22,456		
Menhaden	400	8					187,700	2,832
Mojarra			51,000	510			81,878,000	220,246
Mullet	14,500	329	12,100	231				
Mullet	1,525,500	53,715	747,100	19,128	510,100	15,301	3,600	108
Muttonfish			31,000	620	46,100	2,708		
Permit	1,100	22						
Pinfish	1,000	18	24,000	360				
Pompano	19,400	4,165	37,600	8,648	4,700	940		

Fisheries of Florida, 1937—Continued

CATCH: BY COUNTIES—Continued

Species	Manatee		Martin		Monroe		Nassau	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Forgies	500	\$10						
Sea catfish			5,000	\$50				
Shad							19,100	\$2,101
Sharks	875,000	3,500	565,000	4,531			350,000	2,454
Sheepshead	50,200	1,222	23,100	345	700	17	800	16
Skates	3,000	15						
Snapper, mangrove	3,400	90	22,200	668	10,800	668		
Snook or sergeantfish	25,700	983	51,000	2,050	6,000	240		
Spadefish	1,200	24						
Spanish mackerel	67,600	3,097	281,000	13,052	308,700	13,889		
Spot	2,000	40	13,500	205			3,000	45
Squeteagues or "sea trout":								
Spotted	182,600	11,844	33,900	2,034	52,000	3,380	13,200	1,188
White	33,100	1,655						
Tenpounder	7,000	140						
Tripletail			22,200	335				
Yellowtail					83,300	5,781		
Crabs:								
Hard	162,000	3,240					206,000	3,090
Stone	600	150			2,000	600		
Sea crawfish or spiny lobster					67,800	3,777	3,075,900	92,447
Shrimp								
Clams, hard, public	3,800	570						
Conchs					7,400	553		
Oysters, market:								
Public, spring							37,300	1,680
Public, fall							1,800	108
Private, spring							147,300	6,054
Private, fall							17,900	908
Scallops, bay	2,900	542						
Sponges:								
Grass					4,700	2,196		
Sheepswool					40,000	94,431		
Yellow					16,900	6,117		
Total	3,116,300	90,268	2,480,600	76,442	1,881,800	178,977	85,966,400	334,531

Species	Okaloosa		Okeechobee		Palm Beach		Pasco	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Amberjack					2,500	\$50		
Angelfish					1,100	33		
Bluefish	33,500	\$1,005			1,250,000	63,265	7,800	\$395
Blue runner or hardtail	297,800	2,978			22,400	568		
Catfish and bullheads			497,300	\$21,100	154,500	6,942		
Cigarfish	13,800	276						
Crappie			95,500	3,343	57,100	1,713		
Crevalle					10,000	200		
Croaker					2,100	41		
Drum:								
Black	100	3						
Red or redfish	7,000	211			4,100	132	19,200	576
Flounders	1,800	96					2,200	66
Groupers	432,900	12,987			50,600	2,129		
Grunts					1,300	40		
Jewfish					900	19		
Kingfish or "king mackerel"	10,900	338			1,353,200	40,946		
King whiting or "kingfish"					500	10		
Menhaden	32,000	480						
Mojarra					27,500	825		
Moonfish					4,000	147		
Mullet	1,101,000	32,720			28,900	806	636,000	22,280
Muttonfish					27,500	1,146		
Pompano	13,800	2,650			21,200	4,328	500	100
Porgies	13,600	408					600	18
Sea catfish	5,400	78						
Sheepshead	100	3			1,800	50	7,700	231
Snapper:								
Mangrove					100	6	1,700	51
Red	325,000	22,752						
Snook or sergeantfish					4,600	137		
Spanish mackerel	167,100	5,013			482,700	21,970	12,400	496
Spot	700	11			800	16		

Fisheries of Florida, 1937—Continued

CATCH: BY COUNTIES—Continued

Species	Okaloosa		Okeechobee		Palm Beach		Pasco	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Squeteagues or "sea trout," spotted	17,700	\$1,182			4,100	\$304	47,600	\$3,092
Sturgeon	2,300	210						
Sunfish			109,600	\$3,938	26,500	537		
Tenpounder	134,800	1,948						
Sea crawfish or spiny lobster					4,400	220		
Oysters, market, public, fall	1,500	165						
Turtles, soft-shell			140,900	2,818	5,700	114		
Sponges:							2,000	1,303
Grass							13,200	32,983
Sheepswool							300	199
Wire							5,300	3,906
Yellow								
Total	2,618,600	85,514	843,300	31,199	3,548,700	148,694	756,500	65,736

Species	Pinellas		Putnam		St. Johns		St. Lucie	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Alwivies			400,000	\$1,999				
Amberjack	33,000	\$820						
Bluefish	40,600	2,413			8,000	\$400	1,013,800	\$50,690
Blue runner or hardtail	800	9					5,300	79
Cabo or crab eater	1,500	45						
Catfish and bullheads			1,745,900	69,842				
Crappie			91,000	2,862				
Crevaille							32,000	480
Croaker					4,600	95		
Drum:								
Black	1,500	30			4,000	120		
Red or redfish	26,300	952	100	4	3,900	156	4,400	132
Eels, common			8,600	215				
Flounders	9,300	371			119,000	9,898		
Groupers	299,100	9,173					14,700	588
Grunts					3,000	60		
Hickory shad			51,000	1,520				
Kingfish or "king mackerel"	198,500	7,904			1,700	85	342,300	17,115
King whiting or "kingfish"	300	14			359,500	5,444	7,200	108
Mojarra							20,400	306
Mullet	1,792,100	64,501	1,600	48	77,400	1,997	371,000	9,270
Muttonfish							6,800	204
Pigfish	500	10					5,200	78
Pompano	9,000	1,800			800	190	1,400	240
Porgies	6,400	231			2,800	33		
Sea bass					1,100	67		
Shad			171,800	12,012				
Sheepshead	33,800	1,342			5,100	102	29,500	442
Snapper:								
Mangrove	8,400	337						
Red	60,900	4,263			48,000	3,840	16,300	978
Snook or sergeantfish	6,300	234					16,600	664
Spanish mackerel	517,700	28,728			2,000	100	741,100	37,055
Spot	4,200	84					10,700	160
Squeteagues or "sea trout":								
Gray					400	4		
Spotted	461,300	28,080			15,800	1,422	23,700	1,422
White	14,900	732						
Sunfish			303,400	8,245				
Tenpounder	2,500	80						
Crabs:								
Hard					26,000	520		
Stone	17,700	3,320						
Shrimp					6,975,400	209,477		
Clams, hard, public	9,600	1,500			28,100	2,873		
Oysters, market:								
Public, spring	8,700	365			80,200	3,645	4,000	520
Public, fall	6,800	727			15,100	756		
Private, spring	13,100	1,080						
Scallops, bay	42,000	2,880						
Turtles, soft-shell			2,700	55				
Sponges:								
Grass	10,800	7,514						
Sheepswool	378,000	929,982						
Wire	15,900	12,183						
Yellow	119,900	88,486						
Total	4,145,800	1,200,160	2,776,100	96,802	7,781,900	240,784	2,666,400	120,631

Fisheries of Florida, 1937—Continued

CATCH: BY COUNTIES—Continued

Species	Santa Rosa		Sarasota		Seminole		Taylor	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Amberjack			12,100	\$183				
Angelfish							600	\$21
Bluefish			6,500	310			3,600	226
Blue runner or hardtail			5,500	80			5,000	174
Catfish and bullheads					289,200	\$11,568		
Crapple					3,200	112		
Crevalle							4,800	169
Drum:								
Black			1,500	34				
Red or redfish	200	\$8	15,800	553			42,200	1,470
Flounders	1,400	\$6	5,400	216			8,800	297
Groupers			6,800	171			1,600	45
Grunts			400	10				
Jewfish			4,000	96				
Kingfish or "king mackerel"			116,000	4,700			2,000	60
King whiting or "kingfish"			2,700	61				
Mojarra			13,000	303				
Mullet	162,000	4,770	1,175,800	38,206			866,000	12,690
Permit			1,600	61				
Pigfish			17,700	3,540			1,200	42
Pompano							2,100	420
Porgies			200	2				
Shad					8,500	220		
Sheepshead	400	12	66,200	1,614			46,500	1,693
Snapper, mangrove			17,800	577			1,700	57
Snook or sergeantfish			19,700	741				
Spanish mackerel			117,500	4,998			6,800	445
Spot	600	12	800	17			1,600	52
Squeteagues or "sea trout":								
Spotted	17,000	1,190	109,100	6,885			174,000	10,965
White	200	8	6,900	345				
Sunfish			400	105	14,200	426		
Crabs, stone								
Clams, hard, public			4,700	686				
Oysters, market:								
Public, spring	5,700	587	5,200	376				
Public, fall	6,200	840	800	78				
Scallops, bay			6,700	447				
Sponges:							3,900	2,721
Grass							12,000	20,969
Sheepswool							6,900	5,068
Yellow								
Total	193,700	7,483	1,740,400	65,295	312,100	12,826	689,800	66,613

Species	Volusia		Wakulla		Walton	
	Pounds	Value	Pounds	Value	Pounds	Value
Bluefish	16,200	\$738	5,500	\$240		
Blue runner or hardtail			3,000	60		
Catfish and bullheads	383,100	9,502				
Crapple	32,300	1,294				
Crevalle	2,000	30				
Drum:						
Black			5,000	100		
Red or redfish			9,500	315	104,500	4,066
Flounders	28,200	1,410	12,400	596	200	\$7
Groupers	28,000	1,120			1,700	117
Kingfish or "king mackerel"						
King whiting or "kingfish"	28,500	427				
Mullet	308,900	10,610	1,570,100	458,277	60,000	2,100
Pinfish or sailors choice	2,000	30				
Pompano	10,100	2,309	1,300	238		
Sea bass	19,000	570				
Shad	2,000	160				
Sheepshead	3,900	68	40,500	1,330	100	3
Snapper, red	88,000	7,920				
Spanish mackerel			6,800	272		
Spot	40,300	601	55,600	1,665		
Squeteagues or "sea trout":						
Spotted	52,400	3,723	98,200	6,599	1,400	98
White					100	4

Fisheries of Florida, 1937—Continued

CATCH: BY COUNTIES—Continued

Species	Volusia		Wakulla		Walton	
	Pounds	Value	Pounds	Value	Pounds	Value
Sunfish	194,800	\$4,860				
Crabs:						
Hard	130,200	2,182	2,300	\$90		
Stone			17,200	2,580		
Shrimp	477,800	19,503				
Oysters, market:						
Public, spring			2,100	173		
Public, fall	2,000	125	8,800	890	4,700	\$522
Private, spring	29,800	1,845				
Private, fall	71,600	3,710				
Turtles, soft-shell	3,000	30				
Total	1,968,600	73,172	1,938,200	77,376	68,200	2,851

CATCH: BY DISTRICTS

Species	East coast		West coast		Lake Okeechobee	
	Pounds	Value	Pounds	Value	Pounds	Value
Alewives	400,000	\$1,999				
Amberjack	2,500	50	48,100	\$1,068		
Angelfish	5,700	125	3,300	116		
Blue fish	2,869,800	145,172	708,900	25,938		
Blue runner or hardtail	57,900	1,251	711,400	7,624		
Cabio or crab eater			1,800	52		
Catfish and bullheads	3,376,900	130,530	90,300	4,051	1,029,800	\$39,572
Cigarfish			16,800	341		
Crappie	149,800	5,640			374,300	11,706
Crevale	153,700	2,447	42,200	1,129		
Croaker	33,800	546	2,100	49		
Dolphin	3,000	150				
Drum:						
Black	68,400	1,532	16,400	380		
Red or redfish	82,100	2,421	947,800	34,042		
Fels, common	8,600	215				
Flounders	180,400	12,943	112,100	4,770		
Groupers	289,500	15,125	4,883,500	147,538		
Grunts	35,300	720	18,900	383		
Hickory shad	51,000	1,520				
Hogfish	7,200	154	4,000	94		
Jewish fish	28,500	847	36,800	1,523		
Kingfish or "king mackerel"	1,983,300	72,450	1,372,400	51,483		
King whiting or "kingfish"	737,100	11,114	14,300	450		
Menhaden	133,358,000	357,102	6,250,000	15,868		
Mojarra	99,100	2,114	249,900	4,540		
Moonfish	4,900	147	500	12		
Mullat	3,809,500	109,178	23,870,100	818,252		
Muttonfish	187,100	11,738	46,100	2,708		
Permit			11,800	277		
Pigfish	29,200	438	7,400	202		
Pinfish or sailors choice	32,500	474				
Pompano	165,100	37,369	476,400	95,050		
Porgies	2,800	33	45,700	1,402		
Sea bass	42,000	1,940				
Sea catfish	5,000	50	65,200	1,274		
Shad	288,400	23,606				
Sharks	1,435,000	10,068	875,000	3,500		
Sheepshead	123,100	2,034	696,200	19,489		
Skates			3,000	15		
Snapper:						
Mangrove	46,400	1,624	148,300	5,271		
Red	210,400	17,260	4,550,500	302,099		
Snook or sergeantfish	133,300	5,483	390,700	15,317		
Spadefish			10,800	222		
Spanish mackerel	2,230,500	109,359	3,919,500	166,833		
Spot	176,800	2,673	116,800	2,920		
Squeteagues or "sea trout":						
Gray	400	4				
Spotted	659,300	44,271	2,676,500	170,032		
White			89,100	4,020		
Sturgeon			33,500	3,331		
Sunfish	566,900	15,990			413,800	12,546
Tenpounder			434,300	7,986		
Tripletail	22,200	335	1,000	22		
Yellowtail	25,900	2,027	83,300	5,781		

Fisheries of Florida, 1937—Continued

CATCH: BY DISTRICTS—Continued

Species	East coast		West coast		Lake Okeechobee	
	Pounds	Value	Pounds	Value	Pounds	Value
Crabs:						
Hard.....	3,750,700	\$82,079	775,400	\$11,727		
Soft and peelers.....			1,500	89		
Stone.....	7,700	2,541	38,400	6,776		
Sea crawfish or spiny lobster.....	224,700	17,844	67,800	3,777		
Shrimp.....	12,546,700	382,230	1,490,700	49,582		
Clams:						
Coquina.....			3,700	450		
Hard, public.....	28,100	2,373	720,000	46,799		
Conchs.....			7,400	553		
Oysters, market:						
Public, spring.....	124,200	6,072	426,700	25,534		
Public, fall.....	21,700	1,162	358,900	27,217		
Private, spring.....	183,900	8,220	21,200	1,537		
Private, fall.....	132,900	6,408	10,400	585		
Scallops, bay.....			118,600	9,499		
Turtles:						
Green.....			10,000	400		
Soft-shell.....	5,700	85			208,100	\$4,162
Sponges:						
Grass.....			21,700	14,003		
Sheepswool.....			444,000	1,089,367		
Wire.....			16,200	12,382		
Yellow.....			149,500	103,953		
Total.....	171,384,600	1,651,312	58,764,800	3,331,682	2,026,000	67,986

Sponge fishery of Florida, 1937

OPERATING UNITS: BY GEAR

Item	Sponge hooks	Diving outfits	Total
	Number	Number	Number
Fishermen:			
On vessels.....		49	49
On boats and shore, regular.....	380	520	900
Total.....	380	569	949
Vessels, motor:			
Net tonnage.....		7	7
Boats:			
Motor.....		65	65
Other.....	256		256
Apparatus, number.....	256	72	328

CATCH: BY GEAR

Sponges	Sponge hooks		Diving outfits		Total	
	Pounds	Value	Pounds	Value	Pounds	Value
Grass.....	21,700	\$14,003	352,700	\$866,486	21,700	\$14,003
Sheepswool.....	91,300	222,881	16,200	12,382	444,000	1,089,367
Wire.....	46,700	28,147	102,800	75,806	16,200	12,382
Yellow.....					149,500	103,953
Total.....	169,700	265,031	471,700	954,674	631,400	1,219,705

SPONGES SOLD AT THE EXCHANGE, TARPON SPRINGS, FLA.

During 1937 sponges sold on the exchange at Tarpon Springs, Fla., amounted to 561,943 pounds, valued at \$1,097,301. This is a decrease of 11 percent in quantity but an increase of 6 percent in value as compared with the transactions on the exchange in 1936. Revised data on the volume of sponges sold on the exchange in 1936 show

that sales during that year totaled 628,226 pounds, valued at \$1,035,-429. Of the total sponges sold on the exchange during 1937, 43,218 pounds, valued at \$163,745, were large wool; 26,511 pounds, valued at \$60,923, were medium and small wool; 329,018 pounds, valued at \$752,032, were wool rags; 130,562 pounds, valued at \$96,536, were yellow; 16,954 pounds, valued at \$11,807, were grass; and 15,680 pounds, valued at \$12,258, were wire. It is estimated that sponges valued at \$1,250 were sold outside the exchange.

ALABAMA

Fisheries of Alabama, 1937

OPERATING UNITS: BY GEAR

Item	Haul seines	Gill nets, stake	Trammel nets	Lines			Fyke nets
				Hand	Trot with baits or snoods	Trot with hooks	
Fishermen:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
On vessels.....				79			
On boats and shore:							
Regular.....	36	3	163	29	94	28	7
Casual.....			5	16	11	31	
Total	36	3	168	124	105	59	7
Vessels, motor:							
5 to 10 tons.....				1			
11 to 20 tons.....				9			
61 to 70 tons.....				1			
Total				11			
Net tonnage.....				202			
Boats:							
Motor.....	5	2	57	10	32	9	7
Other.....	6	1	162	27	70	49	
Apparatus:							
Number.....	6	12	166	124	102	279	90
Length, yards.....	3,500						
Square yards.....		2,525	82,400				
Hooks, baits, or snoods.....				208	29,900	83,100	

Item	Otter trawls, shrimp	Pots, fish	Spears	Dredges, oyster	Tongs, oyster	By hand		Total, exclusive of duplication
						Oyster	Other	
Fishermen:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
On vessels.....	48			53	40			168
On boats and shore:								
Regular.....	323	45	22	12	198	10	20	653
Casual.....		15	32		20		22	110
Total	371	60	54	65	258	10	42	931
Vessels, motor:								
5 to 10 tons.....	14			8	12			19
11 to 20 tons.....	7			5	1			17
41 to 50 tons.....				1				1
61 to 70 tons.....								1
Total	21			14	13			38
Net tonnage.....	203			109	111			494
Boats:								
Motor.....	156	8		6	74			264
Other.....		52			151		12	412
Apparatus:								
Number.....	177	655	54	25	244			
Yards at mouth.....	2,639			25				

Fisheries of Alabama, 1937—Continued

CATCH: BY GEAR

Species	Haul seines		Gill nets, stake		Trammel nets		Lines	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Bluefish.....	17,700	\$1,103	-----	-----	10,600	\$619	-----	-----
Blue runner or hardtail.....	13,400	332	-----	-----	900	19	-----	-----
Croaker.....	5,600	126	-----	-----	25,400	675	-----	-----
Drum:								
Black.....	3,100	109	-----	-----	4,600	161	-----	-----
Red or redfish.....	25,200	1,890	-----	-----	34,800	2,609	6,700	\$503
Flounders.....	3,000	285	-----	-----	17,900	1,713	-----	-----
Groupers.....	-----	-----	-----	-----	-----	-----	219,200	7,670
King whiting or "kingfish".....	2,300	69	-----	-----	4,900	141	-----	-----
Mullet.....	877,200	25,408	-----	-----	2,865,200	82,612	-----	-----
Pompano.....	700	134	-----	-----	1,100	204	-----	-----
Sea catfish.....	3,900	92	-----	-----	21,700	498	-----	-----
Sheepshead, salt-water.....	19,100	956	-----	-----	22,000	1,100	-----	-----
Snapper, red.....	-----	-----	-----	-----	-----	-----	500	15
Spanish mackerel.....	9,800	832	-----	-----	13,200	1,158	1,168,200	83,887
Spot.....	6,900	157	-----	-----	28,600	642	300	26
Squeteagues or "sea trout":								
Spotted.....	25,400	2,414	-----	-----	107,300	10,220	12,800	1,216
White.....	5,000	162	-----	-----	14,900	452	2,600	82
Sturgeon.....	-----	-----	3,100	\$233	-----	-----	-----	-----
Tenpounder.....	6,400	128	-----	-----	14,000	280	-----	-----
Total.....	1,024,700	34,196	3,100	233	3,178,100	103,033	1,410,100	93,370

Species	Lines—Continued				Fyke nets		Otter trawls	
	Trot with baits or snoods		Trot with hooks					
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Buffalofish.....	-----	-----	-----	-----	29,000	\$1,650	-----	-----
Catfish and bullheads.....	-----	-----	33,900	\$2,543	7,300	547	-----	-----
Paddlefish or spoonbill cat.....	-----	-----	20,100	1,407	1,200	88	-----	-----
Sheepshead, fresh-water.....	-----	-----	-----	-----	13,500	675	-----	-----
Crabs, hard.....	756,000	\$11,336	-----	-----	-----	-----	-----	-----
Shrimp.....	-----	-----	-----	-----	-----	-----	3,103,800	\$137,985
Total.....	756,000	11,336	54,000	3,950	51,000	2,960	3,103,800	137,985

Species	Pots		Spears		Dredges		Tongs		By hand	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Catfish and bullheads.....	75,400	\$5,661	-----	-----	-----	-----	-----	-----	-----	-----
Flounders.....	-----	-----	16,400	\$1,562	-----	-----	-----	-----	-----	-----
Oysters, market:										
Public, spring.....	-----	-----	-----	-----	643,600	\$27,681	282,500	\$13,902	-----	-----
Public, fall.....	-----	-----	-----	-----	-----	-----	197,400	15,572	-----	-----
Private, spring.....	-----	-----	-----	-----	-----	-----	48,800	3,077	-----	-----
Private, fall.....	-----	-----	-----	-----	-----	-----	62,900	5,913	-----	-----
Terrapin, diamond-back.....	-----	-----	-----	-----	-----	-----	-----	-----	9,300	\$930
Total.....	75,400	5,661	16,400	1,562	643,600	27,681	591,600	38,464	9,300	930

OPERATING UNITS: BY COUNTIES

Item	Baldwin	Mobile
	Number	Number
Fishermen:		
On vessels.....	11	157
On boats and shore:		
Regular.....	87	566
Casual.....	25	85
Total.....	123	806

Fisheries of Alabama, 1937—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Baldwin	Mobile
	Number	Number
Vessels, motor:		
5 to 10 tons.....	2	17
11 to 20 tons.....	1	16
41 to 50 tons.....		1
61 to 70 tons.....		1
Total vessels.....	3	35
Total net tonnage.....	32	462
Boats:		
Motor.....	34	230
Other.....	72	340
Apparatus:		
Haul seines.....	2	4
Length, yards.....	1,200	2,300
Gill nets, stake.....	12	
Square yards.....	2,625	
Trammel nets.....	38	128
Square yards.....	20,600	61,800
Lines:		
Hand.....	26	98
Hooks.....	31	172
Trot with baits or snoods.....	6	96
Baits or snoods.....	1,600	28,300
Trot with hooks.....	82	197
Hooks.....	24,400	58,700
Fyke nets.....	15	75
Otter trawls, shrimp.....	11	166
Yards at mouth.....	158	2,481
Pots, fish.....	165	490
Spears.....	21	33
Dredges, oyster.....	2	23
Yard at mouth.....	2	23
Tongs, oyster.....	36	208

CATCH: BY COUNTIES

Species	Baldwin		Mobile	
	Pounds	Value	Pounds	Value
Bluefish.....	5,100	\$445	23,200	\$1,277
Blue runner or hardtail.....			14,300	351
Buffalo fish.....	6,000	500	23,000	1,150
Catfish and bullheads.....	32,000	2,401	84,600	6,350
Croaker.....	10,900	249	20,100	452
Drum:				
Black.....	600	21	7,100	249
Red or redfish.....	13,400	1,005	53,300	3,997
Flounders.....	8,800	853	28,500	2,707
Groupers.....	14,400	504	204,800	7,166
King whiting or "kingfish".....	2,600	72	4,600	138
Mullet.....	856,200	24,569	2,877,200	83,451
Paddlefish or spoonbill cat.....	4,600	326	16,700	1,169
Pompano.....	800	168	1,000	180
Sea catfish.....	4,600	111	21,000	479
Sheepshead:				
Fresh-water.....	3,300	165	10,200	510
Salt-water.....	4,700	235	36,700	1,885
Snapper, red.....	15,300	1,077	1,152,900	82,790
Spanish mackerel.....	7,800	631	15,500	1,385
Spot.....	11,100	249	24,400	550
Squeteagues or "sea trout":				
Spotted.....	38,300	3,658	107,200	10,192
White.....	5,700	181	19,800	545
Sturgeon.....	3,100	233		
Tempounder.....	2,500	50	17,900	358
Crabs, hard.....	20,000	300	736,000	11,036
Shrimp.....	199,000	8,998	2,904,800	128,987
Oysters, market:				
Public, spring.....	71,000	3,249	855,100	38,334
Public, fall.....	19,100	1,496	178,300	14,076
Private, spring.....	24,900	1,368	23,900	1,709
Private, fall.....	30,800	2,467	32,100	3,446
Terrapin, diamond-back.....	3,700	370	5,600	560
Total.....	1,420,300	55,941	9,496,800	408,429

MISSISSIPPI

Fisheries of Mississippi, 1937

OPERATING UNITS: BY GEAR

Item	Haul seines	Trammel nets	Lines			Cast nets
			Hand	Troll	Trot, with baits or snoods	
Fishermen:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
On vessels.....			24			
On boats and shore:						
Regular.....	52	74	61	6	172	15
Casual.....	4		35		11	26
Total	56	74	120	6	183	41
Vessels, motor:						
5 to 10 tons.....			3			
21 to 30 tons.....			1			
Total			4			
Net tonnage			48			
Boats:						
Motor.....	12	26	18	3	65	
Other.....	12	59	43		106	5
Apparatus:						
Number.....	12	59	120	6	173	41
Length, yards.....	4,800					
Square yards.....		29,850				
Hooks, baits, or snoods.....			149	6	101,600	

Item	Otter trawls, shrimp	Spears	Dredges, oyster	Tongs, oyster	By hand, other than for oysters	Total, exclusive of duplication
Fishermen:						
On vessels.....	424		793			983
On boats and shore:						
Regular.....	1,003	16	155	634	2	1,670
Casual.....	22	29		20	2	116
Total	1,449	45	948	654	4	2,769
Vessels:						
Motor:						
5 to 10 tons.....	105		61			113
11 to 20 tons.....	80		77			103
21 to 30 tons.....	6		12			14
31 to 40 tons.....	1		1			2
41 to 50 tons.....			1			1
Total	192		152			233
Net tonnage	2,131		1,989			2,831
Sail:						
5 to 10 tons.....			3			3
11 to 20 tons.....			4			4
Total			7			7
Net tonnage			84			84
Total vessels	192		159			240
Total net tonnage	2,131		2,073			2,916
Boats:						
Motor.....	503		35	111		605
Other.....				522		633
Apparatus:						
Number.....	695	45	385	621		
Yards at mouth.....	10,637		388			

Fisheries of Mississippi, 1937—Continued

CATCH: BY GEAR

Species	Haul seines		Trammel nets		Lines			
	Pounds	Value	Pounds	Value	Hand		Troll	
					Pounds	Value	Pounds	Value
Croaker.....			5,200	\$160	2,400	\$73		
Drum:								
Black.....			7,900	250	3,700	112		
Red or redfish.....			104,900	5,245	18,300	915		
Flounders.....			5,500	495				
Groupers.....					128,600	3,857		
King whiting or "kingfish".....			7,500	234	900	28		
Mullet.....			153,600	4,610				
Pompano.....			100	15				
Sea catfish.....			8,300	166	2,500	50		
Sheepshead.....			29,300	1,172	3,800	152		
Snapper, red.....					303,800	21,251		
Spanish mackerel.....							700	\$84
Spot.....			1,200	39				
Squeteagues or "sea trout":								
Spotted.....			122,100	10,990	88,500	7,065		
White.....			108,900	3,958	53,400	2,076		
Crabs, hard.....					16,700	292		
Shrimp, Mississippi.....	180,000	\$8,100						
Total.....	180,000	\$8,100	554,200	27,332	622,600	36,771	700	84

Species	Lines—Continued		Cast nets		Otter trawls		Spears	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Flounders.....					1,500	\$135	20,800	\$1,842
Mullet.....			7,500	\$225				
Crabs:								
Hard.....	1,418,100	\$24,909						
Soft and peelers.....	1,800	306						
Shrimp:								
Mississippi.....					4,493,300	202,197		
Louisiana.....					18,884,700	849,927		
Total.....	1,419,900	25,215	7,500	225	23,379,500	1,052,259	20,800	1,842

Species	Dredges		Tongs		By hand	
	Pounds	Value	Pounds	Value	Pounds	Value
Oysters, market:						
Public, spring, Mississippi.....	2,136,700	\$93,975	2,030,200	\$97,039		
Public, fall, Mississippi.....	27,500	2,145	307,300	20,081		
Public, spring, Louisiana.....	8,087,000	347,679	86,000	4,105		
Public, fall, Louisiana.....	123,700	6,813	95,700	8,502		
Terrapin, diamond-back.....					600	\$48
Total.....	10,374,900	449,612	2,519,200	129,727	600	48

OPERATING UNITS: BY COUNTY

Item	Hancock	Harrison	Jackson
	Number	Number	Number
Fishermen:			
On vessels.....	25	887	71
On boats and shore:			
Regular.....	169	1,420	72
Casual.....	13	84	19
Total.....	207	2,400	162
Vessels:			
Motor:			
5 to 10 tons.....	3	107	3
11 to 20 tons.....	2	95	6
21 to 30 tons.....		12	2

Fisheries of Mississippi, 1937—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Hancock	Harrison	Jackson
Vessels—Continued.			
Motor—Continued.	<i>Number</i>	<i>Number</i>	<i>Number</i>
31 to 40 tons.....		2	
41 to 50 tons.....		1	
Total.....	5	217	11
Net tonnage.....	51	2,624	166
Sail:			
5 to 10 tons.....		1	2
11 to 20 tons.....	1	3	
Total.....	1	4	2
Net tonnage.....	14	53	17
Total vessels.....	6	221	13
Total net tonnage.....	65	2,677	173
Boats:			
Motor.....	39	548	18
Other.....	120	441	72
Apparatus:			
Haul seines.....		12	
Length, yards.....		4,800	
Trammel nets.....	21	27	11
Square yards.....	10,400	14,150	5,800
Lines:			
Hand.....	32	47	41
Hooks.....	32	58	59
Troll.....	6		
Hooks.....	6		
Trot with baits or snoods.....	1	149	23
Baits or snoods.....	450	89,350	11,800
Cast nets.....	6	30	5
Otter trawls, shrimp.....	34	649	12
Yards at mouth.....	504	9,946	187
Spears.....	7	23	15
Dredges, oyster.....	13	344	28
Yards at mouth.....	14	346	28
Tongs, oyster.....	96	484	41

CATCH; BY COUNTIES

Species	Hancock		Harrison		Jackson	
	Pounds	Value \$105	Pounds	Value \$90	Pounds	Value \$38
Croaker.....	3,500		3,000		1,100	
Drum:						
Black.....	7,000	210	3,300	114	1,000	38
Red or redfish.....	46,500	2,325	53,300	2,915	18,400	920
Flounders.....	6,000	540	19,000	1,680	2,800	252
Groupers.....			67,000	2,010	61,600	1,847
King whiting or "kingfish".....	3,300	99	2,700	81	2,400	82
Mullet.....	23,000	690	42,500	1,275	95,600	2,870
Pompano.....					100	15
Sea catfish.....	7,700	164	2,300	46	800	16
Sheepshead.....	9,500	390	3,600	144	20,000	800
Snapper, red.....			87,000	6,290	216,800	14,961
Spanish mackerel.....	700	84				
Spot.....					1,200	39
Squeteagues or "sea trout":						
Spotted.....	84,000	7,561	109,500	9,855	17,100	1,539
White.....	28,000	1,120	38,000	1,520	96,300	3,392
Crabs:						
Hard.....	2,100	37	1,269,700	22,308	163,000	2,856
Soft and peelers.....			1,800	306		
Shrimp:						
Mississippi.....	196,000	8,812	4,195,100	188,785	102,200	4,600
Louisiana.....	952,500	43,029	17,852,200	803,307	260,000	11,691
Oysters, market:						
Public, spring, Mississippi.....	408,500	23,229	3,244,200	144,639	514,200	23,146
Public, fall, Mississippi.....	50,600	3,180	229,200	13,822	55,000	5,224
Public, spring, Louisiana.....	248,500	10,794	7,663,500	329,671	263,000	11,319
Public, fall, Louisiana.....	21,900	1,422	197,500	12,593		
Terrapin, diamond-back.....					600	48
Total.....	2,097,300	103,771	35,089,400	1,641,751	1,893,200	85,693

LOUISIANA

Fisheries of Louisiana, 1937

OPERATING UNITS: BY GEAR

Item	Haul seines	Gill nets, run-around	Trammel nets	Lines			Fyke nets	Dip nets,
				Hand	Trot with baits or snoods	Trot with hooks		Common
	Number	Number	Number	Number	Number	Number	Number	Number
Fishermen:								
On vessels.....				10				
On boats and shore:								
Regular.....	514	2	105	148	576	439	53	36
Casual.....	81		11	174	291	111	36	29
Total.....	595	2	116	332	867	550	89	65
Vessels, motor:								
5 to 10 tons.....				1				
11 to 20 tons.....				1				
Total.....				2				
Net tonnage.....				18				
Boats:								
Motor.....	91	1	50	84	177	174	33	
Other.....	117	1	26	188	700	421	56	34
Apparatus:								
Number.....	131	1	57	332	876	550	428	65
Length, yards.....	27,570							
Square yards.....		650	12,700					
Hooks, baits, or snoods.....				347	220,550	235,800		

Item	Dip nets—	Cast nets	Otter trawls, shrimp	Brush traps	Dredges, oyster	Tongs, oyster	By hand, other than for oysters	Total, exclusive of duplication
	Continued							
	Drop	Number	Number	Number	Number	Number	Number	Number
Fishermen:								
On vessels.....					130	35		502
On boats and shore:								
Regular.....		149	73	3,762	144	804	12	5,565
Casual.....		56	91	23	6	7	12	693
Total.....		205	164	4,164	144	846	24	6,760
Vessels, motor:								
5 to 10 tons.....				158	25	14		179
11 to 20 tons.....				23	9	1		25
21 to 30 tons.....				2				2
Total.....				183	34	15		206
Net tonnage.....				1,394	310	103		1,567
Boats:								
Motor.....		22		1,878	30	259		2,468
Other.....		168	67		114	385		1,712
Accessory boats.....						15		15
Apparatus:								
Number.....		8,925	160	2,096	28,300	827		
Yards at mouth.....				26,976				

Fisheries of Louisiana, 1937—Continued

CATCH: BY GEAR

Species	Haul seines		Gill nets, runaround		Trammel nets		Lines	
							Hand	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Buffalofish	421,300	\$22,240			5,000	\$250	1,000	\$55
Cabio or crab eater							200	4
Catfish and bullheads	377,700	28,854			3,500	263	16,000	1,180
Croaker	66,500	1,766			24,900	811	45,200	1,300
Drum:								
Black	100,400	2,732			15,300	484	49,400	1,404
Red or redfish	257,000	16,945	1,000	\$60	92,600	5,900	99,000	5,918
Flounders	16,600	1,338			22,300	2,187		
Garfish	6,000	120			200	4		
Grouper							6,100	244
Jewfish							17,000	765
King whiting or "kingfish"	1,800	44			24,000	820		
Mullet	7,700	231			3,000	90		
Paddlefish or spoonbill cat	500	25						
Pompano							800	195
Sea catfish	4,600	92			5,200	105	4,000	82
Sheepshead:								
Fresh-water	305,900	8,113					1,000	25
Salt-water	108,000	5,507	200	10	32,700	1,640	46,100	2,917
Snapper, red							148,100	12,068
Spanish mackerel							2,000	200
Spot	3,200	64			500	15		
Squeteagues or "sea trout":								
Spotted	332,400	29,820	5,000	450	169,200	14,004	281,100	24,293
White	69,900	2,321	300	12	35,900	1,928	93,500	3,932
Tripletail	1,000	60					1,000	50
Crabs:								
Hard	250,000	2,610					70,000	740
Soft and peelers	60,000	9,700						
Shrimp	2,264,700	58,678						
Terrapin, diamond-back	500	60						
Total	4,656,700	191,310	6,500	532	434,300	28,501	881,500	55,372

Species	Lines—Continued.						Dip nets	
	Trot with baits or snoods		Trot with hooks		Fyke nets		Common	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Buffalofish			22,400	\$1,295	433,800	\$10,942		
Catfish and bullheads			1,190,600	91,703	4,500	370		
Paddlefish or spoonbill cat			48,400	2,784	500	25		
Sheepshead, fresh-water			67,800	2,210	215,600	5,835		
Crabs:								
Hard	12,887,000	\$141,630					13,600	\$501
Soft and peelers	32,000	5,080					9,800	1,437
Total	12,919,000	146,710	1,329,200	97,992	454,300	17,172	23,400	1,938

Species	Dip nets—Continued.		Cast nets		Otter trawls		Brush traps	
	Drop						Pounds	Value
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Flounders					15,000	\$870		
Crabs:								
Hard	1,496,500	\$49,330						
Soft and peelers	84,500	13,090					143,000	\$21,650
Shrimp			101,000	\$3,530	66,415,200	2,320,332		
Total	1,581,000	62,420	101,000	3,530	66,430,200	2,321,202	143,000	21,650

Fisheries of Louisiana, 1937—Continued

CATCH: BY GEAR—Continued

Species	Dredges		Tongs		By hand	
	Pounds	Value	Pounds	Value	Pounds	Value
Oysters, market:						
Public, spring.....	1,318,400	\$71,536	79,400	\$4,689	-----	-----
Public, fall.....	51,200	4,993	11,700	1,167	-----	-----
Private, spring.....	1,561,600	100,802	2,672,800	224,886	-----	-----
Private, fall.....	240,600	22,504	2,114,400	221,939	-----	-----
Terrapin, diamond-back.....	-----	-----	-----	-----	3,200	\$340
Total.....	3,160,800	199,835	4,878,300	452,681	3,200	340

OPERATING UNITS: BY PARISHES

Item	Calca- sieu	Cam- eron	Iberla	Jeffer- son	Jeffer- son Davis	Lafour- che	Orleans	Plaque- mines
	Number	Number	Number	Number	Number	Number	Number	Number
Fishermen:								
On vessels.....	-----	3	-----	66	-----	105	26	104
On boats and shore:								
Regular.....	15	250	54	1,086	30	666	179	785
Casual.....	28	9	57	16	23	3	107	63
Total.....	43	262	111	1,168	53	774	312	952
Vessels, motor:								
5 to 10 tons.....	-----	-----	-----	26	-----	43	6	34
11 to 20 tons.....	-----	1	-----	3	-----	5	-----	4
21 to 30 tons.....	-----	-----	-----	2	-----	-----	-----	-----
Total.....	-----	1	-----	31	-----	48	6	38
Net tonnage.....	-----	11	-----	269	-----	335	39	280
Boats:								
Motor.....	23	124	48	479	28	289	92	335
Other.....	20	13	55	215	22	53	133	236
Accessory boats.....	-----	-----	-----	-----	-----	-----	-----	8
Apparatus:								
Haul seines.....	1	1	6	10	-----	5	9	7
Length, yards.....	150	350	1,800	4,070	-----	1,670	1,130	3,050
Gill nets, runaround.....	-----	-----	1	-----	-----	-----	-----	-----
Square yards.....	-----	-----	550	-----	-----	-----	-----	-----
Trammel nets.....	-----	-----	3	3	-----	-----	3	15
Square yards.....	-----	-----	600	590	-----	-----	1,600	3,080
Lines:								
Hand.....	4	-----	5	52	9	-----	57	10
Hooks.....	4	-----	5	52	9	-----	62	10
Trot with baits or snoods.....	3	4	4	115	12	3	31	108
Baits or snoods.....	250	700	800	36,000	1,200	600	11,700	40,500
Trot with hooks.....	31	-----	80	17	39	-----	-----	-----
Hooks.....	33,700	-----	37,500	2,400	23,500	-----	-----	-----
Fyke nets.....	68	-----	47	-----	42	-----	-----	-----
Dip nets, drop.....	-----	-----	-----	750	-----	-----	3,300	-----
Cast nets.....	-----	-----	-----	14	-----	-----	88	-----
Otter trawls, shrimp.....	-----	125	1	467	1	306	45	314
Yards at mouth.....	-----	1,517	10	5,994	11	4,097	609	3,845
Brush traps.....	-----	-----	-----	28,300	-----	-----	-----	-----
Dredges, oyster.....	-----	-----	4	2	-----	-----	18	28
Yards at mouth.....	-----	-----	4	2	-----	-----	18	28
Tongs, oyster.....	-----	8	7	22	-----	110	2	245

NOTE.—The catch as shown above for Louisiana does not include the following products, which were taken by Mississippi craft in Louisiana waters: Shrimp, 19,064,700 pounds, valued at \$858,027; oysters, market, spring, 8,173,000 pounds of meats, valued at \$351,784; and oysters, market, fall, 219,400 pounds of meats, valued at \$14,315. These products have been included with the Mississippi catch.

Fisheries of Louisiana, 1937—Continued

OPERATING UNITS: BY PARISHES—Continued

Item	St. Bernard	St. Charles	St. John the Baptist	St. Mary	St. Tammany	Tangipahoa	Terrebonne	Vermillion
Fishermen:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
On vessels.....	29			56	10		99	4
On boats and shore:								
Regular.....	370	116	2	554	77	36	1,299	46
Casual.....	67	38	9	100	70	36	32	35
Total.....	466	154	11	710	157	72	1,430	85
Vessels, motor:								
5 to 10 tons.....	10			16	1		42	1
11 to 20 tons.....				7	2		3	
Total.....	10			23	3		45	1
Net tonnage.....	76			225	35		209	8
Boats:								
Motor.....	159	48	1	187	11	31	589	24
Other.....	130	85	7	420	94	29	174	26
Accessory boats.....					1		6	
Apparatus:								
Haul seines.....	41	5	4	11	5	5	11	10
Length, yards.....	4,150	1,330	120	3,830	850	2,000	1,820	1,750
Trammel nets.....	8					3	19	3
Square yards.....	1,560					1,200	3,080	1,150
Lines:								
Hand.....	25	12		42	69		47	
Hooks.....	25	12		52	69		47	
Trot with baits or snoods.....	120	70		380	1		8	17
Baits or snoods.....	24,300	20,800		78,000	850		1,150	3,700
Trot with hooks.....		76	2	267		38		
Hooks.....		22,800	900	81,500		33,800		
Fyke net.....				237			84	
Dip nets:								
Common.....					53	12		
Drop.....	1,850		125		2,800	600		
Cast nets.....					34	20		
Other trawls, shrimp.....	133	30	4	119	10		587	8
Yards at mouth.....	1,653	394		1,727	128		6,908	85
Dredges, oyster.....	18			7	6		23	11
Yards at mouth.....	18			7	6		23	11
Tongs, oyster.....	6			6	13		404	4

CATCH: BY PARISHES

Species	Calcasieu		Cameron		Iberia		Jefferson	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Buffalofish.....	76,300	\$3,052			41,500	\$1,660	400	\$20
Cable or crab eater.....							200	4
Catfish and bullheads.....	15,800	1,422			106,000	9,540	25,000	1,750
Croaker.....	1,000	40			2,200	88	4,500	90
Drum:								
Black.....			500	\$15	500	20	14,000	180
Red or redbfish.....	1,400	84	1,000	60	7,700	462	23,000	1,250
Flounders.....			100	10			400	32
Garfish.....			1,000	20	200	4		
Paddlefish or spoonbill cat.....	5,400	270			3,000	150		
Pompano.....							800	185
Sea catfish.....			800	6			3,000	60
Sheepshead:								
Fresh-water.....	7,300	255			127,000	4,445		
Salt-water.....	300	15	800	25	3,700	185	4,000	200
Spanish mackerel.....							2,000	200
Squeteague or "sea trout":								
Spotted.....	4,000	400	8,000	800	17,000	1,530	96,800	6,976
White.....			500	20	4,600	184	28,000	560
Tripletail.....							1,000	50
Crabs:								
Hard.....	5,000	125	10,000	250	4,500	130	3,363,500	85,920
Soft and peelers.....							171,400	25,910
Shrimp.....			3,940,400	157,640	23,400	1,020	14,781,800	469,669
Oysters, market:								
Public, spring.....			6,100	590			46,400	2,580
Public, fall.....			5,800	580	1,900	216		
Private, spring.....					17,900	1,509	101,000	8,020
Private, fall.....					15,700	1,803	71,400	7,436
Total.....	116,500	5,663	3,974,200	160,016	376,800	22,946	18,738,600	661,102

Fisheries of Louisiana, 1937—Continued

CATCH: BY PARISHES—Continued

Species	Jefferson Davis		Lafourche		Orleans		Plaquemines	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Buffalo fish	32,000	\$1,120						
Catfish and bullheads	83,000	7,050						
Croaker	500	20			16,000	\$405	22,200	\$705
Drum:								
Black					12,000	390	10,900	299
Red or redfish					71,000	4,045	48,700	3,425
Flounders					1,200	96	22,000	2,198
Grouper					6,100	244		
Jewfish					17,000	765		
King whiting or "kingfish"							23,000	790
Mullet					4,500	135		
Paddlefish or spoonbill cat.	1,000	50						
Sea catfish							5,300	106
Sheepshead:								
Fresh-water	28,000	840						
Salt-water					32,900	1,545	21,000	1,075
Snapper, red					45,000	3,820		
Spot					500	10	1,700	35
Squeteague or "sea trout":								
Spotted	5,000	500			73,500	7,025	101,000	10,100
White					40,500	1,575	26,200	936
Tripletail							1,000	50
Crabs:								
Hard	25,000	625	12,000	\$140	857,000	30,960	2,080,000	23,280
Soft and peelers					11,500	1,725		
Shrimp	35,000	1,400	10,951,600	399,138	1,449,000	50,209	9,395,500	372,694
Oysters, market:								
Public, spring					21,900	1,876	639,500	34,450
Public, fall					15,500	1,498	16,100	1,580
Private, spring			698,400	46,272	245,800	20,654	1,322,100	121,029
Private, fall			450,600	49,283	161,000	16,100	1,057,800	114,244
Total	209,500	11,605	12,112,600	494,833	3,081,900	143,047	14,793,800	686,906

Species	St. Bernard		St. Charles		St. John the Baptist		St. Mary	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Buffalo fish			50,000	\$2,500			438,000	\$24,165
Catfish and bullheads			301,700	19,002	4,900	\$368	851,700	68,136
Croaker	56,400	\$1,218						
Drum:								
Black	75,800	1,644						
Red or redfish	122,900	8,603						
Flounders	11,900	952					4,000	200
Paddlefish or spoonbill cat.							36,400	2,184
Sea catfish	1,600	32						
Sheepshead:								
Fresh-water			2,000	40			405,000	10,007
Salt-water	74,800	4,280						
Snapper, red							103,100	8,248
Spot	1,700	34						
Squeteague or "sea trout":								
Spotted	177,000	15,780						
White	30,000	1,464						
Crabs:								
Hard	1,775,000	17,950	223,700	2,237	22,000	880	5,728,800	57,288
Soft and peelers	93,000	15,040			500	75		
Shrimp	4,332,200	151,618	944,500	32,113	10,500	368	5,318,600	198,745
Oysters, market:								
Public, spring	433,200	24,180						
Public, fall							3,600	297
Private, spring	36,400	2,700					161,600	12,543
Private, fall	1,000	88					40,100	3,475
Terrapin, diamond-back	1,500	180						
Total	7,224,400	245,753	1,521,900	55,892	37,900	1,691	13,090,900	385,288

Fisheries of Louisiana 1937—Continued

CATCH: BY PARISHES—Continued

Species	St. Tammany		Tangipahoa		Terrebonne		Vermillion	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Buffalofish	500	\$25	37,000	\$1,850	7,800	\$390		
Catfish and bullheads	2,500	175	160,500	12,043	41,200	2,884	8,000	\$380
Croaker	13,200	434			12,600	497		
Drum:								
Black					46,000	1,840	5,400	262
Red or redfish	21,700	1,412	3,500	280	131,200	7,872	17,500	1,330
Flounders					14,000	880	300	27
Garfish							5,000	100
King whiting or "kingfish"					2,800	74		
Mullet	800	24			5,400	162		
Paddlefish or spoonbill cat.			3,600	180				
Sea catfish	500	10			3,100	65		
Sheepshead:								
Fresh-water			12,000	240	8,900	356		
Salt-water	27,200	1,519			10,600	630	12,000	700
Squeteagues or "sea trout":								
Spotted	112,200	11,060			159,200	11,146	34,000	3,250
White	43,500	1,740			17,700	1,380	8,600	344
Crabs:								
Hard	376,000	18,186	128,000	5,120	61,000	610	45,600	1,110
Soft and peelers	45,400	7,155	7,500	1,052				
Shrimp	351,300	12,771	20,000	700	16,961,400	525,135	265,700	9,320
Oysters, market:								
Public, spring	248,700	12,549						
Public, fall	20,000	1,989						
Private, spring					1,370,200	97,839	281,000	15,122
Private, fall					519,100	48,598	38,300	3,416
Terrapin, diamond-back					2,200	220		
Total	1,283,500	69,049	372,100	21,465	19,374,400	700,478	721,400	35,361

TEXAS

Fisheries of Texas, 1937

OPERATING UNITS: BY GEAR

Item	Haul seines	Gill nets		Trammel nets	Lines			
		Run-around	Stake		Hand	Troll	Trot with baits or snoods	Trot with hooks
	Number	Number	Number	Number	Number	Number	Number	Number
Fishermen:					64			
On vessels								
On boats and shore:								
Regular	127	80	141	188	167	4	17	103
Casual	7			21	131	3	32	2
Total	134	80	141	209	362	7	49	105
Vessels, motor:								
5 to 10 tons					1			
11 to 20 tons					5			
21 to 30 tons					2			
31 to 40 tons					1			
Total					9			
Net tonnage					152			
Boats:								
Motor	20	32	29	105	91	4	9	40
Other	7	7	53	4	119		40	45
Apparatus:								
Number	44	131	352	106	362	7	49	77
Length, yards	15,150							
Square yards		32,650	84,090	57,700				
Hooks, baits, or snoods					441	7	14,700	64,500

U. S. BUREAU OF FISHERIES

Fisheries of Texas, 1937—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Dip nets	Otter trawls, shrimp	Pots, crab	Spears	Dredges, oyster	Tongs, oyster	By hand, oyster	Total, exclusive of duplication
Fishermen:	Number	Number	Number	Number	Number	Number	Number	Number
On vessels.....	90				19			161
On boats and shore:								
Regular.....	24	770	22	52	159	60		1,382
Casual.....	10		7	82		52	4	296
Total.....	34	860	29	134	178	112	4	1,839
Vessels, motor:								
5 to 10 tons.....		36			4			36
11 to 20 tons.....		9			1			14
21 to 30 tons.....								2
31 to 40 tons.....								1
Total.....		45			5			53
Net tonnage.....		389			46			535
Boats:								
Motor.....		385	10		53	31		624
Other.....	13		12	9		54		294
Apparatus:								
Number.....	34	430	800	134	58	110		
Square yards.....		6,677						
Yards at mouth.....					60			

CATCH: BY GEAR

Species	Haul seines		Gill nets				Trammel nets	
			Runaround		Stake			
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Croaker.....	6,700	\$201	11,600	\$290	16,100	\$341	30,400	\$866
Drum:								
Black.....	150,700	5,539	346,700	7,576	512,400	10,651	141,900	4,482
Red or redfish.....	152,300	11,193	149,500	10,511	149,300	10,150	266,900	17,124
Flounders.....	5,600	513	3,300	312	500	43	8,500	784
King whiting or "kingfish".....							3,000	65
Mullet.....			1,300	36	400	11	4,900	112
Pompano.....					200	30	4,200	843
Sea catfish.....	2,000	60	5,900	314	600	17	8,400	220
Sheepshead.....	8,900	267	4,200	150	4,800	129	21,500	645
Snook or sergeantfish.....	3,000	210	1,000	40	2,000	80	1,000	70
Spanish mackerel.....	4,300	341	4,100	249	1,800	116	9,400	624
Spot.....	3,000	60	1,000	20			8,000	180
Squeteagues or "sea trout":								
Spotted.....	239,000	20,580	512,200	43,833	559,300	47,760	478,600	39,526
White.....	500	15	3,100	83	1,000	26	10,400	297
Total.....	576,000	38,979	1,043,900	63,384	1,248,400	69,354	997,100	65,797

Fisheries of Texas, 1937—Continued

CATCH: BY GEAR—Continued

Species	Lines							
	Hand		Troll		Trot with baits or snoods		Trot with hooks	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Buffalofish.....							3,400	\$204
Catfish and bullheads.....							66,600	3,325
Croaker.....	13,800	\$394					4,000	130
Drum:								
Black.....	137,700	3,951					259,600	7,731
Red or redfish.....	98,000	7,241					138,600	8,447
Flounders.....	2,600	232					2,700	248
Groupers.....	19,800	638						
Jewfish.....	2,700	91						
Kingfish or "king mackerel".....			3,000	\$107				
Pompano.....	100	15						
Sea catfish.....	2,100	62					12,800	311
Sheepshead.....	1,700	50						
Snapper, red.....	1,141,200	79,781						
Snook or sergeantfish.....	2,200	154						
Spanish mackerel.....	17,200	1,081	2,000	100				
Squeteague or "sea trout":								
Spotted.....	234,200	17,460					66,600	5,987
White.....	4,600	131						
Crabs, hard.....					801,800	\$7,707		
Total.....	1,677,600	111,281	5,000	207	301,800	7,707	553,600	26,373

Species	Dip nets		Otter trawls		Pots		Spears	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Flounders.....							87,600	\$8,058
Crabs, hard.....	212,900	\$5,660			406,900	\$11,220		
Shrimp.....			16,904,800	\$551,404				
Total.....	212,900	5,660	16,904,800	551,404	406,900	11,220	87,600	8,058

Species	Dredges		Tongs		By hand	
	Pounds	Value	Pounds	Value	Pounds	Value
Oysters, market:						
Public, spring.....	508,800	\$35,550	106,600	\$8,902	2,700	\$245
Public, fall.....	446,300	34,112	123,600	11,668	1,700	156
Total.....	955,100	69,662	230,100	20,568	4,400	401

OPERATING UNITS: BY COUNTIES

Item	Aransas	Brazoria	Cal-houn	Cam-eron	Galves-ton	Harris
	Number	Number	Number	Number	Number	Number
Fishermen:						
On vessels.....	2		10	12	88	
On boats and shore:						
Regular.....	130	9	179	163	244	26
Casual.....	34	6	12	15	54	15
Total.....	166	15	201	190	386	41
Vessels, motor:						
5 to 10 tons.....			4	1	14	
11 to 20 tons.....	1			1	8	
21 to 30 tons.....					2	
31 to 40 tons.....					1	
Total.....	1		4	2	25	
Net tonnage.....	13		26	20	294	
Boats:						
Motor.....	53	5	101	41	121	16
Other.....	24	4	30	41	42	12
Apparatus:						
Haul seines.....	3		3		7	
Length, yards.....	300		300		1,750	

Fisheries of Texas, 1937—Continued

OPERATING UNITS: BY COUNTIES—Continued

Item	Aransas	Brazoria	Calhoun	Cam- eron	Galves- ton	Harris
Apparatus—Continued.						
Gill nets:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Runaround.....	34			70		
Square yards.....	7,100			17,500		
Stake.....	19			267		
Square yards.....	3,600			64,100		
Trammel nets.....	21		27		13	9
Square yards.....	14,000		15,000		4,500	2,700
Lines:						
Hand.....	35	9	10	57	84	
Hooks.....	35	9	10	57	156	
Troll.....				5		
Hooks.....				5		
Trot with baits or snoods.....					34	11
Baits or snoods.....					10,500	3,100
Trot with hooks.....		5	18			2
Hooks.....		1,800	4,500			700
Dip nets.....	28					
Otter trawls, shrimp.....	27	1	66	28	103	
Yards at mouth.....	436	13	890	462	1,762	
Pots, crab.....			660		140	
Spears.....	14		14	4	4	
Dredges, oyster.....	18		8	3	3	1
Yards at mouth.....	20		8		3	1
Tongs, oyster.....	9	3	18	3	21	12
Item	Jeffer- son	Kleberg	Mata- gorda	Nueces	San Pa- tricko	Willacy
Fishermen:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
On vessels.....	2		25	2	20	
On boats and shore:						
Regular.....	71	20	179	174	177	10
Casual.....	2		27	86	33	12
Total.....	75	20	231	262	230	22
Vessels, motor:						
5 to 10 tons.....	1		8	1	7	
11 to 20 tons.....			1		3	
Total.....	1		9	1	10	
Net tonnage.....	8		82	7	85	
Boats:						
Motor.....	34	4	87	65	92	5
Other.....	2	12	14	78	25	10
Apparatus:						
Haul seines.....			1	28	2	
Length, yards.....			100	12,500	200	
Gill nets:						
Runaround.....			3	22	2	
Square yards.....			1,650	5,800	600	
Stake.....				60	6	
Square yards.....				15,200	1,190	
Trammel nets.....			16		20	
Square yards.....			8,900		12,600	
Lines:						
Hand.....	7	14		84	44	18
Hooks.....	14	14		84	44	18
Troll.....					2	
Hooks.....					2	
Trot with baits or snoods.....	2			2		
Baits or snoods.....	200			900		
Trot with hooks.....		16		21	5	10
Hooks.....		17,000		22,000	4,500	14,000
Dip nets.....				3	3	
Otter trawls, shrimp.....	33		61	29	82	
Yards at mouth.....	584		928	407	1,195	
Spears.....			24	64	10	
Dredges, oyster.....			24	4		
Yards at mouth.....			24	4		
Tongs, oyster.....			23	18	3	

Fisheries of Texas, 1937—Continued

CATCH: BY COUNTIES

Species	Aransas		Brazoria		Calhoun		Cameron	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Buffalofish					800	\$48		
Catfish and bullheads					58,700	2,785		
Croaker	9,200	\$276			6,100	183	25,000	\$500
Drum:								
Black	62,800	2,220	600	\$24	67,100	2,044	837,900	16,758
Red or redfish	66,700	4,759	12,400	992	75,200	5,075	206,400	14,181
Flounders	22,200	1,776	100	10	17,100	1,690	3,200	318
Groupers			200	6			5,000	200
Jewfish							1,000	40
Kingfish or "king mackerel"							2,600	91
Mullet	200	6						
Pompano					3,900	780	200	30
Sea catfish	9,000	403			16,900	422		
Sheepshead	2,200	60			5,600	168	4,000	95
Snapper, red			24,000	1,680			104,600	7,168
Snook or sargeantfish					4,000	280	3,000	120
Spanish mackerel	9,900	504			5,000	347	4,800	240
Spot							1,000	20
Squeteagues or "sea trout":								
Spotted	122,100	9,768	200	20	135,100	10,974	987,300	81,075
White	5,200	155			1,600	48		38
Crabs, hard	194,000	5,190			333,200	9,210		
Shrimp	909,200	28,343	24,000	960	1,865,800	57,275	830,200	31,497
Oysters, market:								
Public, spring	100,400	7,596	2,300	188	82,400	6,317	5,400	490
Public, fall	79,500	7,082	5,900	576	80,600	6,993	3,500	320
Total	1,592,600	68,234	69,700	4,456	2,756,100	104,639	3,026,900	153,177

Species	Galveston		Harris		Jefferson		Kleberg	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Croaker	9,000	\$225						
Drum:								
Black	17,000	510					159,800	\$4,794
Red or redfish	101,000	6,060	28,200	\$1,724			25,800	1,806
Flounders	3,700	318					1,100	99
Groupers	11,400	342			3,000	\$90		
Jewfish	1,000	30			700	21		
King whiting or "kingfish"	2,000	40						
Mullet	2,000	40						
Sea catfish			500	15				
Sheepshead	10,000	300						
Snapper, red	867,500	60,725			140,000	9,800		
Spanish mackerel	7,200	576						
Spot	6,000	120						
Squeteagues or "sea trout":								
Spotted	158,000	12,640	53,000	4,480			30,500	2,745
White	1,500	30						
Crabs, hard	223,200	5,785	128,900	3,188	5,500	200		
Shrimp	4,669,000	172,381			1,428,400	52,849		
Oysters, market:								
Public, spring	30,200	3,170	36,900	3,180				
Public, fall	19,500	2,020	25,600	2,375				
Total	6,148,200	265,312	269,100	14,962	1,577,600	62,960	217,200	9,444

Fisheries of Texas, 1937—Continued

CATCH: BY COUNTIES—Continued

Species	Matagorda		Nueces		San Patricio		Willacy	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Buffalofish.....			2,600	\$156				
Catfish and bullheads.....			10,900	540				
Croaker.....	7,800	\$234	2,900	87	22,600	\$676		
Drum:								
Black.....	64,500	1,935	175,200	6,726	63,100	2,514	101,000	\$2,405
Red or redfish.....	92,000	5,920	242,200	16,108	80,500	6,340	26,100	1,701
Flounders.....	20,100	1,910	30,100	2,890	12,500	1,126	500	46
Kingfish or "king mackerel"					400	16		
King whiting or "kingfish"	1,000	25						
Mullet.....	2,800	69	1,600	44				
Pompano.....	300	63			100	15		
Sea catfish.....			1,000	30	3,300	99	600	15
Sheepshead.....	7,600	228	11,100	363	600	21		
Snapper, red.....			5,100	408				
Snook or sargeantfish.....					2,200	164		
Spanish mackerel.....	2,400	168	800	64	8,600	516	100	6
Spot.....	2,000	40	3,000	60				
Squeteaguea or "sea trout":								
Spotted.....	116,600	9,875	317,500	28,305	169,600	15,264		
White.....	4,400	133	1,000	30	4,000	120		
Crabs, hard.....			32,900	844	5,900	160		
Shrimp.....	3,099,000	84,623	967,300	30,019	3,111,900	93,457		
Oysters:								
Public, spring.....	325,100	21,640	22,800	1,853	3,500	263		
Public, fall.....	292,900	20,966	63,300	5,532	800	70		
Total.....	4,038,400	147,829	1,891,300	94,049	3,489,600	120,811	128,300	4,172

FISHERIES OF THE PACIFIC COAST STATES⁹

The yield of the commercial fisheries of the Pacific Coast States (Washington, Oregon, and California) during 1937 amounted to 1,576,877,400 pounds, valued at \$28,776,385 to the fishermen, representing a decrease of 18 percent in volume, but an increase of 16 percent in value as compared with the catch in the previous year. These fisheries gave employment to 21,555 fishermen as compared with 20,620 in 1936.

There were 330 fishery wholesale and manufacturing establishments in the three States in 1937, as compared with 339 in 1936. During 1937 these establishments employed 19,792 persons, paid \$10,669,409 in salaries and wages, and produced manufactured products (canned, cured, packaged, and byproducts) valued at \$56,149,695. In 1936 the wholesale and manufacturing firms employed 16,589 persons, paid \$9,365,375 in salaries and wages, and produced manufactured products valued at \$52,498,170.

⁹ 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 March 31, 1938, 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, 1937

SUMMARY OF CATCH

Product	Washington		Oregon	
	Pounds	Value	Pounds	Value
Fish.....	143,928,900	\$6,147,971	64,257,300	\$2,200,760
Shellfish, etc.....	11,876,100	1,074,376	4,687,600	408,479
Total.....	155,805,000	7,222,347	68,944,900	2,609,239

Product	California		Total	
	Pounds	Value	Pounds	Value
Fish.....	1,345,570,600	\$18,374,105	1,563,756,800	\$26,722,836
Shellfish, etc.....	5,418,800	529,471	21,982,500	2,012,326
Whale products.....	1,138,100	41,223	1,138,100	41,223
Total.....	1,352,127,500	18,944,799	1,576,877,400	28,776,385

OPERATING UNITS: BY STATES

Item	Washington				Oregon		
	Puget Sound district	Coastal district	Columbia River district	Total	Columbia River district	Coastal district	Total
Fishermen:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
On vessels.....	3,367	81	25	3,473	129	49	178
On boats and shore.....	1,852	8,794	888	6,534	2,036	1,228	3,264
Total.....	5,219	3,875	913	10,007	2,165	1,277	3,442
Vessels:							
Steam, 21 to 30 tons.....	1			1			
Net tonnage.....	23			23			
Motor:							
5 to 10 tons.....	161	38	7	206	37	12	49
11 to 20 tons.....	142	3	3	148	10	4	14
21 to 30 tons.....	134		1	135			
31 to 40 tons.....	44			44			
41 to 50 tons.....	31			31			
51 to 60 tons.....	11			11			
61 to 70 tons.....	12			12	1		1
101 to 110 tons.....					1	1	2
Total.....	635	41	11	687	49	17	66
Net tonnage.....	10,970	293	113	11,376	578	261	839
Sail:							
391 to 400 tons.....	1			1			
411 to 420 tons.....	1			1			
561 to 570 tons.....	1			1			
Total.....	3			3			
Net tonnage.....	1,374			1,374			
Total vessels.....	639	41	11	691	49	17	66
Total net tonnage.....	12,367	293	113	12,773	578	261	839
Boats:							
Motor.....	826	481	619	1,926	910	835	1,745
Other.....	271	207	22	500	80	110	190
Accessory boats.....	275			275	2	1	3
Apparatus:							
Purse seines:							
Herring.....	4			4			
Length, yards.....	468			468			
Salmon.....	212			212			
Length, yards.....	115,500			115,500			
Sardine.....	17			17	2	1	3
Length, yards.....	7,240			7,240	885	500	1,385
Haul seines.....	170	4	1	175	44	4	48
Length, yards.....	12,392	280	167	12,839	23,072	666	23,738

¹ Used in the pilchard fishery of the Washington and Oregon coasts by Puget Sound purse seine vessels. See separate sections for catch statistics.

Fisheries of the Pacific Coast States, 1937—Continued

OPERATING UNITS: BY STATES—Continued

Item	Washington				Oregon		
	Puget Sound district	Coastal district	Columbia River district	Total	Columbia River district	Coastal district	Total
Apparatus—Continued.							
Gill nets:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Drift.....	416	184	471	1,071	703	410	1,113
Square yards.....	628,160	354,752	1,303,728	2,286,640	2,240,082	577,690	2,817,772
Set.....	14	125	129	137	137	993	1,040
Square yards.....	960	27,600	28,560	28,560	38,360	321,480	359,840
Lines:							
Trawl, set, and hand.....	26,418	.....	349	26,767	700	160	866
Hooks.....	548,786	.....	17,680	564,466	18,940	2,880	21,820
Troll.....	1,360	650	195	2,205	808	415	1,223
Hooks.....	6,010	2,925	862	9,797	3,426	1,840	5,266
Pound nets.....	2	.....	.....	2	.....	.....	.....
Brush weirs.....	4	.....	.....	4	.....	.....	.....
Dip nets.....	23	60	222	305	163	.....	163
Reef nets.....	37	.....	.....	37	.....	.....	.....
Beam trawls.....	10	.....	.....	10	.....	.....	.....
Yards at mouth.....	66	.....	.....	66	.....	.....	.....
Otter trawls.....	43	.....	.....	43	2	2	4
Yards at mouth.....	645	.....	.....	645	40	40	80
Traps:							
Crab.....	2,541	2,863	.....	5,404	.....	16,835	16,835
Crawfish.....	.....	.....	.....	.....	1,125	.....	1,125
Octopus.....	247	.....	.....	247	.....	.....	.....
Dredges, oyster.....	.....	4	.....	4	.....	.....	.....
Yards at mouth.....	.....	8	.....	8	.....	.....	.....
Tongs and rakes, oyster.....	120	230	.....	350	.....	18	18
Shovels.....	467	3,023	.....	3,490	.....	177	177

Item	California						Grand total
	North-ern district	San Fran-cisco district	Monterey district	San Pedro district	San Diego district	Total	
Fishermen:							
On vessels.....	31	1,293	729	2,336	1,059	5,448	9,099
On boats and shore.....	263	850	458	838	249	2,658	12,456
Total.....	294	2,143	1,187	3,174	1,308	8,106	21,555
Vessels:							
Steam:							
11 to 20 tons.....	1	.....	.....	.....	1	1
21 to 30 tons.....	1	.....	.....	.....	1	2
31 to 40 tons.....	1	.....	.....	.....	1	1
Total.....	3	.....	.....	.....	3	4
Net tonnage.....	73	.....	.....	.....	73	96
Motor:							
5 to 10 tons.....	17	16	19	45	30	127	382
11 to 20 tons.....	19	1	23	16	59	221
21 to 30 tons.....	5	1	43	5	54	189
31 to 40 tons.....	28	2	35	8	73	117
41 to 50 tons.....	17	9	16	3	45	76
51 to 60 tons.....	12	19	39	2	72	83
61 to 70 tons.....	17	9	15	1	42	55
71 to 80 tons.....	6	9	7	7	29	29
81 to 90 tons.....	3	1	1	4	9	9
91 to 100 tons.....	2	1	3	2	7	7
101 to 110 tons.....	2	2	4
111 to 120 tons.....	4	5	9	9
121 to 130 tons.....	1	4	5	5
131 to 140 tons.....	1	7	8	8
141 to 150 tons.....	1	2	3	3
151 to 160 tons.....	2	2	2
161 to 170 tons.....	1	1	2	2

* Operated on Indian reservations.

Fisheries of the Pacific Coast States, 1937—Continued

OPERATING UNITS: BY STATES—Continued

Item	California						Grand total
	North- ern district	San Fran- cisco district	Monterey district	San Pedro district	San Diego district	Total	
Vessels—Continued.							
Motor—Continued.	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
171 to 180 tons				1	1	2	2
181 to 190 tons				1	2	3	3
191 to 200 tons					3	3	3
201 to 210 tons				2		2	2
291 to 300 tons					1	1	1
361 to 370 tons				1		1	1
Total	17	125	70	240	108	660	1,213
Net tonnage	127	5,029	3,055	9,950	6,674	24,835	37,050
Sail:							
321 to 330 tons		1				1	1
391 to 400 tons							1
411 to 420 tons							1
491 to 500 tons		1				1	1
561 to 570 tons							1
Total		2				2	5
Net tonnage		824				824	2,198
Total vessels	17	130	70	240	108	565	1,222
Total net tonnage	127	5,926	3,055	9,950	6,674	25,732	39,344
Boats:							
Motor	203	521	209	432	121	1,486	5,157
Other	3	47	24	45	2	121	811
Accessory boats		176	61	232	106	575	853
Apparatus:							
Purse seines:							
Herring							4
Length, yards							468
Mackerel			2	12		14	14
Length, yards			1,200	5,537		6,737	6,737
Salmon							212
Length, yards							115,600
Sardine or pilchard		89	50	107		246	266
Length, yards		34,052	18,385	41,457		93,894	102,519
Tuna		7	11	84		102	102
Length, yards		4,100	6,352	49,783		60,235	60,235
Lampara and ring nets:							
Mackerel		1	1	56	9	67	67
Length, yards		400	440	28,438	3,150	32,428	32,428
Sardine or pilchard		15	24	77	18	134	134
Length, yards		4,425	6,487	37,768	4,421	53,101	53,101
Other			17	13	2	32	32
Length, yards			3,230	6,162	1,000	10,392	10,392
Haul seines		4				4	227
Length, yards		580				580	37,157
Gill nets:							
Drift:							
Barracuda				5	5	10	10
Square yards				45,000	15,000	60,000	60,000
Salmon		115				115	2,299
Square yards		362,250				362,250	5,466,662
Sea bass		7	12			19	19
Square yards		12,460	24,000			36,460	36,460
Shad		125				125	125
Square yards		437,000				437,000	437,000
Set:							
"California halibut"			14			14	14
Square yards			33,796			33,796	33,796
Crab			10			10	10
Square yards			33,600			33,600	33,600
Salmon							1,169
Square yards							383,400
Sea bass				13	0	22	22
Square yards				41,600	43,942	85,542	85,542
Miscellaneous		17	46	33	21	4	121
Square yards	12,750	50,174	43,915	18,700	6,080	137,619	137,619
Trammel nets.							
Square yards				93,432	86,665	180,097	180,097

Fisheries of the Pacific Coast States, 1937—Continued

OPERATING UNITS: BY STATES—Continued

Item	California						Grand total
	North- ern district	San Fran- cisco district	Monterey district	San Pedro district	San Diego district	Total	
Apparatus—Continued.							
Lines:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Trawl, set, and hand.....	299	759	766	1,946	1,289	5,059	32,692
Hooks.....	39,978	38,095	80,268	238,041	36,903	483,285	1,069,671
Troll.....	1,083	1,266	1,500	1,580	590	5,989	9,417
Hooks.....	4,723	4,484	3,846	1,612	560	15,225	30,288
Pound nets.....							29
Brush weirs.....							4
Fyke nets.....		1,989				1,989	1,989
Dip nets.....	24	3				27	495
Bag nets, shrimp.....		9				9	9
Length, yards.....		6,656				6,656	6,656
Reef nets.....							37
Paranzella nets.....		10		4		14	14
Yards at mouth.....		167		67		234	234
Beam trawls.....		15				15	25
Yards at mouth.....		100				100	166
Otter trawls.....			7			7	54
Yards at mouth.....			78			78	803
Traps:							
Crab.....	703	5,095				5,798	28,037
Crawfish.....							1,125
Octopus.....			100			100	347
Sea crawfish.....				4,940	781	5,721	5,721
Harpoons:							
Swordfish.....				52	15	67	67
Whales.....		2				2	2
Dredges, oyster:							
Yards at mouth.....							4
Pongs and rakes, oyster.....	3	41				48	416
Shovels.....	13	81	26	63		183	3,850
Abalone outfits.....			14	10		24	24

CATCH: BY STATES

Species	Washington		Oregon		California ¹		Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
FISH								
Anchovies.....					226,200	\$3,239	226,200	\$3,239
Barracuda.....					2,933,000	160,520	2,933,000	160,520
Cabrilla.....					131,200	6,918	131,200	6,918
Carp.....	126,700	\$3,458			36,400	1,418	163,100	4,876
Catfish.....					302,900	34,437	302,900	34,437
Cod ²	7,893,500	114,705	12,700	\$190	4,731,400	80,671	12,637,600	195,566
Flounders:								
“California halibut”.....					1,206,900	102,234	1,206,900	102,234
“Sole”.....	3,773,900	104,526	650,400	11,849	8,302,200	457,614	12,726,500	573,989
Other.....	523,200	13,144	261,500	2,750	1,566,900	56,506	2,351,600	72,400
Flyingfish.....					41,900	1,834	41,900	1,834
Grayfish.....	1,620,100	14,360			913,100	15,009	2,533,200	29,369
Groupers.....					57,900	2,886	57,900	2,886
Hake.....					63,400	668	63,400	668
Halibut.....	23,733,600	2,118,668	367,200	31,670	316,900	26,507	24,417,700	2,176,845
Hardhead.....					54,200	4,894	54,200	4,894
Herring.....	1,130,800	12,066	30,000	402	631,300	4,777	1,792,100	17,245
Horse mackerel.....					6,541,600	64,803	6,541,600	64,803
Kingfish.....					645,600	15,683	645,600	15,683
“Lingcod”.....	1,611,000	54,723	161,700	5,090	968,300	41,287	2,731,000	101,100
Mackerel.....					60,936,400	669,377	60,936,400	669,377
Marlin.....					4,100	182	4,100	182
Mullet.....					8,500	731	8,500	731

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.

NOTE.—In addition to the California operating units shown above, 47 motor vessels, 43 accessory boats, and 7 motorboats having their home ports in the State of Washington, and 19 motor vessels, 16 accessory boats, and 21 motorboats having their home ports in the State of Oregon, were operated off California and contributed to the California catch. The following gear was operated by these craft: 45 sardine purse seines, 1 tuna purse seine, 3 sardine ring nets, 6 set and hand lines, and 282 troll lines.

Fisheries of the Pacific Coast States, 1937—Continued

CATCH: BY STATES—Continued

Species	Washington		Oregon		California		Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
FISH—contd.								
Perch.....	122,500	\$4,471	600	\$12	213,400	\$9,382	336,500	\$13,865
Pilchard or sardine.....	34,429,100	224,093	33,462,500	217,506	1,071,613,400	6,373,234	1,139,505,000	6,814,833
Pompano.....					5,100	2,434	5,100	2,434
Rock bass.....					324,300	18,024	324,300	18,024
Rockfishes.....	444,600	19,437	153,800	4,459	4,290,900	189,484	4,889,300	213,380
Rudderfish.....					36,100	1,783	36,100	1,783
Sablefish.....	3,067,500	155,210	147,700	6,591	733,600	29,428	3,948,800	191,229
Salmon:								
Blueback, red, or sockeye.....	6,794,700	702,742	247,000	34,580			7,041,700	737,322
Chinook or king.....	12,624,600	1,067,991	16,059,000	1,270,126	6,907,800	528,993	35,591,400	2,867,110
Chum or keta.....	9,855,900	268,049	1,579,100	26,291			11,435,000	294,340
Humpback or pink.....	25,424,500	637,123	400	12			25,424,900	637,135
Silver or coho.....	8,952,000	522,599	7,215,800	368,690			16,167,800	891,289
Sculpin.....					145,500	11,002	145,500	11,002
Sea bass:								
Black.....					714,200	39,749	714,200	39,749
White.....					602,300	56,810	602,300	56,810
Shad.....	37,600	978	524,600	16,184	651,000	29,156	1,213,200	46,318
Sheepshead.....					81,400	2,998	81,400	2,998
Skates.....					447,500	8,511	447,500	8,511
Smelts:								
Eulachon.....	562,100	37,590	472,800	33,096			1,034,900	70,686
Other.....	367,700	21,980			682,000	29,041	1,049,700	51,021
Spanish mackerel.....					26,700	1,351	26,700	1,351
Spittail.....					10,800	371	10,800	371
Squawfish.....					500	23	500	23
Steelhead trout.....	339,900	20,810	1,725,100	101,369			2,065,000	122,179
Striped bass.....			34,100	1,855	651,000	29,156	34,100	1,855
Sturgeon.....	72,800	3,398	81,900	1,892			154,700	5,290
Suckers.....					7,900	219	7,900	219
Swordfish.....					625,300	85,006	625,300	85,006
Tomcod.....					1,100	35	1,100	35
Tuna and tuna-like fishes:								
Albacore.....	420,600	25,850	1,079,400	66,146	2,020,000	194,828	3,520,000	286,824
Bluefin.....					12,693,900	724,913	12,693,900	724,913
Bonito.....					7,808,000	286,282	7,808,000	286,282
Skipjack or striped tuna.....								
Yellowfin.....					47,104,100	2,318,523	47,104,100	2,318,523
Whitebait.....					91,522,500	5,457,819	91,522,500	5,457,819
Whitefish.....					86,100	4,665	86,100	4,665
Yellowtail.....					57,100	3,032	57,100	3,032
Other fish.....					5,371,000	212,008	5,371,000	212,008
					166,800	2,806	166,800	2,806
Total.....	143,928,900	6,147,971	64,257,300	2,200,760	1,345,570,600	18,374,105	1,553,756,800	26,722,836
SHELLFISH, ETC.								
Crabs.....	2,359,800	174,816	4,372,000	367,248	1,624,200	179,035	8,356,000	721,099
Crawfish, freshwater.....			84,200	9,262			84,200	9,262
Sea crawfish or spiny lobster.....					1,322,400	163,659	1,322,400	163,659
Shrimp.....	46,900	6,604			1,111,700	16,915	1,158,600	23,519
Abalone.....					572,600	92,654	572,600	92,654
Clams:								
Hard.....	966,100	66,994			13,200	2,780	979,300	69,774
Pismo.....					56,000	10,833	56,000	10,833
Razor.....	424,200	79,843	56,500	13,447			480,700	93,290
Soft.....					29,700	7,891	29,700	7,891
Mixed.....			77,800	6,682			77,800	6,682
Mussels.....					200	17	200	17
Octopus.....	64,200	2,504			23,900	1,890	88,100	4,394
Oysters, market:								
Eastern.....	800	300			67,300	23,047	68,100	23,347
Japanese.....	7,712,700	543,041	87,500	5,400	90,700	13,602	7,890,900	562,043
Native.....	266,000	193,950	9,600	6,440	5,300	1,768	280,900	202,158
Scallops, bay.....	24,100	5,745					24,100	5,745

Fisheries of the Pacific Coast States, 1937—Continued

CATCH: BY STATES—Continued

Species	Washington		Oregon		California		Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
SHELLFISH, ETC.—CON.								
Squid.....	1,300	\$79			601,600	\$15,380	602,900	\$15,459
Trepang.....	10,000	500					10,000	500
Total.....	11,876,100	1,074,376	4,687,800	\$408,479	5,418,800	529,471	21,982,500	2,012,326
WHALE PROD- UCTS								
Whale meat.....					624,900	12,207	624,900	12,207
Whale oil.....					513,200	29,016	513,200	29,016
Total.....					1,138,100	41,223	1,138,100	41,223
Grand total.....	155,805,000	7,222,347	68,944,900	2,609,239	1,352,127,500	18,944,799	1,576,877,400	28,776,385

Industries related to the fisheries of the Pacific Coast States, 1937

OPERATING UNITS, SALARIES, AND WAGES

Item	Washington	Oregon	California	Total
Transporting:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Persons engaged.....	144	42	24	210
Vessels, motor.....	52	21	3	76
Net tonnage.....	1,297	266	161	1,724
Wholesale and manufacturing:				
Establishments.....	113	48	169	330
Persons engaged:				
Proprietors.....	63	39	275	377
Salaried employees.....	246	90	818	1,154
Wage earners:				
Average for season.....	3,046	1,149	14,066	18,261
Average for year.....	1,305	551	5,133	6,989
Paid to salaried employees.....	\$591,984	\$188,075	\$2,478,881	\$3,258,940
Paid to wage earners.....	\$1,454,320	\$556,729	\$5,400,420	\$7,410,469
Total salaries and wages.....	\$2,046,304	\$743,804	\$7,879,301	\$10,669,409
Fishermen manufacturing.....	59	18	75	152

PRODUCTS MANUFACTURED

Item	Washington		Oregon		California	
	Quantity	Value	Quantity	Value	Quantity	Value
By manufacturing firms:						
Barracuda, fresh filets... pounds					650,000	\$97,500
Cabrilla, fresh filets... do					55,000	8,450
Cod:						
Salted:						
Dry... do	470,925	\$38,876				
Boneless and absolutely boneless... pounds	917,047	138,966			(1)	(1)
Fresh filets... do	41,623	4,281				
Flounders:						
Fresh filets... do	848,659	110,405	(1)	(1)	1,825,000	352,500
Frozen filets... do	144,335	18,763	(1)	(1)		
Grayfish, fresh filets... do					25,000	3,125
Halibut, frozen steaks... do	109,755	17,476				
Lingcod, fresh filets... do	121,130	12,372	(1)	(1)	75,000	11,250
Mackerel:						
Canned... standard cases					839,450	2,657,370
Meal... tons					2,194	77,827
Oil... gallons					80,811	30,812
Pilchard:						
Canned... standard cases					2,812,456	8,592,117
Meal... tons	2,871	104,762	2,822	\$102,966	83,729	3,117,554
Oil... gallons	824,332	319,344	689,393	281,155	14,479,491	5,603,117
Rockfishes, fresh filets... pounds	(1)	(1)	(1)	(1)	1,050,000	157,500

See footnotes at end of table.

Industries related to the fisheries of the Pacific Coast States, 1937—Continued
PRODUCTS MANUFACTURED—Continued

Item	Washington		Oregon		California	
	Quantity	Value	Quantity	Value	Quantity	Value
By manufacturing firms—Contd.						
Sablefish:						
Fresh steaks..... pounds					25,000	\$3,750
Kipperd..... do	290,052	\$49,827			206,016	41,203
Salted..... do	202,275	12,505	(1)	(1)		
Salmon:						
Frozen steaks..... do	25,355	3,999	(1)	(1)		
Salted:						
Mild-cured ¹ do	2,596,500	524,405	466,675	\$107,923	830,400	166,196
Eggs for caviar..... do	274,000	29,740				
Kipperd..... do	1,190,761	211,942	(1)	(1)		
Smoked..... do	213,143	60,582	159,321	52,828	225,277	97,573
Canned:						
Blueblack, red, or sock-eye..... standard cases	65,184	1,073,911	5,071	83,209		
Chinook or king..... do	87,322	1,083,480	213,690	2,999,670		
Chum or keta..... do	34,525	151,159	31,472	133,204		
Humpback or pink..... do	328,790	1,590,295				
Silver or coho..... do	38,957	399,045	68,672	676,765		
Steelhead trout..... do	3,523	35,275	13,166	155,180		
Eggs for bait..... do	4,896	72,550	(1)	(1)		
Oil..... gallons	(1)	(1)	83,165	51,686		
See bass:						
Black, fresh steaks..... pounds					250,000	40,000
White, fresh filets..... do					175,000	41,000
Shad:						
Canned..... standard cases	1,214	4,128	2,160	7,361	5,845	19,065
Roe, canned..... do	(1)	(1)	633	13,926	1,189	34,424
Sheephead, fresh filets..... pounds					25,000	3,750
Swordfish, fresh steaks..... do					100,000	25,000
Totauva, fresh steaks..... do					515,000	93,000
Tuna and tunalike fishes:						
Canned:						
Albacore..... standard cases	(1)	(1)	(1)	(1)	104,683	726,532
Bluefin..... do					211,886	1,197,421
Bonito..... do					152,175	771,498
Striped..... do					695,007	3,917,454
"Tonno"..... do					262,857	1,915,779
Yellowfin..... do					1,649,776	10,038,641
Yellowtail..... do					62,974	309,692
Meal..... tons					10,872	378,531
Oil..... gallons					141,963	30,702
Crabs:						
Canned..... standard cases			499	14,886		
Meat, packaged, fresh-cooked..... pounds	103,149	38,186	536,579	206,698	541,000	165,154
Abalone, steaks..... do						
Clams, hard:						
Fresh-shucked..... gallons	3,559	4,535	(1)	(1)		
Canned:						
Whole..... standard cases	25,339	108,785				
Mined..... do	22,397	106,443				
Juice..... do	5,305	11,565				
Shells, crushed for poultry feed..... tons	1,050	9,100				
Clams, razor:						
Canned:						
Whole..... standard cases	1,246	10,466	(1)	(1)		
Mined..... do	14,334	120,767	1,288	10,718		
Oysters:						
Japanese:						
Fresh-shucked..... gallons	299,738	360,697	45,174	52,174	(1)	(1)
Canned..... standard cases	109,192	462,049	(1)	(1)		
Native, fresh-shucked..... gallons	19,401	154,970	6,598	51,287	(1)	(1)
Shell products:						
Poultry feed..... tons	6,065	53,455	(1)	(1)	14,402	67,533
Lime..... do	2,609	15,535	(1)	(1)	1,805	6,377
Shrimp, bran and meal..... do					71	1,810
Unclassified:						
Packaged..... pounds	104,875	18,465	142,093	30,158	(9)	(9)
Salted..... do	504,268	39,073	(9)	(9)	1,138,098	147,810
Smoked..... do	(9)	(9)	(9)	(9)	63,650	11,115
Canned:						
Cat and dog food						
..... standard cases					189,309	548,086
Other..... do	5,498	47,038	7,256	63,702	(9)	(9)
Meal..... tons	1,139	51,738	(9)	(9)	1,340	30,701
Oil..... gallons	152,899	1,088,533			76,123	198,562
Miscellaneous..... do		11,682			27,984	501,672
Total.....		8,781,192		5,128,540		42,238,553

See footnotes at end of table.

Industries related to the fisheries of the Pacific Coast States, 1937—Continued

PRODUCTS MANUFACTURED—Continued

Item	Washington		Oregon		California	
	Quantity	Value	Quantity	Value	Quantity	Value
By fishermen:						
Cod, green salted ¹ pounds.....	2,310,240	\$108,325			1,466,700	\$80,671
Cod tongues, salted..... do.....	18,940	1,615				
Sablefish, salted..... do.....	58,100	1,995				
Crab meat, packaged, fresh-cooked..... do.....			3,200	\$1,120		
Shrimp:						
Meat, packaged, fresh-cooked..... do.....					55,934	7,831
Bran..... tons.....					47	1,410
Clams, mixed, fresh-shucked..... gallons.....			8,645	10,374		
Scallops, bay, fresh-shucked..... do.....	998	2,220				
Total.....		112,155		11,494		89,912
Grand total.....		8,893,347		5,140,034		42,328,465

¹ The production of this item has been included under "Unclassified products."

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

³ Includes the production of both edible and industrial salmon oils.

⁴ Includes fresh fillets of rockfishes; frozen fillets of halibut and "lingcod"; and fresh-shucked bay scallops.

⁵ Includes fresh fillets of flounders, "lingcod", and rockfishes; frozen fillets of flounders, "lingcod", and salmon; frozen salmon steaks; and fresh-shucked hard clams.

⁶ The production of this item has been included under "miscellaneous."

⁷ Includes green salted cod in process, partly boned, spiced herring, and salmon bellies.

⁸ Includes salted barracuda, black sea bass, white sea bass, bonito, mackerel, pilchards, and yellowtail; pickled and spiced herring; green salted cod in process, partly boned; and boneless and absolutely boneless salted cod.

⁹ Includes smoked chubs, herring, mackerel, and miscellaneous fish.

¹⁰ Includes canned salted cod, shad roe, albacore tuna, fish paste, and hard clam chowder.

¹¹ Includes canned salmon eggs for bait, kippered sturgeon, albacore tuna, whole razor clams, razor clam juice, and Japanese oysters.

¹² Includes salmon, salmon egg, grayfish, and miscellaneous fish meals.

¹³ Includes shark and miscellaneous fish meals, and miscellaneous green scrap.

¹⁴ Includes salmon, grayfish, and miscellaneous fish oils; and halibut, "lingcod," sablefish, and tuna liver oils.

¹⁵ Includes shark and whale oil; and shark and miscellaneous fish liver oils.

¹⁶ Includes smoked herring blotters, and kippered herring; kelp products; and clam-shell limes.

¹⁷ Includes salted sablefish; smoked shad and sturgeon, and kippered salmon; salmon and salmon egg meals; oyster-shell poultry feed and lime; and marine-shell novelties.

¹⁸ Includes fresh-shucked, eastern, Japanese, and native oysters; fresh-cooked shrimp meat; sun-dried shrimp; canned tuna roe and squid; liquid glue; kelp products; and marine-shell novelties.

NOTE.—The total value of manufactured products in the Pacific Coast States was as follows: By manufacturing establishments, \$56,148,285; and by fishermen, \$213,561. Some of the above products may have been imported from another State or 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, 1937

CATCH: BY DISTRICTS

Species	Puget Sound district		Coastal district		Columbia River district	
	Pounds	Value	Pounds	Value	Pounds	Value
FISH						
Carp.....						
Cod ¹	7,893,500	\$114,705			126,700	\$3,458
Flounders:						
" Sole".....	3,772,400	104,496	1,500	\$30		
Other.....	493,000	12,818			30,200	326
Grayfish.....	1,620,100	14,360				
Halibut.....	23,689,200	2,114,323	1,300	100	43,100	4,245
Herring.....	1,130,800	12,066				
"Lingcod".....	1,598,000	54,204	10,200	408	2,800	111
Perch.....	122,500	4,471				
Pilchard or sardine.....	22,500	450	34,406,600	223,643		
Rockfishes.....	428,000	18,943	300	6	16,300	498
Sablefish.....	2,862,800	146,070			204,700	9,140

¹ Nearly all of the cod were taken off Alaska.

Fisheries of Washington, 1937—Continued

CATCH: BY DISTRICTS—Continued

Species	Puget Sound district		Coastal district		Columbia River district	
	Pounds	Value	Pounds	Value	Pounds	Value
FISH—continued						
Salmon:						
Blueback, red, or sockeye	6,287,100	\$644,259	419,500	\$46,149	88,100	\$12,334
Chinook or king	5,572,100	486,169	1,925,400	173,801	5,127,100	408,021
Chum or keta	7,757,000	239,683	1,247,200	16,590	851,700	12,776
Humpback or pink	25,419,700	636,893	4,800	230		
Silver or coho	6,432,600	371,148	1,614,300	101,930	905,100	49,521
Shad					37,600	978
Smelt:						
Eulachon	10,200	760			551,900	36,830
Surf or silver	319,300	19,318	48,400	2,662		
Steelhead trout			21,300	2,012	318,600	18,798
Sturgeon			41,200	2,678	31,600	720
Tuna, albacore	1,300	96	277,600	17,255	141,700	8,499
Total	95,432,100	4,995,232	40,019,600	586,494	8,477,200	566,245
SHELLFISH, ETC.						
Crabs	484,100	24,760	1,875,700	150,056		
Shrimp	46,900	6,604				
Clams:						
Hard:						
Butter	471,800	25,275				
Little neck	494,300	41,719				
Razor			424,200	79,843		
Octopus	64,200	2,504				
Oysters, market:						
Eastern			800	300		
Japanese	630,700	47,302	7,082,000	495,739		
Native	262,500	192,000	3,500	1,950		
Scallops, bay	24,100	5,745				
Squid	1,300	79				
Trepang	10,000	500				
Total	2,489,900	346,488	9,386,200	727,888		
Grand total	97,922,000	5,341,720	49,405,800	1,314,382	8,477,200	566,245

Fisheries of the Puget Sound District of Washington, 1937

OPERATING UNITS: BY GEAR

Item	Purse seines			Haul seines	Gill nets		Lines		Pound nets ¹	Brush weirs
	Salmon	Sardine ¹	Herring		Drift	Set ²	Trawl, set, and hand	Troll		
	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number
Fishermen:										
On vessels	1,671	193	14	40			1,204	278		
On boats and shore	8			434	445	4	166	186	4	4
Total	1,679	193	14	474	445	4	1,370	464	4	4
Vessels:										
Motor:										
5 to 10 tons	12			10			11	129		
11 to 20 tons	85		1				35	18		
21 to 30 tons	86		3				43	1		
31 to 40 tons	26	1					16			
41 to 50 tons	1	3					28			
51 to 60 tons		5					7			
61 to 70 tons		8					4			
Total	210	17	4	10			144	148		
Net tonnage	4,481	994	90	64			4,241	1,108		

¹ Operated in the Oregon and Washington coast pilchard fishery. See separate sections for catch statistics.

² Fished only on Indian reservations.

Fisheries of the Puget Sound District of Washington, 1937—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Purse seines			Haul seines	Gill nets		Lines		Pound nets	Brush weirs
	Salmon	Sardine	Herring		Drift	Set	Trawl, set, and hand	Troll		
Vessels—Continued.		Number	Number	Number	Number	Number	Number	Number	Number	Number
Sail:										
391 to 400 tons							1			
411 to 420 tons							1			
561 to 570 tons							1			
Total							3			
Net tonnage							1,374			
Total vessels	210	17	4	10			147	148		
Total net tonnage	4,481	994	90	64			5,615	1,108		
Boats:										
Motor	2			100	416	4	113	124	2	
Other				70			32			2
Accessory boats	212	17	4				43			2
Apparatus:										
Number	212	17	4	170	416	4	26,418	1,360	2	4
Length, yards	115,800	7,240	468	12,392						
Square yards					628,180	960				
Hooks							546,786	6,010		
Item	Dip nets	Reef nets	Beam trawls	Otter trawls	Traps		Tongs and rakes, oyster	Shovels	Total, exclusive of duplication	
					Crab	Octopus				
Fishermen:	Number	Number	Number	Number	Number	Number	Number	Number	Number	
On vessels			18	132					3,367	
On boats and shore	23	130	2		77	13	120	467	1,852	
Total	23	130	20	132	77	13	120	467	5,219	
Vessels:										
Steam, 21 to 30 tons			1						1	
Net tonnage			23						23	
Motor:										
5 to 10 tons			5	11					161	
11 to 20 tons			3	22					142	
21 to 30 tons				7					134	
31 to 40 tons				3					44	
41 to 50 tons									31	
51 to 60 tons									11	
61 to 70 tons									12	
Total			8	43					535	
Net tonnage			82	699					10,970	
Sail:										
391 to 400 tons									1	
411 to 420 tons									1	
561 to 570 tons									1	
Total									3	
Net tonnage									1,374	
Total vessels			9	43					539	
Total net tonnage			105	699					12,367	
Boats:										
Motor	18	37	1		64	6	30		826	
Other	5	74			13	7	85		271	
Accessory boats									275	
Apparatus:										
Number	23	37	10	43	2,541	247	120	467		
Yards at mouth			66	645						

Fisheries of the Puget Sound District of Washington, 1937—Continued

CATCH: BY GEAR

Species	Purse seines		Haul seines ¹		Gill nets			
					Drift		Set ²	
					Pounds	Value	Pounds	Value	Pounds	Value
FISH	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Cod.....	700	\$13	300	\$6				
Flounders, "sole".....	800	22	11,800	327			300	\$8
Herring.....	676,100	7,214	43,900	468				
"Lingcod".....	500	10	2,900	58			2,900	58
Perch.....	2,500	91	112,100	4,092				
Pilchard or sardine.....			22,500	450				
Rockfishes.....	700	19	16,100	428			500	13
Salmon: ⁴								
Blueback, red, or sockeye.....	5,564,000	570,310			303,900	\$31,150		
Chinook or king.....	788,400	34,885			1,029,700	56,634	3,400	206
Chum or keta.....	6,706,400	213,418	1,400	85	795,200	19,880	126,000	3,225
Humpback or pink.....	21,703,600	542,590	128,200	3,206	2,305,600	57,640	100	2
Silver or coho.....	4,141,600	216,678			873,300	49,179	22,100	1,470
Smelt:								
Eulachon.....			10,200	780				
Surf or silver.....			319,300	19,318				
Total.....	39,565,200	1,585,250	668,700	26,147	5,307,700	214,483	158,300	4,982
SHELLFISH								
Squid.....			1,300	79				
Octopus.....			100	4				
Total.....			1,400	83				
Grand total.....	39,565,200	1,585,250	670,100	29,230	5,307,700	214,483	158,300	4,982

Species	Lines				Pound nets ¹		Brush weirs	
	Trawl, set and hand ²		Troll		Pounds	Value	Pounds	Value
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
FISH	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Cod.....	7,455,000	\$106,374						
Flounders, "sole".....	200	6						
Grayfish.....	1,620,100	14,360						
Hallbut.....	23,621,000	2,109,289	68,200	\$5,034				
Herring.....							407,000	\$4,343
"Lingcod".....	967,800	41,891	93,300	2,175				
Rockfishes.....	316,000	16,113						
Sablefish.....	2,862,800	146,070						
Salmon: ⁴								
Blueback, red, or sockeye.....					7,500	\$600		
Chinook or king.....			3,647,800	387,896	96,800	5,859		
Chum or keta.....					41,000	1,025		
Humpback or pink.....			84,800	3,514	400,400	10,010		
Silver or coho.....			1,266,100	97,110	39,500	2,074		
Tuna, albacore.....			1,300	96				
Grand total.....	36,872,900	2,434,103	5,161,200	495,325	584,800	19,568	407,000	4,343

See footnotes at end of table.

Fisheries of the Puget Sound District of Washington, 1937—Continued

CATCH: BY GEAR—Continued

Species	Dip nets		Reef nets		Beam trawls		Otter trawls	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
FISH								
Cod.....							437,500	\$3,312
Flounders:								
" Sole".....							3,759,300	104,133
Other.....							493,000	12,818
Herring.....	3,800	\$41						
"Lingcod".....							500,600	10,012
Perch.....							7,900	288
Rockfishes.....							94,700	2,370
Salmon: ¹								
Blueback, red or sockeye.....			411,700	\$42,199				
Chinook or king.....			26,200	1,189				
Chum or keta.....			84,000	2,100				
Humpback or pink.....			797,300	19,932				
Silver or coho.....			90,300	4,637				
Total.....	3,800	41	1,409,500	70,057			5,293,000	137,933
SHELLFISH, ETC.								
Shrimp.....					46,900	\$6,604		
Octopus.....							5,800	226
Scallops, bay ¹⁰					24,100	5,745		
Trepang.....					10,000	500		
Total.....					81,000	12,849	5,800	226
Grand total.....	3,800	41	1,409,500	70,057	81,000	12,849	5,298,800	138,159

Species	Traps				Tongs, and rakes, oyster		Shovels	
	Crab		Octopus		Pounds	Value	Pounds	Value
SHELLFISH								
Crabs ¹	484,100	\$24,760						
Clams, hard: ²								
Butter.....							471,800	\$25,275
Little-neck.....							494,300	41,719
Octopus.....			58,300	\$2,274				
Oysters, market: ³								
Japanese.....					630,700	\$47,302		
Native.....					262,500	192,000		
Total.....	484,100	24,760	58,300	2,274	893,200	239,302	966,100	66,094
Grand total.....	484,100	24,760	58,300	2,274	893,200	239,302	966,100	66,094

¹ Includes the catch of smelt by bag drag nets, shown separately prior to 1935.

² Fished only on Indian reservations.

³ In addition, the vessels of the Pacific coast halibut fleet landed approximately 590,000 pounds of halibut, sablefish, and "lingcod" livers at Seattle, valued at \$277,400.

⁴ Most of these cod were taken off Alaska.

⁵ Caught almost entirely for the utilization of the livers for grayfish oil. Most of the fish carcasses were discarded.

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, 19.77 pounds; chum or keta, 10 pounds; humpback, or pink, 5 pounds; and silver, or coho, 7.97 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 10 percent for Japanese oysters.

¹⁰ The weight of bay scallops is based on a yield of 17 percent edible meat.

Fisheries of the coastal district of Washington, 1937

OPERATING UNITS: BY GEAR¹

Item	Haul seines	Gill nets		Lines, troll	Dip nets	Traps, crab	Tongs and rakes, oyster	Dredges, oyster	Shovels	Total, exclusive of duplication
		Drift	Set							
Fishermen:	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number
On vessels				63		14				81
On boats and shore	22	223	125	154	60	63	265		3,023	3,794
Total	22	223	125	217	60	77	265	8	3,023	3,875
Vessels, motor:										
5 to 10 tons				32		6		2		38
11 to 21 tons				2		1				3
Total				34		7		2		41
Net tonnage				232		65		13		293
Boats:										
Motor		184	89	96	10	39	75			481
Other	4		36				165	2		207
Apparatus:										
Number	4	184	125	650	60	2,863	230	4	3,023	
Length, yards	280									
Square yards		354,752	27,600							
Yards at mouth								8		
Hooks				2,925						

¹ In addition, a combined fleet of 15 Puget Sound, Oregon, and California purse-seine vessels operated in the Washington coast pilchard fishery. These vessels were manned by a total of 171 fishermen and had an aggregate capacity of 963 net tons. Of the total vessels 10 were from Puget Sound, 1 from Oregon, and 4 from California. For detailed statistics regarding the operating units in this fishery, refer to the gear tables in the Puget Sound, Oregon, and California sections of this report.

CATCH: BY GEAR

Species	Purse seines, sardine		Haul seines		Gill nets			
	Pounds	Value	Pounds	Value	Drift		Set ¹	
FISH								
Pilchard or sardine	34,406,600	\$223,643						
Salmon: ²								
Blueback, red or sockeye			800	\$38	548,300	\$26,373	419,500	\$46,149
Chinook or king			1,500	19	992,100	12,401	113,500	3,052
Chum or keta			24,000	960	379,000	15,160	253,600	3,170
Silver or coho			38,500	2,118			251,500	8,930
Smelt, surf or silver							21,300	2,012
Steelhead trout ³					41,200	2,678		
Sturgeon								
Total	34,406,600	223,643	64,800	3,135	1,960,600	56,612	1,059,400	63,313

Species	Lines, troll		Dip nets		Otter trawls	
	Pounds	Value	Pounds	Value	Pounds	Value
FISH						
Flounders, "sole"					1,500	\$30
Halibut	1,300	\$100				
"Lingcod"	10,200	408				
Rockfishes	300	6				
Salmon: ²						
Chinook or king	1,262,800	144,338				
Humpback or pink	4,800	230				
Silver or coho	959,800	76,880				
Smelt, surf or silver				9,900	\$544	
Tuna, albacore	277,600	17,255				
Total	2,616,800	239,217		9,900	544	1,500 30

See footnotes at end of table.

Fisheries of the coastal district of Washington, 1937—Continued

CATCH: BY GEAR—Continued

Species	Traps, crab		Dredges, tongs, and rakes		Shovels	
	Pounds	Value	Pounds	Value	Pounds	Value
SHELLFISH						
Crabs ¹	1, 875, 700	\$150, 058				
Clams, razor ²					424, 200	\$79, 843
Oysters, market: ³						
Eastern.....			800	\$300		
Japanese.....			7, 082, 000	495, 739		
Native.....			3, 500	1, 950		
Total.....	1, 875, 700	150, 056	7, 086, 300	497, 989	424, 200	79, 843

¹ Fished by Indians on their reservations.

² 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, 20.78 pounds; chum or keta, 11.09 pounds; silver or coho, 10 pounds; and steelhead trout, 9 pounds.

³ Steelhead trout shown in this table were taken on Indian reservations.

⁴ The weight of crabs shown is based on an average of 22 pounds per dozen.

⁵ The weight of razor clams shown is in pounds of edible meats, based on a yield of 42 percent of the round weight.

⁶ The statistics on oysters used in this table are based on a yield of 12 percent of edible meats for Japanese and native oysters and 13 percent for eastern oysters.

Fisheries of the Columbia River district of Washington, 1937

OPERATING UNITS: BY GEAR

Item	Haul seines	Gill nets, drift	Lines		Dip nets	Total, exclusive of duplication
			Trawl and set	Troll		
Fishermen:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
On vessels.....			7	18		25
On boats and shore.....	3	631	69	52	222	888
Total.....	3	631	76	70	222	913
Vessels, motor:						
5 to 10 tons.....			1	6		7
11 to 20 tons.....				3		3
21 to 30 tons.....			1			1
Total.....			2	9		11
Net tonnage.....			30	83		113
Boats:						
Motor.....	1	471	55	30	112	619
Other.....	1		14		7	22
Apparatus:						
Number.....	1	471	349	195	222	
Length, yards.....	167					
Square yards.....		1, 303, 728				
Hooks.....			17, 680	862		

Fisheries of the Columbia River district of Washington, 1937—Continued

CATCH: BY GEAR

Species	Haul seines		Gill nets, drift		Lines				Dip nets	
					Trawl and set		Troll			
					Pounds	Value	Pounds	Value			Pounds	Value
FISH	<i>Pounds</i>	<i>Value</i>	<i>Pounds</i>	<i>Value</i>	<i>Pounds</i>	<i>Value</i>	<i>Pounds</i>	<i>Value</i>	<i>Pounds</i>	<i>Value</i>
Carp.....	126,700	\$3,458								
Flounders, other than "sole".....			29,300	\$293	900	\$33				
Hallbut.....					43,100	4,245				
"Lingcod".....					2,800	111				
Rockfishes.....			800	8	15,500	480				
Sablefish.....					204,700	9,140				
Salmon:										
Blueback, red or sockeye.....			42,600	5,064					45,500	\$6,370
Chinook or king.....			4,523,700	356,488			197,900	\$19,600	405,500	31,953
Chum or keta.....			851,700	12,778						
Silver or coho.....			497,500	24,885			407,800	24,656		
Shad.....			37,500	978						
Smelt, eulachon.....			371,800	26,012					180,300	10,818
Steelhead trout.....			285,400	16,839			100	6	33,100	1,953
Sturgeon.....			15,800	360	15,800	360				
Tuna, albacore.....							141,700	8,499		
Total.....	126,700	3,458	6,655,800	444,563	282,800	14,369	747,500	52,761	664,400	51,094

OREGON

Fisheries of Oregon, 1937

CATCH: BY DISTRICTS

Species	Columbia River district		Coastal district	
	Pounds	Value	Pounds	Value
FISH				
Cod.....	12,700	\$190		
Flounders:				
"Sole".....	538,700	9,747	111,700	\$2,102
Other.....	260,800	2,732	700	18
Hallbut.....	292,400	25,446	74,800	6,224
Herring.....			30,000	402
"Lingcod".....	121,800	4,206	30,400	884
Perch.....			800	12
Pilchard or sardine.....			33,462,500	217,506
Rockfishes.....	117,000	3,185	36,800	1,274
Sablefish.....	80,500	3,715	67,200	2,876
Salmon:				
Blueback, red or sockeye.....	247,000	34,580		
Chinook or king.....	13,878,600	1,100,868	2,180,400	166,258
Chum or keta.....	1,068,100	15,871	521,000	10,420
Humpback or pink.....	100	3	300	9
Silver or coho.....	2,019,300	112,291	5,196,500	256,399
Shad.....	241,900	6,290	282,700	9,894
Smelt, eulachon.....	472,800	23,098		
Steelhead trout.....	1,614,500	95,256	110,600	6,113
Striped bass.....			34,100	1,855
Sturgeon.....	79,700	1,817	2,200	75
Tuna, albacore.....	857,200	52,838	222,200	13,308
Total.....	21,892,600	1,502,181	42,364,700	696,629
SHELLFISH				
Crabs.....			4,372,000	367,248
Crawfish, fresh-water.....	84,200	9,262		
Clams:				
Razor.....			56,500	13,447
Mixed.....			77,800	6,682
Oysters, market:				
Japanese.....			87,500	5,400
Native.....			9,600	6,440
Total.....	84,200	9,262	4,603,400	399,217
Grand total.....	21,976,800	1,511,393	46,968,100	1,097,846

Fisheries of the Columbia River district of Oregon, 1937

OPERATING UNITS: BY GEAR 1

Item	Purse seines, pilchard	Haul seines	Gill nets		Lines		Pound nets	Dip nets	Otter trawls	Traps, crawfish	Total, exclusive of duplication
			Drift, salmon	Set, salmon	Trawl and set	Troll					
Fishermen:											
On vessels.....	Number 23	Number	Number	Number	Number 24	Number 76	Number	Number	Number 6	Number	Number 129
On boats and shore.....		514	1,088	78	62	141	45	163		25	2,036
Total.....	23	514	1,088	78	86	217	45	163	6	25	2,165
Vessels, motor:											
5 to 10 tons.....					2	35					37
11 to 20 tons.....					4	5			2		10
61 to 70 tons.....	1										1
101 to 110 tons.....	1										1
Total.....	2				6	40			2		49
Net tonnage.....	172				78	309			34		578
Boats:											
Motor.....		23	703	71	56	115	21			17	910
Other.....		44		7	6		21			8	80
Accessory boats.....	2										2
Apparatus:											
Number.....	2	44	703	137	706	808	27	163	2	1,125	
Length, yards.....	885	23,072									
Square yards.....			2,240,082	38,360							
Yards at mouth.....									40		
Hooks.....					18,940	3,426					

¹ In addition to the operating units shown, 2 California vessels with a combined crew of 11, and a total net tonnage of 22 tons, operated a paranzella net from the Oregon Columbia River district. These craft are included in the California operating unit tables.

CATCH: BY GEAR 1

Species	Haul seines		Gill nets				Lines	
			Drift		Set		Trawl and set	
FISH	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Flounders:							17,300	\$623
"Sole".....								
Other.....			239,800	\$2,398				
Hallbut.....							291,300	25,372
"Lingcod".....							92,700	3,671
Rockfishes.....							65,900	2,564
Sablefish.....							79,500	3,675
Salmon:								
Blueback, red or sockeye.....	40,100	\$5,614	110,800	15,512	6,200	\$868		
Chinook or king.....	2,799,500	220,601	9,123,300	718,916	32,700	2,577		
Chum or keta.....	96,800	1,452	924,200	13,863	4,300	64		
Silver or coho.....	198,000	9,900	571,600	28,580	1,500	75		
Shad.....	127,600	3,318	113,300	2,946	900	23		
Smelt, eulachon.....			472,800	33,096				
Steelhead trout.....	654,600	38,621	579,900	34,214	6,800	401		
Sturgeon.....	1,300	30	44,800	1,021	100	2	28,200	643
Total.....	3,917,900	279,536	12,180,500	\$50,546	52,500	4,010	574,900	36,548

See footnotes at end of table.

Fisheries of the Columbia River district of Oregon, 1937—Continued

CATCH: BY GEAR—Continued

Species	Lines—Contd.		Pound nets		Dip nets		Otter trawls and paranella nets ¹		Traps, crawfish	
	Troll									
FISH	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Cod.....							12,700	\$190		
Flounders:										
" Sole".....							521,400	9,124		
Other.....							21,000	334		
Halibut.....							1,100	71		
"Lingcod".....	10,800	\$131					17,800	404		
Rockfishes.....	38,200	382					12,900	239		
Sablefish.....							1,000	40		
Salmon:										
Blueback, red or sockeye.....			10,300	\$1,442	79,600	\$11,144				
Chinook or king.....	357,400	35,397	478,100	37,674	1,087,600	85,703				
Chum or keta.....			32,800	492						
Humpback or pink.....	100	3								
Silver or coho.....	1,082,800	65,466	164,900	8,245	500	25				
Shad.....			100	3						
Steelhead trout.....	500	30	228,500	13,482	144,200	8,508				
Sturgeon.....			400	9	4,900	112				
Tuna, albacore.....	857,200	52,838								
Total.....	2,347,000	154,247	915,100	61,347	1,316,800	105,492	587,900	10,405		
SHELLFISH										
Crawfish, fresh-water.....									84,200	\$9,262
Grand total.....	2,347,000	154,247	915,100	61,347	1,316,800	105,492	587,900	10,405	84,200	9,262

¹ Of the species listed the following are taken off the Oregon and Washington coasts but landed in the Columbia River district: "Sole", halibut, "lingcod", rockfishes, sablefish, and tuna. Most of the troll-caught salmon were also taken in coastal waters.

² The catch by paranella nets was made by fishermen from California.

Fisheries of the coastal district of Oregon, 1937

OPERATING UNITS: BY GEAR

Item	Purse seines, pilchard	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	Number
Fishermen:											
On vessels.....	13				4	18	6				
On boats and shore.....		12	503	296	2	90		255	18	177	1,228
Total.....	13	12	503	296	6	108	6	273	18	177	1,277
Vessels, motor:											
5 to 10 tons.....					1	8		8			12
11 to 20 tons.....						1	2	1			4
101 to 110 tons.....	1										1
Total.....	1				1	9	2	9			17
Net tonnage.....	104				9	73	32	82			261
Boats:											
Motor.....		4	410	197	1	74		250	2		835
Other.....		4		80					8	18	110
Accessory boats.....	1										1
Apparatus:											
Number.....	1	4	410	903	160	415	2	16,835	18	177	
Length, yards.....	500	666									
Square yards.....			577,690	321,480							
Yards at mouth.....							40				
Hooks.....					2,880	1,840					

¹ In addition there was a combined fleet of 32 Washington, Oregon, and California purse-seine vessels operated in the Oregon coast pilchard fishery. The vessels were manned by a total of 363 fishermen and had an aggregate tonnage of 1,961 net tons. Of the total vessels, 2 were from the Columbia River district of Oregon, 8 from Washington, and 22 were from California. For detailed statistics regarding the operating units in this fishery refer to the gear tables in the Oregon Columbia River, Washington, and California sections of this report.

Fisheries of the coastal district of Oregon, 1937—Continued

CATCH: BY GEAR

Species	Purse seines, pilchard ¹		Haul seines		Gill nets, drift and set		Lines			
	Pounds	Value	Pounds	Value	Pounds	Value	Trawl and set		Troll	
FISH										
Flounders:							Pounds	Value	Pounds	Value
"sole"							14,800	\$416		
Other							700	18		
Halibut							70,400	5,878	3,700	\$299
Herring			30,000	\$402						
"Lingcod"							14,200	522	3,900	83
Pilchard or sardine	33,462,500	\$217,506								
Rockfishes							35,600	1,232	600	31
Sablefish							67,200	2,876		
Salmon:										
Chinook or king					1,145,700	\$91,656			1,034,700	77,602
Chum or keta					521,000	10,420				
Humpback or pink									300	9
Silver or coho					3,227,600	161,380			1,968,900	95,019
Shad					282,700	9,894				
Steelhead trout					110,600	6,113				
Striped bass					34,100	1,855				
Sturgeon					2,200	75				
Tuna, albacore									222,200	13,308
Total	33,462,500	217,506	30,000	402	5,323,900	281,393	202,900	10,942	3,234,300	186,351

Species	Otter trawls		Traps, crab		Tongs and rakes		Shovels	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
FISH								
Flounders, "sole"	96,900	\$1,686						
Halibut	700	47						
"Lingcod"	12,300	279						
Perch	600	12						
Rockfishes	600	11						
Total	111,100	2,035						
SHELLFISH								
Crabs			4,372,000	\$367,248				
Clams:								
Razor ²							56,500	\$13,447
Mixed ³							77,800	6,682
Oysters, market:								
Japanese					87,500	\$5,400		
Native					9,600	6,440		
Total			4,372,000	367,248	97,100	11,840	134,300	20,129
Grand total	111,100	2,035	4,372,000	367,248	97,100	11,840	134,300	20,129

¹ The Oregon coast pilchard fishery was prosecuted almost entirely by Washington and California purse-seine vessels. See separate sections for data on operating units in the fishery.

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.

CALIFORNIA

Fisheries of California, 1937

CATCH: BY DISTRICTS

Species	Northern district		San Francisco district		Monterey district	
	Pounds	Value	Pounds	Value	Pounds	Value
FISH						
Anchovies			102, 100	\$1, 531	44, 200	\$854
Carp			36, 400	1, 418		
Catfish			302, 900	34, 437		
Cod ¹			4, 731, 400	80, 671		
Flounders:						
"California halibut"			8, 900	1, 338	19, 000	2, 104
"Sole"	3, 374, 000	\$179, 139	4, 403, 000	258, 739	225, 000	10, 785
Other	370, 000	12, 949	1, 136, 100	40, 127	52, 500	2, 122
Grayfish	6, 400	146	396, 300	2, 058	127, 800	1, 305
Hake	700	8	59, 200	592	1, 200	12
Halibut	316, 900	26, 507				
Hardhead			54, 200	4, 894		
Herring	6, 500	50	613, 400	4, 601	4, 300	65
Horse mackerel					42, 200	2, 874
Kingfish			5, 200	262	134, 800	5, 260
"Lingcod"	449, 500	16, 745	399, 400	17, 671	117, 500	6, 770
Mackerel			11, 500	633	2, 019, 500	44, 020
Perch	11, 000	323	98, 600	3, 295	39, 900	1, 778
Pilchard or sardines			435, 550, 200	2, 727, 032	279, 194, 300	1, 694, 374
Pompano					100	47
Rockfishes	454, 600	17, 794	693, 100	39, 580	2, 127, 900	86, 564
Sablefish	571, 100	22, 295	20, 800	623	4, 200	93
Salmon	3, 834, 500	301, 712	2, 181, 300	147, 915	891, 100	79, 328
Sculpin			3, 500	87	4, 400	58
Sea bass:						
Black					100	5
White			11, 600	1, 745	28, 200	2, 969
Shad			651, 000	29, 156		
Skates	37, 600	751	330, 000	6, 600	21, 400	424
Smelt	13, 700	505	322, 800	13, 291	91, 900	4, 865
Spittail			10, 800	371		
Squawfish			500	23		
Suckers			7, 900	219		
Tomcod			1, 100	35		
Tuna and tunalike fishes:						
Albacore	200	18	700	55	582, 700	50, 965
Bonito					300	15
Whitebait	75, 800	3, 877	8, 700	621	1, 600	167
Other fish	72, 100	1, 064	80, 300	1, 207	2, 600	60
Total	9, 594, 600	683, 883	462, 232, 900	3, 420, 817	285, 778, 700	1, 997, 908
SHELLFISH						
Crabs	191, 800	15, 399	1, 418, 500	162, 532	12, 300	1, 056
Shrimp			1, 108, 700	16, 260	3, 000	655
Abalone					286, 900	63, 261
Clams:						
Hard	4, 900	608	1, 600	426		
Pismo					3, 500	866
Soft			28, 700	7, 891		
Mussels	600	25	3, 700	234	200	17
Octopus					19, 200	1, 687
Oysters, market:						
Eastern	1, 200	266	66, 100	22, 781		
Japanese			90, 700	13, 602		
Native			5, 300	1, 768		
Squid			500	30	464, 700	14, 142
Total	196, 500	16, 298	2, 724, 800	225, 524	789, 600	81, 584
WHALE PRODUCTS						
Whale meat			624, 900	12, 207		
Whale oil			513, 200	29, 016		
Total			1, 138, 100	41, 223		
Grand total	9, 793, 100	600, 181	466, 095, 800	3, 687, 564	286, 568, 200	2, 079, 487

¹ The catch of cod was taken off Alaska.

Fisheries of California, 1937—Continued

CATCH: BY DISTRICTS—Continued

Species	San Pedro district					
	Off California		Off Latin America		Total	
	Pounds	Value	Pounds	Value	Pounds	Value
FISH						
Anchovies	79,900	\$854			79,900	\$854
Barracuda	1,418,400	76,434	453,400	\$33,032	1,871,800	109,466
Cabrilla			59,700	3,359	59,700	3,359
Flounders:						
"California halibut"	652,100	57,602	27,800	2,502	679,900	60,104
"Sole"	300,200	8,951			300,200	8,951
Other	8,300	1,308			8,300	1,308
Flyingfish	41,900	1,834			41,900	1,834
Grayfish	305,500	10,314	2,000	83	307,500	10,397
Groupers			4,500	300	4,500	300
Hake	2,300	56			2,300	56
Horse mackerel	6,400,800	60,948	600	29	6,401,300	60,977
Kingfish	504,900	10,142			504,900	10,142
"Lingcod"	1,800	98			1,800	98
Mackerel	55,505,200	587,798			55,505,200	587,798
Marlin	3,600	148	500	34	4,100	182
Mullet	3,000	294			3,000	294
Perch	61,400	3,943			61,400	3,943
Pilchard or sardines	347,461,100	1,903,208			347,461,100	1,903,208
Pompano	4,700	2,330			4,700	2,330
Rock bass	117,100	8,299	19,400	1,271	136,500	9,570
Rockfishes	712,200	30,780			712,200	30,780
Rudderfishes	35,400	1,764			35,400	1,764
Sablefish	137,300	6,412			137,300	6,412
Salmon	900	38			900	38
Sculpin	128,400	10,309			128,400	10,309
Sea bass:						
Black	17,100	873	456,800	26,727	473,900	27,600
White	138,200	15,826	11,400	1,060	149,600	16,886
Sheepshead	70,200	2,571	1,300	56	71,500	2,627
Skates	57,100	722			57,100	722
Smelt	249,000	10,145			249,000	10,145
Spanish mackerel			19,000	1,077	19,000	1,077
Swordfish	398,300	56,572			398,300	56,572
Tuna and tuna-like fishes:						
Albacore	1,110,000	111,082			1,110,000	111,082
Bluefin	9,978,100	572,278	1,316,700	73,591	11,294,800	645,869
Bonito	4,305,400	161,101	865,600	32,454	5,171,000	193,555
Skipjack or striped tuna	575,400	28,771	15,008,700	747,697	15,584,100	776,468
Yellowfin	155,500	9,688	25,961,500	1,545,852	26,117,000	1,555,540
Whitefish	26,100	1,452	3,900	215	30,000	1,667
Yellowtail	125,000	6,455	419,400	17,026	544,400	23,481
Other fish	9,900	370	1,400	93	11,300	463
Total	431,101,700	3,761,770	44,633,500	2,486,458	475,735,200	6,248,228
SHELLFISH						
Crabs	1,600	48			1,600	48
Sea crawfish or spiny lobster	309,600	57,876	1,600	304	311,100	58,180
Abalone	286,000	29,393			286,000	29,393
Clams:						
Hard	6,700	1,746			6,700	1,746
Pismo	52,500	9,967			52,500	9,967
Octopus	400	44			400	44
Squid	36,400	1,208			36,400	1,208
Total	693,200	100,282	1,500	304	694,700	100,586
Grand total	431,794,900	3,862,052	44,635,000	2,486,762	476,429,900	6,348,814

Fisheries of California, 1937—Continued

CATCH: BY DISTRICTS—Continued

Species	San Diego district				Total	
	Off California		Off Latin America			
FISH	Pounds	Value	Pounds	Value	Pounds	Value
Barracuda	375,200	\$15,782	686,000	\$35,272	1,061,200	\$51,054
Cabrilla			71,500	3,559	71,500	3,559
Flounders, "California halibut"	132,200	9,991	366,900	28,697	499,100	38,688
Grayfish	70,300	983	4,800	120	75,100	1,103
Groupers	700	4	53,300	2,582	53,400	2,586
Herring	7,100	61			7,100	61
Horse mackerel	98,100	962			98,100	962
Kingfish	700	19			700	19
"Lincode"			100	3	100	3
Mackerel	3,295,900	35,641	104,300	1,285	3,400,200	36,926
Mullet	5,500	437			5,500	437
Perch	2,100	96	400	17	2,500	113
Pilchard or sardines	9,407,700	48,619	100	1	9,407,800	48,620
Pompano	100	17	200	40	300	57
Rock bass	113,100	5,225	74,700	3,229	187,800	8,454
Rockfishes	143,600	6,952	159,500	7,514	303,100	14,796
Rudderfishes	200	5	500	14	700	19
Sablefish	200	5			200	5
Sculpin	9,000	539	200	9	9,200	548
Sea bass:						
Black	3,200	149	237,000	11,995	240,200	12,144
White	87,500	7,150	325,400	28,060	412,900	35,210
Sheepshead	2,900	120	7,000	231	9,900	371
Skates	1,400	14			1,400	14
Smelt	2,400	122	2,200	113	4,600	235
Spanish mackerel			7,700	274	7,700	274
Swordfish	191,600	23,953	35,400	4,481	227,000	28,434
Tuna and tunalike fishes:						
Albacore	326,400	32,688			326,400	32,688
Bluefin	844,000	47,393	555,100	31,651	1,399,100	79,044
Bonito	1,401,600	47,438	1,235,200	45,274	2,636,700	92,712
Skipjack	1,308,700	65,437	30,211,300	1,478,618	31,520,000	1,542,055
Yellowfin	32,300	1,978	65,373,200	3,900,301	65,405,500	3,902,279
Whitefish	6,200	305	20,900	1,060	27,100	1,365
Yellowtail	98,500	4,845	4,728,100	183,682	4,826,600	188,527
Other fish	500	12			500	12
Total	17,068,200	356,872	104,281,000	5,766,462	122,229,200	6,123,274
SHELLFISH						
Sea crawfish or spiny lobster	76,300	14,115	935,000	91,394	1,011,300	105,479
Grand total	18,044,500	370,987	105,196,000	5,857,766	123,240,500	6,228,753

CATCH: BY WATERS

Species	Off California		Off Latin America	
	Pounds	Value	Pounds	Value
FISH				
Anchovies	226,200	\$3,239		
Barracuda	1,793,600	92,216	1,139,400	\$68,304
Cabrilla			131,200	6,918
Carp	36,400	1,418		
Catfish	302,900	34,437		
Cod ¹	4,731,400	80,671		
Flounders:				
"California halibut"	812,200	71,035	394,700	31,199
"Sole"	3,302,200	457,614		
Other	1,596,900	56,506		
Flyingfish	41,900	1,834		
Grayfish	906,300	14,806	6,800	203
Groupers	100	4	57,800	2,882
Hake	63,400	663		
Halibut	316,900	26,507		
Hardhead	54,200	4,894		
Herring	631,300	4,777		
Horse mackerel	6,541,100	64,774	500	29
Kingfish	645,600	15,683		
"Lincode"	968,200	41,284	100	3
Mackerel	60,832,100	668,092	104,300	1,285
Marlin	3,000	148	500	34
Mullet	8,500	731		
Perch	213,000	9,365	400	17
Pilchard or sardines	1,071,613,300	6,373,233	100	1

¹ The catch of cod was taken off Alaska.

Fisheries of California, 1937—Continued

CATCH: BY WATERS—Continued

Species	Off California		Off Latin America	
	Pounds	Value	Pounds	Value
FISH—continued				
Pompano.....	4,900	\$2,394	200	\$40
Rock bass.....	230,200	13,524	94,100	4,500
Rockfishes.....	4,131,400	181,670	159,500	7,814
Rudderfishes.....	35,600	1,789	500	14
Sablefish.....	733,600	29,428	.....	.....
Salmon.....	6,907,800	528,993	.....	.....
Sculpin.....	146,300	10,993	200	9
Sea bass:				
Black.....	20,400	1,027	693,800	38,722
White.....	265,500	27,690	336,800	29,120
Shad.....	651,000	29,156	.....	.....
Sheepshead.....	73,100	2,691	8,300	307
Skates.....	447,500	8,511	.....	.....
Smelt.....	679,800	28,928	2,200	113
Spanish mackerel.....	.....	.....	26,700	1,351
Spittail.....	10,800	371	.....	.....
Squawfish.....	500	23	.....	.....
Suckers.....	7,900	219	.....	.....
Swordfish.....	599,900	80,525	35,400	4,481
Tomcod.....	1,100	35	.....	.....
Tuna and tunalike fishes:				
Albacore.....	2,020,000	194,828	.....	.....
Bluefin.....	10,822,100	619,671	1,871,800	105,242
Bonito.....	5,707,200	208,654	2,100,800	77,728
Skipjack or striped tuna.....	1,884,100	94,208	45,220,000	2,224,315
Yellowfin.....	187,800	11,666	91,334,700	5,446,158
Whitebait.....	86,100	4,665	.....	.....
Whitefish.....	32,300	1,757	24,800	1,275
Yellowtail.....	223,500	11,300	5,147,500	200,708
Other fish.....	165,400	2,713	1,400	93
Total.....	1,196,676,100	10,121,245	148,894,500	8,252,560
SHELLFISH				
Crabs.....	1,624,200	179,035	.....	.....
Sea crawfish or spiny lobster.....	385,900	71,991	936,500	91,668
Shrimp.....	1,111,700	16,915	.....	.....
Abalone.....	572,600	92,654	.....	.....
Clams:				
Hard.....	13,200	2,780	.....	.....
Pismo.....	66,000	10,833	.....	.....
Soft.....	29,700	7,891	.....	.....
Mussels.....	200	17	.....	.....
Octopus.....	23,900	1,890	.....	.....
Oysters, market:				
Eastern.....	67,300	23,047	.....	.....
Japanese.....	90,700	13,602	.....	.....
Native.....	5,300	1,758	.....	.....
Squid.....	501,600	15,380	.....	.....
Total.....	4,482,300	487,803	936,500	91,668
WHALE PRODUCTS				
Whale meat.....	624,900	12,207	.....	.....
Whale oil.....	513,200	29,016	.....	.....
Total.....	1,138,100	41,223	.....	.....
Grand total.....	1,202,296,500	10,600,271	149,831,000	8,344,528

Fisheries of the northern district of California, 1937

OPERATING UNITS: BY GEAR

Item	Gill nets	Lines		Dip nets	Traps, crab	Shovels	Rakes, oyster	Total, exclusive of duplication
		Set and hand	Troll					
Fishermen:	Number	Number	Number	Number	Number	Number	Number	Number
On vessels.....	2	20	19					31
On boats and shore.....	14	89	225	24	41	13	3	263
Total.....	16	109	244	24	41	13	3	294
Vessels, motor:								
5 to 10 tons.....	1	10	13					17
Net tonnage.....	7	82	91					127
Boats:								
Motor.....	11	70	198		37			203
Other.....							3	3
Apparatus:								
Number.....	17	299	1,083	24	703	13	3	
Square yards.....	12,750							
Hooks.....		39,978	4,723					

CATCH: BY GEAR

Species	Gill nets		Lines				Paranzella nets	
			Set and hand		Troll			
FISH	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Flounders:								
"Sole".....	200	\$10					3,373,800	\$179,129
Other.....	2,300	86					367,700	12,863
Grayfish.....			1,700	\$99			4,700	47
Hake.....					3,400	\$272	700	8
Halibut.....			230,200	18,436			83,300	7,799
Herring.....	6,500	50			30,100	1,054		
"Lingcod".....			242,600	9,601			176,800	6,190
Perch.....	10,300	302			6,100	214		
Rockfishes.....			127,400	4,827			321,100	12,753
Sablefish.....			618,400	20,710			52,700	1,585
Salmon.....					3,834,800	301,712		
Skates.....							37,600	751
Smelt.....	8,400	337						
Tuna, albacore.....					200	18		
Other fish.....			13,100	342	1,800	27	57,200	695
Total.....	27,700	785	1,133,400	53,915	3,876,100	303,297	4,475,600	221,820
SHELLFISH								
Crabs.....							500	40
Octopus.....			600	25				
Total.....			600	25			500	40
Grand total.....	27,700	785	1,134,000	53,940	3,876,100	303,297	4,476,100	221,860

Species	Dip nets		Traps		Shovels		Rakes	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
FISH								
Perch.....	700	\$21						
Smelt.....	5,800	168						
Whitebait.....	75,800	3,877						
Total.....	81,800	4,066						
SHELLFISH								
Crabs.....			191,300	\$15,359				
Clams, hard.....					4,900	\$608		
Oysters, market, eastern.....							1,200	\$266
Total.....			191,300	15,359	4,900	608	1,200	266
Grand total.....	81,800	4,066	191,300	15,359	4,900	608	1,200	266

NOTE.—The catch by paranzella nets was made by fishermen from the San Francisco district.

Fisheries of the San Francisco district of California, 1937

OPERATING UNITS: BY GEAR

Item	Purse seines		Lampara and ring nets		Haul seines	Gill nets	
	Sardine	Tuna	Mackerel	Sardine		Drift, salmon	Drift, sea bass
	Number	Number	Number	Number	Number	Number	Number
Fishermen:							
On vessels.....	960	78	11	129			
On boats and shore.....	6			23	15	210	11
Total	960	78	11	152	15	210	11
Vessels, motor:							
5 to 10 tons.....			1	4			
11 to 20 tons.....				5			
21 to 30 tons.....	4						
31 to 40 tons.....	28	1		3			
41 to 50 tons.....	17						
51 to 60 tons.....	12	1					
61 to 70 tons.....	17	3					
71 to 80 tons.....	6	1					
81 to 90 tons.....	3						
91 to 100 tons.....	2	1					
Total	89	7	1	12			
Net tonnage	4,619	471	9	217			
Boats:							
Motor.....				3	4	113	6
Other.....					1	2	1
Accessory boats	89	7	1	15			
Apparatus:							
Number.....	89	7	1	15	4	115	7
Length, yards.....	34,052	4,100	400	4,425	580		
Square yards.....						362,250	12,460

Item	Gill nets—Contd.		Lines		Fyke nets	Dip nets	Bag nets, shrimp
	Drift, shad	Other	Set and hand	Troll			
	Number	Number	Number	Number	Number	Number	Number
Fishermen:							
On vessels.....		2	97	80			36
On boats and shore.....	237	50	66	264	94	3	5
Total	237	52	163	344	94	3	41
Motor:							
5 to 10 tons.....		1	1	5			8
11 to 20 tons.....			1	14			
21 to 30 tons.....				1			
Total		1	2	20			8
Net tonnage		6	23	267			48
Sail:							
321 to 330 tons.....			1				
491 to 500 tons.....			1				
Total			2				
Net tonnage			824				
Total vessels		1	4	20			8
Total net tonnage		6	847	267			48
Boats:							
Motor.....	125	29	35	250	50	1	1
Other.....		1	6		19	1	
Accessory boats			74				
Apparatus:							
Number.....	125	46	759	1,266	1,989	3	9
Length, yards.....							6,656
Square yards.....	437,000	56,174					
Hooks.....			38,095	4,484			

Fisheries of the San Francisco district of California, 1937—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Paran- zella nets	Beam trawls	Traps, crab	Harpoons, whaling	Rakes and tongs, oyster	Shovels	Total, exclusive of dupli- cation
	Number	Number	Number	Number	Number	Number	Number
Fishermen:							
On vessels.....	93	16	256	16	41	81	1,293
On boats and shore.....							850
Total	93	16	256	16	41	81	2,143
Vessels:							
Steam:							
11 to 20 tons.....				1			1
21 to 30 tons.....				1			1
31 to 40 tons.....	1						1
Total	1			2			3
Net tonnage	32			41			73
Motor:							
5 to 10 tons.....	4						16
11 to 20 tons.....	14						19
21 to 30 tons.....	1						5
31 to 40 tons.....							28
41 to 50 tons.....							2
51 to 60 tons.....							17
61 to 70 tons.....							12
71 to 80 tons.....							17
81 to 90 tons.....							6
91 to 100 tons.....							3
Total	19						125
Net tonnage	260						5,029
Sail:							
321 to 330 tons.....							1
491 to 500 tons.....							1
Total							2
Net tonnage							824
Total vessels	20			2			130
Total net tonnage	292			41			5,926
Boats:							
Motor.....		15	249		17	11	521
Other.....			1		19	2	47
Accessory boats							176
Apparatus:							
Number.....	10	15	5,095	2	41	81	
Yards at mouth.....	167	100					

Fisheries of the San Francisco district of California, 1937—Continued

CATCH: BY GEAR

Species	Purse seines		Lampara and ring nets		Haul seines		Gill nets	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
FISH								
Anchovies.....			39,000	\$585	63,100	\$946		
Carp.....					7,600	114	4,900	\$220
Flounders:								
" Sole".....			100	4				
Other.....							600	17
Grayfish.....	10,800	\$54	200	2			300	2
Hardhead.....					20,800	1,253		
Herring.....			5,000	37	335,400	2,515	272,700	2,046
Kingfish.....			3,800	192				
Mackerel.....			11,100	613				
Perch.....			200	7	57,500	1,895	40,900	1,383
Pilchard or sardines.....	415,096,300	2,594,428	20,454,700	132,512	8,500	85	700	7
Rockfishes.....							200	12
Salmon.....							973,100	58,740
Sculpin.....			600	19				
Sea bass, white.....			500	81			11,100	1,664
Shad.....			300	22			650,700	29,134
Smelt.....			68,300	2,733	18,400	792	231,800	9,511
Spittail.....					4,900	49	100	7
Squawfish.....							100	4
Suckers.....					2,800	38		
Tomcod.....					100	4	100	3
Whitebait.....			300	22	100	10	100	9
Total	415,097,100	2,594,482	20,584,100	136,829	519,200	7,701	2,187,400	102,759
SHELLFISH								
Squid.....							200	12
Grand total	415,097,100	2,594,482	20,584,100	136,829	519,200	7,701	2,187,600	102,771

Species	Lines				Fyke nets		Dip nets	
	Set and hand		Troll		Pounds	Value	Pounds	Value
FISH	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Carp.....					23,900	\$1,084		
Catfish.....	26,200	\$3,025			276,700	31,412		
Cod.....	4,731,400	80,671						
Flounders:								
" California hal- but".....	500	78	200	\$35				
" Sole".....	1,800	88						
Other.....	600	19						
Grayfish.....	46,100	297						
Hardhead.....					33,400	3,641		
" Lingcod".....	211,100	9,195	1,000	48				
Mackerel.....	200	8	200	12				
Rockfishes.....	369,100	21,306	100	5				
Sablefish.....	1,000	30						
Salmon.....			1,208,200	89,175				
Sculpin.....	2,900	68					4,300	\$255
Smelt.....								
Spittail.....					5,800	315		
Squawfish.....					400	19		
Suckers.....					5,100	181		
Tuna, albacore.....			700	55				
Whitebait.....							8,200	580
Other fish.....	200	6						
Total	5,391,100	114,791	1,210,400	89,330	345,300	36,652	12,500	835
SHELLFISH								
Octopus.....	3,700	234						
Grand total	5,394,800	115,025	1,210,400	89,330	345,300	36,652	12,500	835

Fisheries of the San Francisco district of California, 1937—Continued

CATCH: BY GEAR—Continued

Species	Bag nets		Paranzella nets		Beam trawls		Traps	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
FISH								
Flounders:								
"California halibut"			8,200	\$1,225				
"Sole"			4,401,100	258,647				
Other			1,120,700	39,665	14,200	\$426		
Grayfish			338,900	1,703				
Hake			59,200	592				
Herring					300	3		
Kingfish			1,400	70				
"Lingcod"			187,300	8,428				
Rockfishes			323,700	18,257				
Sablefish			19,800	593				
Skates			330,000	6,600				
Tomcod			300	9	600	19		
Other fish			80,100	1,201				
Total			6,870,700	336,990	15,100	448		
SHELLFISH								
Crabs			44,000	5,045			1,374,500	\$157,487
Shrimp	694,900	\$10,052			413,800	6,208		
Squid			300	18				
Total	694,900	10,052	44,300	5,063	413,800	6,208	1,374,500	157,487
Grand total	694,900	10,052	6,915,000	342,053	428,900	6,656	1,374,500	157,487

Species	Harpoons		Rakes and tongs		Shovels	
	Pounds	Value	Pounds	Value	Pounds	Value
SHELLFISH						
Clams:						
Hard					1,600	\$426
Soft					29,700	7,891
Oysters, market:						
Eastern			66,100	\$22,781		
Japanese			90,700	13,602		
Native			5,300	1,768		
Total			162,100	38,151	31,300	8,317
WHALE PRODUCTS						
Whale meat	624,900	\$12,207				
Whale oil	513,200	29,016				
Total	1,138,100	41,223				
Grand total	1,138,100	41,223	162,100	38,151	31,300	8,317

Fisheries of the Monterey district of California, 1937

OPERATING UNITS: BY GEAR

Item	Purse seines			Lampara and ring nets			Gill nets		
	Mack- erel	Sardine	Tuna	Mack- erel	Sardine	Other	Set, "Calif- ornia hall- but"	Set, crab	Drift, sea bass
Fishermen:	Number	Number	Number	Number	Number	Number	Number	Number	Number
On vessels.....	22	564	126	12	138	39			
On boats and shore.....					133	76	24	14	15
Total.....	22	564	126	12	271	115	24	14	15
Vessels, motor:									
5 to 10 tons.....				1	10	5			
11 to 20 tons.....					1				
21 to 30 tons.....		1							
31 to 40 tons.....		2			1				
41 to 50 tons.....	1	9	2						
51 to 60 tons.....		19	4						
61 to 70 tons.....	1	9	3						
71 to 80 tons.....		9	2						
81 to 90 tons.....		1							
Total.....	2	50	11	1	12	5			
Net tonnage.....	112	2,908	659	9	120	31			
Boats:									
Motor.....					12	12	13	10	12
Other.....							1		
Accessory boats.....	2	50	11	1	24	17			
Apparatus:									
Number.....	2	50	11	1	24	17	14	10	12
Length, yards.....	1,200	18,385	6,352	440	6,487	3,230			
Square yards.....							33,796	33,600	24,000

Item	Gill nets— Contd.	Lines		Otter trawls	Traps, octo- pus	Rakes and tongs, other than for oysters	Shovels	Aba- lone outfits	Total, exclu- sive of duplica- tion
	Other	Set and hand	Troll						
Fishermen:	Number	Number	Number	Number	Number	Number	Number	Number	Number
On vessels.....			40	16				58	729
On boats and shore.....	35	208	250	10	4	4	26	11	458
Total.....	35	208	290	26	4	4	26	69	1,187
Vessels, motor:									
5 to 10 tons.....			13	3				11	19
11 to 20 tons.....			1					1	1
21 to 30 tons.....									1
31 to 40 tons.....			1						2
41 to 50 tons.....				1					9
51 to 60 tons.....									19
61 to 70 tons.....									9
71 to 80 tons.....									9
81 to 90 tons.....									1
Total.....			15	4				12	70
Net tonnage.....			148	70				93	3,055
Boats:									
Motor.....	15	150	196	3	3	4	7	2	209
Other.....	8	14					6		24
Accessory boats.....									61
Apparatus:									
Number.....	33	766	1,500	7	100	4	26	14	
Square yards.....	43,916								
Yards at mouth.....				78					
Hooks.....		80,288	3,846						

Fisheries of the Monterey district of California, 1937—Continued

CATCH: BY GEAR

Species	Purse seines		Lampara and ring nets		Gill nets	
	Pounds	Value \$200	Pounds	Value \$654	Pounds	Value
FISH	10,000		34,200			
Anchovies.....						
Flounders:			400	48	8,900	\$984
"California halibut".....			400	20	8,400	420
"Sole".....					5,300	167
Other.....	12,800	131	5,000	51	10,400	100
Grayfish.....			3,600	54	700	11
Herring.....	700	48	37,600	2,561	3,700	251
Horse mackerel.....			57,700	2,252	68,000	2,633
Kingfish.....					1,500	86
"Lingcod".....	322,500	3,225	1,095,700	16,743	300	12
Mackerel.....			24,100	1,074	11,500	512
Perch.....	259,041,500	1,566,217	20,139,600	128,025	13,200	132
Pilchard or sardines.....			100	47		
Pompano.....	1,400	56			3,300	130
Rockfishes.....					100	2
Sablefish.....					500	6
Sculpin.....						
Sea bass:					100	5
Black.....			2,300	242	25,400	2,675
White.....	400	42	100	2	4,800	95
Skates.....			11,100	582	70,600	3,754
Smelt.....			200	10	100	5
Tuna and tunalike fishes, bonito.....			1,600	167		
Whitebait.....					100	3
Other fish.....						
Total.....	259,389,300	1,569,919	21,413,700	152,532	236,900	12,009
SHELLFISH					12,100	1,040
Crabs.....			464,700	14,142		
Squid.....						
Total.....			464,700	14,142	12,100	1,040
Grand total.....	259,389,300	1,569,919	21,878,400	166,674	249,000	13,049

Species	Lines				Otter trawls and paranzella nets ¹	
	Set and hand		Troll		Pounds	Value
FISH	Pounds	Value \$102	Pounds	Value \$22		
Flounders:					8,600	\$948
"California halibut".....	900	640	200		203,400	9,705
"Sole".....	12,800	642			34,400	1,313
Other.....	12,800	201			79,700	814
Grayfish.....	19,700		200	2	1,200	12
Hake.....						
Horse mackerel.....	200	14			4,900	191
Kingfish.....	4,200	164			2,800	161
"Lingcod".....	112,600	6,489	600	34	100	4
Mackerel.....	600,900	24,036			2,400	107
Perch.....	1,900	85			26,300	1,430
Rockfishes.....	2,096,400	84,928	500	20		
Sablefish.....	4,100	91				
Salmon.....			891,100	79,328		
Sculpin.....	3,900	52				
Sea bass, white.....	100	10			15,500	307
Skates.....	1,000	20				
Smelt.....	10,200	529	582,700	50,985		
Tuna, albacore.....					2,300	52
Other fish.....	200	5				
Total.....	2,881,900	118,008	1,475,300	130,391	381,600	15,044
SHELLFISH					200	16
Crabs.....					400	33
Octopus.....	8,500	685				
Total.....	8,500	685			600	49
Grand total.....	2,890,400	118,693	1,475,300	130,391	382,200	15,093

¹ The catch by paranzella nets was made by fishermen from the San Francisco district.

Fisheries of the Monterey district of California, 1937—Continued

CATCH: BY GEAR—Continued

Species	Traps		Rakes and tongs		Shovels		Abalone outfits	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
SHELLFISH	3,000	\$655					286,600	\$63,261
Shrimp.....								
Abalone.....					3,500	\$866		
Clams, Pismo.....			200	\$17				
Mussels.....	10,300	869						
Octopus.....								
Total	13,300	1,524	200	17	3,500	866	286,600	63,261

Fisheries of the San Pedro district of California, 1937

OPERATING UNITS: BY GEAR

Item	Purse seines			Lampara and ring nets			Gill nets		
	Mack- erel	Sar- dine	Tuna	Mack- erel	Sar- dine	Other	Drift, barra- cuda	Set, sea bass	Other
Fishermen:	Number	Number	Number	Number	Number	Number	Number	Number	Number
On vessels.....	132	1,175	927	651	867	94	3	3	10
On boats and shore.....					10	24	12	27	25
Total	132	1,175	927	651	877	118	15	30	35
Vessels, motor:									
5 to 10 tons.....					4	3			3
11 to 20 tons.....	1	1		7	14	2	1	1	1
21 to 30 tons.....	8	24	13	18	20				
31 to 40 tons.....	1	21	14	18	22	3			
41 to 50 tons.....	2	8	6	6	8				
51 to 60 tons.....		31	31	6	8				
61 to 70 tons.....		14	11	1					
71 to 80 tons.....		7	6						
81 to 90 tons.....		1	1						
91 to 100 tons.....			1						
171 to 180 tons.....			1						
Total vessels	12	107	84	56	76	8	1	1	4
Total net tonnage	348	5,006	4,353	1,877	2,315	157	6	6	38
Boats:									
Motor.....					1	5	4	11	12
Other.....								1	5
Accessory boats	12	107	84	56	77	13			
Apparatus:									
Number.....	12	107	84	56	77	13	5	13	21
Length, yards.....	5,537	41,467	49,783	28,438	37,768	6,162			
Square yards.....							45,000	41,600	18,700

Fisheries of the San Pedro district of California, 1937—Continued

OPERATING UNITS: BY GEAR—Continued

Item	Trammel nets	Lines		Paran-zella nets	Traps, sea craw-fish	Har-poons, sword-fish	Shovels	Aba-lone outfits	Total, exclu-sive of dupli-cation
		Sot and hand	Troll						
	Number	Number	Number	Number	Number	Number	Number	Number	Number
Fishermen:									
On vessels.....	11	475	17	9	13	18		5	2,336
On boats and shore.....	50	596	368	24	176	105	63	30	838
Total.....	61	1,071	385	33	189	123	63	35	3,174
Vessels, motor:									
5 to 10 tons.....	3		7	1	3	5		1	45
11 to 20 tons.....			17	1	2				23
21 to 30 tons.....	1	5	1						43
31 to 40 tons.....									35
41 to 50 tons.....		1							16
51 to 60 tons.....									39
61 to 70 tons.....		1							15
71 to 80 tons.....									7
81 to 90 tons.....									1
91 to 100 tons.....		2							3
111 to 120 tons.....		4							4
121 to 130 tons.....		1							1
131 to 140 tons.....		1							1
141 to 150 tons.....		1							1
161 to 170 tons.....		1							1
171 to 180 tons.....									1
181 to 190 tons.....		1							2
201 to 210 tons.....		2							1
361 to 370 tons.....		1							2
Total vessels.....	4	70	8	2	5	6		1	240
Total net tonnage.....	43	2,898	76	26	58	43		9	9,950
Boats:									
Motor.....	18	322	261	6	99	46	2	9	432
Other.....		16			23		13		45
Accessory boats.....		79							282
Apparatus:									
Number.....	22	1,946	1,580	4	4,940	52	63	10	
Square yards.....	93,432			67					
Yards at mouth.....									
Hooks.....		288,041	1,612						

CATCH OFF CALIFORNIA: BY GEAR

Species	Purse seines		Lampara and ring nets		Gill nets		Trammel nets	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
FISH								
Anchovies.....			79,900	\$854				
Barracuda.....	131,100	\$7,065	221,500	11,936	36,600	\$1,972		
Flounders:								
"California halibut".....			600	53	100	9	403,000	\$35,598
"Sole".....			400	12			1,200	36
Flyingfish.....			200	9	41,700	1,825		
Grayfish.....	1,100	37	4,200	142	31,500	1,063	78,800	2,660
Horse mackerel.....	1,652,500	15,735	4,746,900	45,199	900	9		
Klinefish.....			440,900	8,856	3,000	60		
Mackerel.....	7,858,700	82,516	38,705,400	406,407	12,700	141		
Mullet.....					3,000	294		
Perch.....	900	58	47,500	3,050	8,200	527		
Pilchard or sardines.....	177,856,500	970,249	169,603,300	932,946	1,300	13		
Pompano.....			4,200	2,062	600	248		
Rock bass.....			400	28	4,500	319	3,300	234
Rock fishes.....			400	17	100	4	1,900	82
Butterfishes.....			34,500	1,719	300	15		
Sculpin.....			100	8			100	8
Sea bass:								
Black.....	200	10	300	15	900	46	1,500	76
White.....	14,200	1,626	20,200	2,313	88,500	10,020	1,500	172
Sheepshead.....					200	7	3,600	182
Skates.....							11,400	144
Smelt.....	300	12	220,300	8,976	22,900	933		
Swordfish.....	200	28						

Fisheries of the San Pedro district of California, 1937—Continued

CATCH OFF CALIFORNIA: BY GEAR—Continued

Species	Purse seines		Lampara and ring nets		Gill nets		Trammel nets	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
FISH								
Tuna and tunalike fishes:								
Albacore	45,600	\$4,640	39,000	\$3,900			100	\$10
Bluefin	6,387,400	366,179	3,578,300	205,387	100	\$6		
Bonito	1,260,200	47,154	2,848,900	106,601	3,100	116	900	34
Skipjack or striped tuna	1,600	80	900	45				
Yellowfin	64,700	4,031	7,600	473				
Whitefish							100	6
Yellowtail	81,800	4,224	23,600	1,219	100	5		
Other fish	100	4	1,400	52	500	19	300	11
Total	195,357,100	1,503,568	220,630,900	1,742,299	260,700	17,651	507,700	39,203
SHELLFISH								
Sea crawfish or spiny lobster							5,200	972
Squid	200	7	36,200	1,201				
Total	200	7	36,200	1,201			5,200	972
Grand total	195,357,300	1,503,575	220,667,100	1,743,500	260,700	17,651	512,900	40,175

Species	Lines				Paranzella nets		Traps	
	Set and hand		Troll		Pounds	Value	Pounds	Value
FISH								
Barracuda	356,900	\$19,232	672,300	\$36,229				
Flounders:								
"California halibut"	38,800	3,427	100	9	209,500	\$18,506		
"Sole"	2,400	72			296,200	8,831		
Other	8,200	1,300			100	8		
Grayfish	185,700	6,270	1,000	34	3,200	108		
Hake	2,300	56						
Horse mackerel	500	5						
Kingfish	60,800	1,222			100	2	100	\$2
"Lingcod"	1,800	98						
Mackerel	8,927,100	98,719	1,300	15				
Marlin	2,600	107					1,200	77
Perch	3,600	231					29,400	2,084
Rock bass	79,200	5,613	300	21			800	35
Rock fishes	707,900	30,594			1,100	48		
Rudderfishes	600	30						
Sablefish	137,300	6,412						
Salmon			900	38				
Sculpin	124,700	10,012					3,500	281
Sea bass:								
Black	14,000	716			200	10		
White	13,800	1,695						
Sheepshead	13,700	502					52,700	1,930
Skates	4,300	54			41,400	524		
Smelt	5,500	224						
Tuna and tunalike fishes:								
Albacore	626,000	62,650	399,300	39,962				
Bluefin	4,800	276	7,600	430				
Bonito	52,400	1,961	139,900	5,235				
Skipjack or striped tuna	570,300	28,516	2,600	130				
Yellowfin	74,800	4,661	8,400	523				
Whitefish	23,600	1,312					2,400	134
Yellowtail	13,900	718	5,000	289				
Other fish	6,200	195	200	7			2,200	82
Total	12,062,700	286,880	1,230,400	82,922	551,800	28,037	92,300	4,625
SHELLFISH								
Crabs							1,600	48
Sea crawfish or spiny lobster							304,400	58,904
Octopus	300	33					100	11
Total	300	33					306,100	58,963
Grand total	12,063,000	286,913	1,230,400	82,922	551,800	28,037	398,400	61,588

Fisheries of the San Pedro district of California—Continued

CATCH OFF CALIFORNIA: BY GEAR—Continued

Species	Harpoons		Shovels		Abalone outfits	
	Pounds	Value	Pounds	Value	Pounds	Value
FISH						
Marlin.....	1,000	\$41				
Swordfish.....	398,100	56,544				
Total.....	399,100	56,585				
SHELLFISH						
Abalone.....					286,000	\$29,393
Clams:						
Hard.....			6,700	\$1,746		
Pismo.....			52,500	9,967		
Total.....			59,200	11,713	286,000	29,393
Grand total.....	399,100	56,585	59,200	11,713	286,000	29,393

CATCH OFF LATIN AMERICA: BY GEAR

Species	Purse seines		Gill nets		Trammel nets		Lines, set and hand		Traps	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
FISH										
Barracuda.....	357,300	\$26,031					96,100	\$7,001		
Cabrillo.....							59,700	3,359		
Flounders, "California halibut"					26,800	\$2,412	1,000	90		
Grayfish.....					800	33	1,200	50		
Groupers.....							4,500	300		
Horse mackerel.....							500	29		
Marlin.....							500	34		
Rock bass.....							19,400	1,271		
Sea bass:										
Black.....	200	12	1,000	\$58			455,600	26,657		
White.....	100	9	8,600	800	200	19	2,500	232		
Sheepshead.....					100	4	1,200	52		
Spanish mackerel.....							19,000	1,077		
Tuna and tunalike fishes:										
Bluefin.....	1,316,000	73,542					700	49		
Bonito.....	786,400	29,485					79,200	2,969		
Skipjack or striped tuna.....	6,402,200	318,938					8,606,500	428,759		
Yellowfin.....	8,542,800	508,672					17,418,700	1,037,180		
Whitefish.....							3,900	215		
Yellowtail.....	253,300	10,283					166,100	6,743		
Other fish.....							1,400	93		
Total.....	17,658,300	966,972	9,600	858	27,900	2,468	26,937,700	1,516,160		
SHELLFISH										
Sea crawfish or spiny lobster.....									1,500	\$304
Grand total.....	17,658,300	966,972	9,600	858	27,900	2,468	26,937,700	1,516,160	1,500	304

Fisheries of the San Diego district of California, 1937

OPERATING UNITS: BY GEAR

Item	Lampara and ring nets			Gill nets		
	Mackerel	Sardine	Other	Drift, barracuda	Set, sea bass	Other
Fishermen:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
On vessels.....	100	174	20		3	
On boats and shore.....		29		14	24	7
Total	100	203	20	14	27	7
Vessels, motor:						
5 to 10 tons.....	7	11	1		1	
11 to 20 tons.....	2	4				
21 to 30 tons.....			1			
Total	9	15	2		1	
Net tonnage	77	129	29		5	
Boats:						
Motor.....		3		5	8	3
Other.....						1
Accessory boats.....	9	18	2			
Apparatus:						
Number.....	9	18	2	5	9	4
Length, yards.....	3, 150	4, 421	1, 000			
Square yards.....				15, 000	43, 942	6, 060

Item	Trammel nets	Lines		Traps, sea crawfish	Harpoons, swordfish	Total, exclusive of duplication
		Set and hand	Troll			
Fishermen:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
On vessels.....	3	974	13		23	1, 059
On boats and shore.....	25	163	118	34	27	249
Total	28	1, 137	131	34	50	1, 308
Vessels, motor:						
5 to 10 tons.....	1	24	5		3	30
11 to 20 tons.....		16			3	16
21 to 30 tons.....		5				5
31 to 40 tons.....		8				8
41 to 50 tons.....		3				3
51 to 60 tons.....		2				2
61 to 70 tons.....		1				1
71 to 80 tons.....		7				7
81 to 90 tons.....		4				4
91 to 100 tons.....		2				2
101 to 110 tons.....		2				2
111 to 120 tons.....		5				5
121 to 130 tons.....		4				4
131 to 140 tons.....		7				7
141 to 150 tons.....		2				2
151 to 160 tons.....		2				2
161 to 170 tons.....		1				1
171 to 180 tons.....		1				1
181 to 190 tons.....		2				2
191 to 200 tons.....		3				3
201 to 300 tons.....		1				1
Total	1	102	5		6	108
Net tonnage	5	6, 627	40		67	6, 674
Boats:						
Motor.....	8	77	81	24	9	121
Other.....				1		2
Accessory boats.....		101				106
Apparatus:						
Number.....	9	1, 289	560	781	15	
Square yards.....	86, 665		560			
Hooks.....		36, 903				

Fisheries of the San Diego district of California, 1937—Continued

CATCH OFF CALIFORNIA: BY GEAR

Species	Purse seines		Lampara and ring nets		Gill nets		Trammel nets	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
FISH								
Barracuda.....	22,100	\$930	76,900	\$3,234	31,700	\$1,333		
Flounders, "California halibut".....			200	15			128,300	\$9,696
Grayfish.....					1,700	24	53,000	740
Herring.....					7,100	61		
Horse mackerel.....	21,400	208	76,700	744				
Mackerel.....	102,800	1,079	2,265,700	23,790	5,800	116	200	4
Mullet.....					5,500	437		
Perch.....			2,100	36				
Pilchard or sardines.....	425,100	2,197	8,982,600	46,422				
Pompano.....			100	17				
Rockfishes.....			200	10			700	34
Sea bass:								
Black.....					900	42	400	19
White.....			43,200	3,530	15,600	1,275	700	57
Smelt.....			700	35	400	20		
Tuna and tunalike fishes:								
Albacore.....			2,300	230				
Bluefin.....	181,800	10,208	587,100	32,968				
Bonito.....	100,400	3,398	830,100	28,097	600	20	1,800	61
Skipjack or striped tuna.....	15,600	790	500	25				
Yellowfin.....	100	6						
Yellowtail.....	1,600	79	16,400	807	100	5	200	10
Total.....	870,900	18,885	12,884,800	139,960	69,400	3,333	185,300	10,621

Species	Lines				Traps		Harpoons	
	Set and hand		Troll		Pounds	Value	Pounds	Value
	Pounds	Value	Pounds	Value				
FISH								
Barracuda.....	179,300	\$7,543	65,200	\$2,742				
Flounders, "California halibut".....	3,700	280						
Grayfish.....	14,700	206	900	13				
Groupers.....	100	4						
Kingfish.....	700	19						
Mackerel.....	921,400	10,652						
Rock bass.....	75,900	3,506	100	5	37,100	\$1,714		
Rockfishes.....	142,700	6,908						
Rudderfishes.....	200	5						
Sablefish.....	200	5						
Sculpin.....	9,000	539						
Sea bass:								
Black.....	1,900	88						
White.....	27,900	2,280	100	8				
Sheepshead.....	1,200	50			1,700	70		
Skates.....	1,400	14						
Smelt.....	1,300	67						
Swordfish.....							191,600	\$23,933
Tuna and tunalike fishes:								
Albacore.....	132,300	13,250	191,800	19,208				
Bluefin.....	70,100	3,936	5,000	281				
Bonito.....	288,400	9,763	180,200	6,099				
Skipjack or striped tuna.....	1,287,400	64,372	5,200	260				
Yellowfin.....	29,200	1,792	3,000	180				
Whitefish.....	6,200	305						
Yellowtail.....	66,800	3,285	13,400	659				
Other fish.....	500	12						
Total.....	3,262,500	128,881	464,900	29,455	38,800	1,784	191,600	23,933
SHELLFISH								
Sea crawfish or spiny lobster.....					76,300	14,115		
Grand total.....	3,262,500	128,881	464,900	29,455	115,100	15,899	191,600	23,933

Fisheries of the San Diego district of California, 1937—Continued

CATCH OFF LATIN AMERICA: BY GEAR

Species	Purse seines		Lampara and ring nets		Gill nets		Trammel nets	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
FISH								
Barracuda.....	89,200	\$4,686	42,500	\$2,185	33,800	\$1,738		
Flounders, "California halibut".....							366,600	\$28,675
Grayfish.....					1,900	48	1,300	32
Grouper.....					300	15		
Mackerel.....			34,900	430	4,700	58		
Perch.....			300	13				
Pilchard or sardines.....			100	1				
Pompano.....			200	40				
Rock bass.....					1,000	43		
Rockfishes.....					100	5	300	15
Sea bass:								
Black.....	15,200	769			5,100	258	3,000	152
White.....			60,100	5,183	113,500	9,787	700	60
Sheepshead.....							400	14
Smelt.....			1,700	87	400	21		
Tuna and tunalike fishes:								
Bluefin.....			470,100	26,805				
Bonito.....	5,700	209	245,100	8,984	10,100	370	1,100	40
Skipjack or striped tuna.....	102,300	5,115						
Yellowfin.....	631,100	37,866						
Yellowtail.....	14,100	548	79,300	3,081	3,900	152		
Total.....	857,600	49,093	934,300	46,809	174,800	12,495	373,400	28,988
SHELLFISH								
Sea crawfish or spiny lobster.....							200	20
Grand total.....	857,600	49,093	934,300	46,809	174,800	12,495	373,600	29,008

Species	Lines				Traps		Harpoons	
	Set and hand		Troll		Pounds	Value	Pounds	Value
	Pounds	Value	Pounds	Value				
FISH								
Barracuda.....	469,400	\$24,136	51,100	\$2,627				
Cabrilla.....	71,500	3,559						
Flounders, "California halibut".....	300	22						
Grayfish.....	1,600	40						
Grouper.....	53,000	2,567						
"Lingcod".....	100	3						
Mackerel.....	64,700	797						
Perch.....	100	4						
Rock bass.....	73,700	3,186						
Rockfishes.....	159,100	7,794						
Ruddersfishes.....	500	14						
Sculpin.....	200	9						
Sea bass:								
Black.....	213,700	10,816						
White.....	180,900	13,013	200	17				
Sheepshead.....	6,300	226			300	\$11		
Smelt.....	100	5						
Spanish mackerel.....	7,700	274						
Swordfish.....							35,400	\$4,481
Tuna and tunalike fishes:								
Bluefin.....	84,400	4,812	600	24				
Bonito.....	867,900	31,811	106,300	3,860				
Skipjack or striped tuna.....	30,109,000	1,471,503						
Yellowfin.....	64,742,100	3,862,435						
Whitefish.....	20,900	1,060						
Yellowtail.....	4,612,100	179,175	18,700	726				
Total.....	101,709,300	5,617,261	175,900	7,264	300	11	35,400	4,481
SHELLFISH								
Sea crawfish or spiny lobster.....					934,800	91,344		
Grand total.....	101,709,300	5,617,261	175,900	7,264	935,100	91,355	35,400	4,481

HALIBUT FISHERY OF THE PACIFIC COAST ¹⁰

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 1937 the total catch of halibut by vessels of both nationalities amounted to 48,659,000 pounds, valued at \$3,828,000. This is an increase of 1 percent in volume and 6 percent in value, as compared with the catch and its value in 1936. Of the total catch in 1937, 76 percent was taken by United States craft and 24 percent by Canadian craft. Considered according to ports of landing, 43 percent was landed at Seattle, Wash.; 39 percent at Canadian ports; and 18 percent at ports in Alaska.

Halibut fishery of the Pacific coast, 1937

UNITED STATES OPERATING UNITS: BY FLEET CLASSIFICATION

Item	Washing- ton fleet	Alaska fleet	Total
Regular halibut vessels:	<i>Number</i>	<i>Number</i>	<i>Number</i>
Number.....	131	113	244
Net tonnage.....	3,974	1,369	5,343
Crew.....	1,033	476	1,509
Skates of lines.....	4,052	2,113	6,165
Vessels in other fisheries but landing one or more fares of halibut:			
Number.....	13	42	55
Net tonnage.....	267	447	714
Crew.....	73	132	205
Skates of lines.....	289	534	823
Regular halibut boats:			
Number.....		33	33
Crew.....		81	81
Skates of lines.....		381	381
Boats in other fisheries but landing one or more fares of halibut:			
Number.....		67	67
Crew.....		127	127
Skates of lines.....		510	510

¹⁰ 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 shown represent the poundage of fish landed after evisceration and removal of heads.

Halibut fishery of the Pacific coast, 1937—Continued

CATCH OF ALL SPECIES: BY UNITED STATES VESSELS AND BOATS

Fleet classification	Landed in—						Total	
	Seattle, Wash.		British Columbia		Alaska			
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
WASHINGTON FLEET								
Regular vessels:								
Hallbut.....	20,068,011	\$1,829,600	2,504,885	\$199,214	553,577	\$40,296	23,126,473	\$2,069,110
Sablefish.....	2,799,738	143,823	41,851	1,476	17,881	523	2,869,470	145,822
“Lingcod”.....	845,039	38,007	-----	-----	585	6	845,624	38,013
Rockfishes.....	307,425	15,926	-----	-----	2,735	27	310,160	15,953
Total.....	24,020,213	2,027,356	2,546,736	200,690	574,778	40,852	27,141,727	2,268,898
Other vessels and boats:								
Hallbut.....	447,232	37,087	-----	-----	36,240	2,404	483,472	39,491
Sablefish.....	3,303	248	-----	-----	-----	-----	3,303	248
“Lingcod”.....	55,852	1,952	-----	-----	-----	-----	55,852	1,952
Rockfishes.....	522	20	-----	-----	-----	-----	522	20
Total.....	506,909	39,307	-----	-----	36,240	2,404	543,149	41,711
ALASKA FLEET								
Regular vessels:								
Hallbut.....	588,460	52,314	4,305,796	342,441	5,876,870	384,714	10,771,126	779,469
Sablefish.....	25,582	1,294	393,015	13,857	1,633,113	44,066	2,051,710	59,217
“Lingcod”.....	65,059	3,314	-----	-----	690	11	65,649	3,325
Rockfishes.....	34,654	1,694	-----	-----	10,054	139	44,708	1,833
Total.....	713,755	58,616	4,698,811	356,298	7,520,627	428,930	12,933,193	843,844
Other vessels and boats:								
Hallbut.....	64,405	5,102	210,633	16,751	2,235,517	130,307	2,510,555	152,160
Sablefish.....	323	16	-----	-----	69,349	1,785	69,672	1,801
“Lingcod”.....	845	34	-----	-----	-----	-----	845	34
Rockfishes.....	-----	-----	-----	-----	1,200	14	1,200	14
Total.....	65,573	5,152	210,633	16,751	2,306,066	132,106	2,562,272	154,009
COMBINED FLEETS								
Regular vessels:								
Hallbut.....	20,656,471	1,881,914	6,810,681	541,655	6,430,447	425,010	33,897,699	2,848,579
Sablefish.....	2,825,320	145,117	434,866	15,333	1,650,994	44,599	4,911,180	205,039
“Lingcod”.....	910,098	41,321	-----	-----	1,175	17	911,273	41,338
Rockfishes.....	342,079	17,620	-----	-----	12,789	166	354,868	17,786
Total.....	24,733,968	2,085,972	7,245,547	556,988	8,095,405	469,782	40,074,920	3,112,742
Other vessels and boats:								
Hallbut.....	511,637	42,189	210,633	16,751	2,271,757	132,711	2,994,027	191,651
Sablefish.....	3,626	264	-----	-----	69,349	1,785	72,975	2,049
“Lingcod”.....	56,697	1,966	-----	-----	-----	-----	56,697	1,966
Rockfishes.....	522	20	-----	-----	1,200	14	1,722	34
Total.....	572,482	44,459	210,633	16,751	2,342,306	134,510	3,125,421	195,720
All vessels and boats:								
Hallbut.....	21,168,108	1,924,103	7,021,314	558,406	8,702,204	557,721	36,891,626	3,040,230
Sablefish.....	2,828,946	145,381	434,866	15,333	1,720,343	46,374	4,984,155	207,088
“Lingcod”.....	966,795	43,307	-----	-----	1,175	17	967,970	43,324
Rockfishes.....	342,601	17,640	-----	-----	13,969	180	356,590	17,820
Grand total.....	25,306,450	2,130,431	7,456,180	573,739	10,437,711	604,292	43,200,341	3,308,462

Halibut fishery of the Pacific coast, 1937—Continued

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, Wash.		British Columbia		Alaska			
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
WASHINGTON FLEET								
Regular halibut vessels.....	20,068	1,830	2,506	199	554	40	23,127	2,069
Other vessels and boats.....	447	37	-----	-----	36	3	483	40
Total.....	20,515	1,867	2,506	199	590	43	23,610	2,109
ALASKA FLEET								
Regular halibut vessels.....	588	52	4,306	342	5,877	385	10,771	779
Other vessels and boats.....	64	5	211	17	2,286	130	2,511	152
Total.....	652	57	4,517	359	8,113	515	13,282	931
COMBINED FLEETS								
Regular halibut vessels.....	20,656	1,882	6,811	541	6,431	425	33,898	2,848
Other vessels and boats.....	511	42	211	17	2,272	133	2,994	192
Total.....	21,167	1,924	7,022	558	8,703	558	36,892	3,040
British Columbia fleet.....	18	2	11,746	786	3	(1)	11,767	788
Grand total.....	21,185	1,926	18,768	1,344	8,706	558	48,659	3,826

1 Less than \$500.

NOTE.—In addition to the above, it is estimated that about 1,190,477 pounds of halibut, sablefish, "lingcod," and rockfish livers, valued at approximately \$561,856, were landed by the combined fleets at Pacific coast ports during 1938.

The tabulation does not include landings at ports south of Seattle, Wash., which are normally less than 4 percent of the annual Pacific coast catch.

VESSEL FISHERIES AT SEATTLE, WASH.

A total of 52,320,295 pounds of fishery products, valued at \$3,664,057, were handled by Seattle wholesale dealers during 1937, exclusive of quantities received by transporting vessels or by rail from Alaska or Canada. This represents an increase of 5 percent in volume and 13 percent in value as compared with the quantity and value of the products handled during the preceding year. Of the total quantity handled, 25,306,450 pounds, valued at \$2,130,431, were landed by fishing vessels—a decrease of 6 percent in volume and 3 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 27,013,845 pounds, valued at \$1,533,626, which is an increase of 19 percent in volume and 46 percent in value.

Fishery products landed by United States vessels at Seattle, Wash., 1937¹

BY FISHING GROUNDS

Fishing grounds	Trips	Halibut				Sablefish		"Lingcod"		Rockfishes		Total	
		No. 1		No. 2		Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
West of Cape Spencer.....	455	10,009,925	\$979,717	5,512,969	\$459,605	72,875	\$3,140	6,271	\$154	13,723	\$593	15,615,783	\$1,443,209
South of Cape Spencer.....	742	2,614,245	253,971	3,030,949	230,810	2,756,071	142,241	960,524	43,153	328,878	17,047	9,690,667	687,222
Total.....	1,197	12,624,170	1,233,688	8,543,938	690,415	2,828,946	145,381	966,795	43,307	342,601	17,640	25,306,450	2,130,431

¹ Halibut fleet.

BY MONTHS

Months	Trips	Halibut				Sablefish		"Lingcod"		Rockfishes		Total	
		No. 1		No. 2		Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
January.....	16					7,512	\$592	103,992	\$6,994	67,702	\$4,144	179,236	\$11,730
February.....	27					818	38	148,224	8,241	66,835	3,898	215,877	12,177
March.....	84	866,594	\$77,753	455,199	\$31,017	19,838	892	48,170	1,900	12,320	561	1,431,141	112,123
April.....	163	2,013,616	175,505	1,013,116	67,161	19,813	1,002	108,603	4,851	9,459	517	3,162,607	249,034
May.....	167	1,921,990	171,325	1,428,697	98,559	6,627	261	136,264	3,908	16,536	665	3,510,024	274,618
June.....	149	1,808,180	165,920	1,476,406	117,518	73,776	5,163	77,278	2,840	9,454	484	3,445,694	291,925
July.....	150	1,736,060	168,127	1,559,500	123,695	132,214	7,009	67,295	2,772	20,697	908	3,515,786	308,111
August.....	89	1,256,171	139,816	873,772	85,379	373,563	17,414	38,287	1,496	27,192	1,052	2,568,985	245,157
September.....	117	1,343,719	154,107	818,466	75,813	767,467	37,663	54,927	1,786	21,053	666	3,005,651	270,035
October.....	143	1,643,930	181,127	918,873	86,273	936,933	49,314	48,703	1,751	9,934	298	3,563,263	318,773
November.....	66					425,119	21,974	46,633	2,467	34,277	1,770	506,029	26,211
December.....	27					65,226	3,459	90,419	4,401	47,142	2,677	202,787	10,537
Total.....	1,197	12,624,170	1,233,688	8,543,938	690,415	2,828,946	145,381	966,795	43,307	342,601	17,640	25,306,450	2,130,431

NOTE.—The statistics in this table are compiled from reports collected by the Bureau of Fisheries and the International Fisheries Commission.

Fishery products received by Seattle wholesale dealers, 1937; by months ¹

Species	January		February		March		April		May		June	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Cod.....	58,882	\$1,384	101,834	\$3,045	147,587	\$3,276	51,614	\$929	18,992	\$393	1,891	\$55
Flounders:												
" Sole".....	183,964	5,390	163,901	4,737	212,297	7,664	256,407	7,051	340,713	8,279	478,888	10,152
Other.....	75,868	1,441	108,764	2,827	53,817	1,189	11,195	224	4,551	69	2,535	45
Hallbut.....					1,312	201	2,688	174	33,623	1,917	63,673	4,081
Herring.....	6,190	125	64,786	1,166	391,650	2,962						
" Lingcod".....	20,735	460	36,032	1,117	63,355	1,730	55,063	1,107	169,587	2,713	80,174	1,267
Perch.....	5,767	204	11,327	467	14,705	603	22,379	768	9,183	359	1,416	48
Rockfishes.....	8,665	250	13,549	448	23,784	523	18,248	449	9,599	319	6,883	256
Sablefish.....											2,501	75
Salmon:											54	4
Blueback, red or sockeyes.....											798,635	75,951
Chinook or king.....			302	40	112,339	16,579	318,676	36,903	221,017	23,671	173,374	12,309
Silver or coho.....							69	4	4,072	322	13,919	1,282
Smelt.....	22,247	1,506	24,837	1,411	27,884	1,104	968	74	10,321	980	163,704	16,174
Crabs.....	191,091	14,465	89,638	7,001	171,404	12,855	123,832	11,888	143,964	13,245	353	49
Shrimp.....							20,335	2,419	5,345	738		
Clams, hard, in shell (meats).....	21,672	1,732	33,910	2,712	57,492	4,565	53,773	4,248	280	18		
Scallops, bay (meats).....	1,630	363	1,918	441	2,086	490	1,656	389	1,791	435	1,558	366
Octopus.....	3,051	95	4,735	136	7,513	225	4,503	135	4,412	181	3,414	137
Squid.....	1,655	116									900	36
Total.....	601,307	27,531	656,533	25,548	1,287,195	53,966	941,436	66,762	977,420	53,619	1,793,872	122,287

See footnotes at end of table.

Fishery products received by Seattle wholesale dealers, 1937; by months—Continued

Species	July		August		September		October		November		December		Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Cod.....	5,942	\$154	8,337	\$106	17,121	\$274	15,503	\$319	52,212	\$1,138	65,011	\$1,749	544,896	\$12,822
Flounders:														
"Solé".....	404,985	8,411	339,528	7,334	428,969	10,596	272,183	6,968	76,181	2,309	189,756	6,963	3,347,782	85,934
Other.....	238	3	552	8	101	2	990	15	10,599	247	169,801	4,279	439,011	10,349
Halibut.....	50,059	3,409	10,193	676	819	67	259	26					182,626	10,550
Herring.....							360	7			1,045	21	464,031	4,281
"Lingcod".....	103,965	2,443	194,355	4,315	192,566	4,737	72,948	1,590					1,069,077	23,782
Perch.....	772	31	2,384	81	4,916	167	8,703	303	41,467	1,004	38,800	1,299	99,561	3,634
Rockfishes.....	12,357	219	12,218	333	21,268	564	16,707	373	6,306	223	11,703	380	162,210	4,322
Sablefish.....	76,643	2,399	83,882	2,340	6,109	153	7,574	183	4,711	123	14,221	465	190,013	5,616
Salmon:														
Blueback, red or sockeya.....	13,508	1,234	62,039	6,167	20,036	1,843	70	6					95,707	9,254
Chinook or king.....	1,341,683	114,607	1,600,269	161,147	1,040,379	100,709	449,798	40,752	137,111	8,943		32	6,020,500	579,334
Chum or keta.....			497	16	13,775	441	2,478,965	82,302	3,516,837	113,242	291	32	6,010,891	196,030
Humpback or pink.....	183,557	4,304	417,302	13,354	678,647	22,395	2,280	60					1,281,786	40,113
Silver or coho.....	481,003	33,090	803,009	60,306	1,043,509	81,185	1,910,573	139,853	201,374	15,486	2,075	166	4,619,058	342,721
Smelt.....	17,664	1,351	73,787	4,132	65,895	3,347	58,811	3,270	35,872	2,581	27,775	1,964	379,980	22,962
Crabs.....	102,628	10,468	94,490	9,657	73,150	7,461	190,334	14,389	151,648	10,934	193,004	12,796	* 1,688,887	141,333
Shrimp.....	213	28	1,361	245	1,894	321	2,549	474	1,678	310	4,343	777	38,071	5,361
Clams, hard, in shell (meats).....					43,504	3,881	42,840	3,836	39,469	3,536	40,019	3,569	332,929	28,097
Scallops, bay (meats).....	2,064	486	2,008	487	1,736	422	2,487	567	1,579	369	1,818	466	22,231	5,301
Octopus.....	566	23	340	19	1,758	102	3,733	164	3,627	211	3,965	203	41,637	1,631
Squid.....											406	27	2,961	179
Total.....	2,797,847	182,660	3,706,551	270,722	3,656,172	238,667	5,537,667	296,477	4,293,975	161,182	764,870	35,206	27,013,845	1,533,626

¹ This tabulation does not include fish received from Alaska or Canada or vessels in the halibut fleet.

² 78,550 dozen.

NOTE.—The yields of bivalve mollusks have been converted from weights in the shell to weights of meats on the following basis: Hard clams, 25 per cent, and bay scallops 17 per cent.

LAKE FISHERIES ¹¹

In 1937 the yield of the fisheries of the Great Lakes, including those of the international lakes of northern Minnesota, in the United States and Canada amounted to 116,063,700 pounds, representing a decrease of 7 percent as compared with the catch in the preceding year.

Considering the fishery of United States craft only, the catch amounted to 83,958,400 pounds, valued at \$6,033,084, which is a decrease of 11 percent in volume and 6 percent in value as compared with the catch in the previous year. These fisheries gave employment to 6,418 fishermen as compared with 5,623 in the previous year.

Lake fisheries of the United States and Canada, 1937

CATCH: BY LAKES

Species	Lake Ontario			Lake Erie		
	United States	Canada	Total	United States	Canada	Total
	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
Blue pike.....	60,100	26,200	86,300	10,980,800	9,354,700	20,315,500
Bowfin.....	300	(¹)	300			
Burbot.....	35,700	(¹)	35,700	369,700	(¹)	369,700
Carp.....	86,200	163,000	239,200	2,163,100	337,900	2,491,000
Catfish and bullheads.....	68,700	210,800	279,500	804,400	66,700	861,100
Cisco.....				64,000	99,400	163,400
Eels.....	10,100	66,000	76,100			
Garfish.....				6,400	(¹)	6,400
Goldfish.....				267,400	(¹)	267,400
Lake herring.....	123,800	1,572,900	1,696,700	2,600	200	2,800
Lake trout.....	12,900	206,000	217,900	14,900	(¹)	14,900
Mooneye.....	9,400	141,400	150,800	3,500	2,800	6,300
Pike or pickerel (jacks).....	7,400	(¹)	7,400	3,300	(¹)	3,300
Rook bass.....				1,214,300	(¹)	1,214,300
Sauger.....				4,069,200	(¹)	4,069,200
Sheepshead.....		8,000	20,300	5,800	13,300	19,100
Sturgeon.....	12,300	(¹)	49,400	1,103,300	(¹)	1,103,300
Sucker "mullet".....	49,400	(¹)	32,500			
Sunfish.....	32,500	(¹)				
White bass.....				436,100	(¹)	436,100
Whitefish, common.....	66,700	551,600	608,300	647,500	1,401,000	2,048,500
Yellow perch.....	49,000	148,000	197,000	1,760,200	1,691,100	3,441,300
Yellow pike.....	3,900	21,800	25,700	3,080,000	449,000	3,509,000
Mussel shells.....				7,100	(¹)	7,100
Miscellaneous.....		271,900	271,900		1,258,100	1,258,100
Total.....	618,400	3,376,600	3,995,000	26,932,600	14,664,200	41,596,800

¹ Where there has been a Canadian catch of these species it is included under "Miscellaneous."

¹¹ 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 two seasons. For Lake of the Woods, the seasons are from June 1 to November 1 and December 1 to April 1 and for Rainy and Namakan Lakes from May 15 to November 1 and December 1 to April 1. The catches for these two seasons, in the order named, have been combined to constitute a year. The quantity of fish taken in these lakes between January 1 and April 1 is estimated at less than 3 percent of the total catch.

Lake fisheries of the United States and Canada, 1937—Continued

CATCH: BY LAKES—Continued

Species	Lake Huron			Lake Michigan	Lake Superior		
	United States	Canada	Total	United States	United States	Canada	Total
	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
Blue pike.....		21,000	21,000			5,900	5,900
Bowfin.....	700	(¹)	700				
Burbot.....	800	(¹)	800	39,500	1,400	(¹)	1,400
Carp.....	978,100	40,000	1,018,100	1,924,800	200	600	800
Catfish and bullheads.....	143,500	6,900	150,400	58,600	100	(¹)	100
Chubs.....	190,300	606,100	796,400	5,579,200	275,000	131,100	406,100
Lake herring.....	4,150,000	229,500	4,379,500	5,499,500	11,784,100	2,247,000	14,031,100
Lake trout.....	1,340,200	3,901,900	5,242,100	4,987,300	3,084,900	1,698,600	4,783,500
Pike or pickerel (jacks).....	13,100	107,400	120,500	14,000	24,100	7,400	31,500
Rock bass.....	24,900	(¹)	24,900	1,500			
Sauger.....	5,800	(¹)	5,800	300	100	(¹)	100
Sheepshead.....	4,200	(¹)	4,200	5,600			
Smelt.....				1,425,500			
Sturgeon.....		17,300	17,300			1,600	1,600
Sucker "mullet".....	1,725,900	(¹)	1,725,900	2,381,400	447,100	(¹)	447,100
White bass.....				800			
Whitefish:							
Common.....	1,018,700	1,664,100	2,682,800	1,072,600	363,600	300,800	664,400
Menominee.....	72,100	(¹)	72,100	47,300	18,200	(¹)	18,200
Yellow perch.....	547,600	156,400	704,000	2,489,300	9,000	(¹)	9,000
Yellow pike.....	1,626,700	398,800	2,025,500	78,000	3,500	61,800	65,300
Crawfish.....				6,400			
Mussel shells.....	52,400	(¹)	52,400	787,000			
Miscellaneous.....		426,700	426,700			54,300	54,300
Total.....	11,895,000	7,575,100	19,470,100	26,398,100	16,011,300	4,609,100	20,520,400

Species	Namakan Lake			Rainy Lake		
	United States	Canada	Total	United States	Canada	Total
	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
Burbot.....	300	(¹)	300	300	(¹)	300
Chubs.....					6,100	6,100
Pike or pickerel (jacks).....	2,000	1,500	3,500	28,700	96,200	124,900
Sturgeon.....		800	800		100	100
Sucker "mullet".....	100	(¹)	100	1,500	(¹)	1,500
Whitefish, common.....	26,400	10,200	36,600	38,900	90,500	129,400
Yellow perch.....				2,800	6,800	9,600
Yellow pike.....	6,700	2,000	8,700	42,400	105,400	147,800
Miscellaneous.....		100	100		98,000	98,000
Total.....	35,500	14,600	50,100	114,600	403,100	517,700

¹ Where there has been a Canadian catch of these species it is included under "Miscellaneous."

Lake fisheries of the United States and Canada, 1937—Continued

CATCH: BY LAKES—Continued

Species	Lake of the Woods			Total, all lakes		
	United States	Canada	Total	United States	Canada	Total
	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
Blue pike.....		1,800	1,800	11,020,900	9,409,600	20,430,500
Bowfin.....		(1)		1,000	(1)	1,000
Burbot.....	46,800	(1)	46,800	494,500	(1)	494,500
Carp.....	17,500	2,300	19,800	5,159,900	533,800	5,693,700
Catfish and bullheads.....	44,200	33,700	77,900	1,119,500	308,100	1,427,600
Chubs.....				6,044,500	742,300	6,786,800
Cisco.....				64,000	99,100	163,100
Crappie.....	200	(1)	200	(1)	(1)	200
Eels.....				10,100	86,000	96,100
Garfish.....				6,400	(1)	6,400
Goldfish.....				287,400	(1)	287,400
Lake herring.....				21,557,400	4,049,400	25,606,800
Lake trout.....		8,100	8,100	9,427,900	5,813,800	15,241,700
Mooneye.....				14,900	(1)	14,900
Pike or pickerel (jacks).....	163,400	430,900	594,300	268,200	787,600	1,045,800
Rock bass.....				37,100	(1)	37,100
Sauger.....	415,000	16,800	431,800	1,635,500	16,800	1,652,300
Sheepshead.....				4,069,000	(1)	4,069,000
Smelt.....				1,425,500	(1)	1,425,500
Sturgeon.....		200	200	18,100	41,300	59,400
Sucker "mullet".....	183,600	900	184,500	5,892,300	930	5,893,200
Sunfish.....				32,500	(1)	32,500
Tullibees.....	223,300	96,200	319,500	223,300	96,200	319,500
White bass.....				435,400	(1)	435,400
Whitefish:						
Common.....	3,800	154,600	158,400	3,228,200	4,172,300	7,401,000
Menominee.....				137,600	(1)	137,600
Yellow perch.....	218,700	28,000	246,700	5,066,600	2,030,300	7,096,900
Yellow pike.....	636,400	683,800	1,269,900	5,457,600	1,672,300	7,129,900
Crawfish.....				6,400	(1)	6,400
Mussel shells.....				846,500	(1)	846,500
Miscellaneous.....		155,600	155,600		2,264,700	2,264,700
Total.....	1,952,900	1,662,600	3,515,500	83,958,400	32,105,300	116,063,700

¹ Where there has been a Canadian catch of these species it is included under "Miscellaneous."

Lake fisheries of the United States, 1937

OPERATING UNITS: BY LAKES

Item	Lake Ontario	Lake Erie	Lake Huron	Lake Michigan	Lake Superior	Lake of the Woods, Rainy Lake, and Namakan Lake	Total
Fishermen:							
On vessels.....	16	270	137	1,042	197		1,662
On boats and shore:							
Regular.....	85	732	665	790	770	181	3,123
Casual.....	107	311	129	626	260		1,633
Total.....	158	1,313	931	2,658	1,227	181	6,418
Vessels:							
Steam:							
5 to 10 tons.....			1	3			4
11 to 20 tons.....		3	3	11			17
21 to 30 tons.....		7	1	5	3		16
31 to 40 tons.....		4		3	1		8
41 to 50 tons.....		2		1			3
51 to 60 tons.....				1			1
Total.....		16	5	24	4		49
Net tonnage.....		438	81	523	109		1,146

Lake fisheries of the United States, 1937—Continued

OPERATING UNITS: BY LAKES—Continued

Item	Lake Ontario	Lake Erie	Lake Huron	Lake Michigan	Lake Superior	Lake of the Woods, Rainy Lake, and Namakan Lake	Total
Vessels—Continued.							
Motor:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
5 to 10 tons.....	3	19	15	158	45		240
11 to 20 tons.....	1	13	8	112	10		144
21 to 30 tons.....		1	4	27	4		36
31 to 40 tons.....		2	3	3	2		10
41 to 50 tons.....				1			1
51 to 60 tons.....			1	1			2
Total.....	4	35	31	302	61		433
Net tonnage.....	42	409	467	3,656	626		5,200
Total vessels.....	4	51	36	326	65		482
Total net tonnage.....	42	842	548	4,179	735		6,346
Boats:							
Motor.....	46	288	246	493	468	96	1,637
Other.....	48	315	127	550	339	29	1,408
Accessory boats.....				3	6		9
Apparatus:							
Haul seines.....	6	128	55	58	12		259
Length, yards.....	483	63,928	27,173	21,034	1,553		114,171
Gill nets:							
“Shoal,” 2½ to 3¾ inches.....	1,720	15,771	2,775	60,059	10,381		90,706
Square yards.....	231,064	1,991,744	544,900	13,288,670	2,361,396		18,417,774
“Shoal,” 4 to 7 inches.....	468	10,026	5,618	45,537	10,164	264	72,077
Square yards.....	83,200	2,060,838	1,477,400	10,560,032	3,330,868	79,712	17,601,060
“Shoal,” 10 to 14 inches.....	26	20					46
Square yards.....	15,730	9,328					25,058
Bar nets.....		113					113
Square yards.....		4,649					4,649
Trammel nets.....				2			2
Square yards.....				350			350
Lines:							
Troll.....					60		60
Hooks.....					400		400
Trot.....	37	39	577	1,232	3,250		5,135
Hooks.....	13,225	14,760	171,000	357,475	666,110		1,222,570
Pound nets.....		41	418	621	183	69	1,332
Trap nets.....	150	5,346	2,903	447	74		8,920
Fyke nets.....	140	667	192	1,682	21	98	2,800
Crawfish pots.....				850			850
Crowfoot bars.....		4	3	151			158
Picks.....			7	30			37

OPERATING UNITS: BY STATES AND LAKES

Item	New York			Pennsylvania—Lake Erie	Ohio—Lake Erie
	Lake Ontario	Lake Erie	Total		
Fishermen:					
On vessels.....					
On boats and shore:					
Regular.....		35	16	51	31
Casual.....		107	62	169	9
Total.....		158	122	280	163
Vessels:					
Steam:					
11 to 20 tons.....					3
21 to 30 tons.....			1	1	6
31 to 40 tons.....			1	1	
41 to 50 tons.....					
Total.....			2	2	9
Net tonnage.....			66	66	185

Lake fisheries of the United States, 1937—Continued

OPERATING UNITS: BY STATES AND LAKES—Continued

Item	New York			Pennsylvan- Lake Erie	Ohio- Lake Erie
	Lake Ontario	Lake Erie	Total		
Vessels—Continued.					
Motor:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
5 to 10 tons.....	3	6	9	7	6
11 to 20 tons.....	1	1	2	4	8
21 to 30 tons.....				1	
31 to 40 tons.....				1	1
Total.....	4	7	11	13	15
Net tonnage.....	42	53	95	161	195
Total vessels.....	4	9	13	22	20
Total net tonnage.....	42	109	151	346	387
Boats:					
Motor.....	46	15	61	8	245
Other.....	48	28	76	1	244
Apparatus:					
Haul seines.....	6	6	12		91
Length, yards.....	483	516	999		54,561
Gill nets:					
“Shoal,” 2½ to 3¾ inches.....	1,720	1,669	3,389	7,167	6,732
Square yards.....	231,064	278,210	509,274	921,228	771,806
“Shoal,” 4 to 7 inches.....	468	2,532	3,000	5,637	1,716
Square yards.....	83,200	550,882	634,082	1,215,718	288,738
“Shoal,” 10 to 14 inches.....	26	8	34		12
Square yards.....	15,730	2,128	17,858		7,200
Bar nets.....					113
Square yards.....					4,649
Lines, Trot.....	37	20	57		
Hooks.....	13,225	10,000	23,225		
Pound nets.....		16	166		5,145
Trap nets.....	150		140		388
Fyke nets.....	140		140		

Item	Michigan					Indiana- Lake Michigan
	Lake Erie	Lake Huron	Lake Michigan	Lake Superior	Total	
Fishermen:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
On vessels.....		137	378	109	624	24
On boats and shore:						
Regular.....	71	665	371	315	1,422	10
Casual.....	53	129	327	142	651	1
Total.....	124	931	1,076	566	2,697	35
Vessels:						
Steam:						
5 to 10 tons.....		1	2		3	
11 to 20 tons.....		3	6		9	
21 to 30 tons.....		1	1	3	5	1
31 to 40 tons.....				1	1	
Total.....		5	9	4	18	1
Net tonnage.....		81	124	109	314	22
Motor:						
5 to 10 tons.....		15	53	13	81	2
11 to 20 tons.....		8	34	7	49	3
21 to 30 tons.....		4	9	3	16	1
31 to 40 tons.....		3		2	5	
51 to 60 tons.....		1			1	
Total.....		31	96	25	152	6
Net tonnage.....		467	1,104	343	1,914	86
Total vessels.....		36	105	29	170	7
Total net tonnage.....		548	1,228	452	2,228	108

Lake fisheries of the United States, 1937—Continued

OPERATING UNITS: BY STATES AND LAKES—Continued

Item	Michigan					Indians— Lake Michigan
	Lake Erie	Lake Huron	Lake Michigan	Lake Superior	Total	
Boats:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Motor.....	20	246	221	212	699	4
Other.....	42	127	167	66	402	3
Apparatus:						
Haul seines.....	31	55	1	12	99	
Length, yards.....	8,551	27,173	65	1,553	37,642	
Gill nets:						
"Shoal," 2¼ to 3¾ inches.....	203	2,775	14,895	4,316	22,189	992
Square yards.....	20,600	544,900	2,750,870	757,695	4,073,965	198,400
"Shoal," 4 to 7 inches.....	141	5,618	20,513	5,711	31,983	676
Square yards.....	14,600	1,477,400	4,577,872	1,887,588	7,957,360	135,200
Lines:						
Troll.....				60	60	
Hooks.....				400	400	
Trot.....	19	577	485	2,356	3,437	
Hooks.....	4,760	171,000	149,800	586,700	912,260	
Pound nets.....				90	90	4
Trap nets.....	185	2,908	447	74	3,609	
Fyke nets.....	279	192	96	6	573	
Crowfoot bars.....	4	3	111		118	
Picks.....		7	30		37	

Item	Illi- nois— Lake Michi- gan	Wisconsin			Minnesota		Total
		Lake Michi- gan	Lake Superior	Total	Lake Superior	Lake of the Woods, Rainy Lake, and Namakan Lake	
Fishermen:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
On vessels.....	77	563	88	651			
On boats and shore:							
Regular.....	2	407	125	532	330	131	461
Casual.....	2	496	47	543	71		71
Total.....	81	1,466	260	1,726	401	131	532
Vessels:							
Steam:							
5 to 10 tons.....		1		1			
11 to 20 tons.....		5		5			
21 to 30 tons.....		3		3			
31 to 40 tons.....		3		3			
41 to 50 tons.....		1		1			
51 to 60 tons.....		1		1			
Total.....		14		14			
Net tonnage.....		377		377			
Motor:							
5 to 10 tons.....	10	93	32	125			
11 to 20 tons.....	9	66	3	69			
21 to 30 tons.....	5	12	1	13			
31 to 40 tons.....		3		3			
41 to 50 tons.....		1		1			
51 to 60 tons.....		1		1			
Total.....	24	176	36	212			
Net tonnage.....	326	2,140	283	2,423			
Total vessels.....	24	190	36	226			
Total net tonnage.....	326	2,517	283	2,800			
Boats:							
Motor.....	2	266	72	338	184	96	280
Other.....		280	66	446	207	29	236
Accessory boats.....		3	1	4	5		5

Lake fisheries of the United States, 1937—Continued

OPERATING UNITS: BY STATES AND LAKES—Continued

Item	Illinois— Lake Michigan	Wisconsin			Minnesota		
		Lake Michigan	Lake Superior	Total	Lake Superior	Lake of the Woods, Rainy Lake, and Namakan Lake	Total
Apparatus:	Number	Number	Number	Number	Number	Number	Number
Haul seines.....	57	57	57	57	57	57	57
Length, yards.....	20,969	20,969	20,969	20,969	20,969	20,969	20,969
Gill nets:							
"Shoal," 2¼ to 3¾ inches.....	2,840	41,332	2,304	43,636	3,761	3,761	3,761
Square yards.....	568,000	9,771,400	618,928	10,290,328	1,084,773	1,084,773	1,084,773
"Shoal," 4 to 7 inches.....	1,725	22,623	3,212	25,835	1,241	264	1,505
Square yards.....	345,000	5,501,960	1,097,520	6,599,480	345,760	79,712	425,472
Trammel nets.....	2	2	2	2	2	2	2
Square yards.....	350	350	350	350	350	350	350
Lines, trot.....	747	747	186	933	708	708	708
Hooks.....	207,675	52,775	260,450	26,635	26,635	26,635	26,635
Pound nets.....	334	334	93	427	69	69	69
Fyke nets.....	1,598	15	1,601	850	98	98	98
Crawfish pots.....	850	850	850	850	850	850	850
Crowfoot bars.....	40	40	40	40	40	40	40

OPERATING UNITS OF LAKE ONTARIO: BY GEAR¹

Item	Haul seines	Gill nets			Lines, trot	Trap nets	Fyke nets	Total, exclusive of duplication
		"Shoal," 2¼ to 3¾ inches	"Shoal," 4 to 7 inches	"Shoal," 10 to 14 inches				
Fishermen:	Number	Number	Number	Number	Number	Number	Number	Number
On vessels.....	16	16	4	4	16	16	16	16
On boats and shore:								
Regular.....	29	29	23	6	3	14	5	35
Casual.....	16	15	9	7	38	31	14	107
Total.....	16	60	36	13	41	45	19	158
Vessels, motor:								
5 to 10 tons.....	3	3	1	1	3	3	3	3
11 to 20 tons.....	1	1	1	1	1	1	1	1
Total.....	4	4	1	1	4	4	4	4
Net tonnage.....	42	42	7	7	42	42	42	42
Boats:								
Motor.....	3	21	16	6	11	18	6	46
Other.....	3	7	3	2	22	10	7	48
Apparatus:	Number	Number	Number	Number	Number	Number	Number	Number
Number.....	6	1,720	468	26	37	150	140	2,547
Length, yards.....	483	483	483	483	483	483	483	483
Square yards.....	231,064	231,064	83,200	15,730	13,225	13,225	13,225	263,244
Hooks.....	13,225	13,225	13,225	13,225	13,225	13,225	13,225	13,225

¹ Includes Niagara River below the Falls and the St. Lawrence River.

Lake fisheries of the United States, 1937—Continued

OPERATING UNITS OF LAKE ERIE: BY GEAR¹

Item	Haul seines	Gill nets			Bar nets
		"Shoal," 2½ to 3¾ inches	"Shoal," 4 to 7 inches	"Shoal," 10 to 14 inches	
Fishermen:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
On vessels.....		254	224	5	
On boats and shore:					
Regular.....	118	47	41	1	12
Casual.....	174	42	15	1	7
Total.....	292	343	280	7	19
Vessels:					
Steam:					
11 to 20 tons.....		3	3		
21 to 30 tons.....		7	7		
31 to 40 tons.....		3	3		
41 to 50 tons.....		2	1		
Total.....		15	14		
Net tonnage.....		401	354		
Motor:					
5 to 10 tons.....		17	17		
11 to 20 tons.....		13	9	1	
21 to 30 tons.....		1	1		
31 to 40 tons.....		2	1		
Total.....		33	28	1	
Net tonnage.....		395	304	15	
Total vessels.....		48	42	4	
Total net tonnage.....		796	658	15	
Boats:					
Motor.....	41	28	14	1	8
Other.....	135	9	5		7
Apparatus:					
Number.....	128	15,771	10,026	20	113
Length, yards.....	63,928				
Square yards.....		1,991,744	2,069,838	9,328	4,649

Item	Lines, trot	Pound nets	Trap nets	Fyke nets	Crowfoot bars	Total, exclusive of duplication
Fishermen:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
On vessels.....						270
On boats and shore:						
Regular.....	6	18	542	70		732
Casual.....	27	7	46	39	4	311
Total.....	33	25	588	109	4	1,313
Vessels:						
Steam:						
11 to 20 tons.....						3
21 to 30 tons.....						7
31 to 40 tons.....						4
41 to 50 tons.....						2
Total.....						16
Net tonnage.....						438

¹ Includes Niagara River above the Falls.

Lake fisheries of the United States, 1937—Continued

OPERATING UNITS OF LAKE ERIE: BY GEAR—Continued

Item	Lines, trot	Pound nets	Trap nets	Fyke nets	Crowfoot bars	Total, exclusive of duplication
Vessels—Continued.						
Motor:	Number	Number	Number	Number	Number	Number
5 to 10 tons.....						19
11 to 20 tons.....						13
21 to 30 tons.....						1
31 to 40 tons.....						2
Total.....						35
Net tonnage.....						409
Total vessels.....						51
Total net tonnage.....						842
Boats:						
Motor.....	4	5	201	29	1	288
Other.....	26		125	55	3	315
Apparatus:						
Number.....	39	41	5,346	667	4	
Hooks.....	14,760					

OPERATING UNITS OF LAKE HURON: BY GEAR

Item	Haul seines	Gill nets		Lines, trot	Pound nets	Trap nets	Fyke nets	Crow-foot bars	Picks	By hand	Total, exclusive of duplication
		"Shoal," 2½ to 3¾ inches	"Shoal," 4 to 7 inches								
Fishermen:	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number
On vessels.....		48	77	58	8	33					137
On boats and shore:											
Regular.....	78	95	120	26	192	501	38				665
Casual.....	33	30	30	7	14	39	4	9	3	11	129
Total.....	111	173	227	91	214	573	42	9	3	11	931
Vessels:											
Steam:											
5 to 10 tons.....		1	1								1
11 to 20 tons.....		1	3	1							3
21 to 30 tons.....		1		1							1
Total.....		3	4	2							5
Net tonnage.....		53	55	41							81
Motor:											
5 to 10 tons.....		3	9	3	1	6					15
11 to 20 tons.....		2	5	3	1	3					8
21 to 30 tons.....		2	2	2							4
31 to 40 tons.....		1		3		1					3
51 to 60 tons.....			1								1
Total.....		8	17	11	2	10					31
Net tonnage.....		143	224	225	18	107					467
Total vessels.....		11	21	13	2	10					36
Total net tonnage.....		196	279	266	18	107					548
Boats:											
Motor.....	32	48	39	10	75	168	12	2	1		248
Other.....	14	30	21	8	15	67	6	1	3	7	127
Apparatus:											
Number.....	55	2,775	5,618	577	418	2,903	192	3	7		
Length, yards.....	27,173										
Square yards.....		544,900	1,477,400								
Hooks.....				171,000							

Lake fisheries of the United States, 1937—Continued

OPERATING UNITS OF LAKE MICHIGAN· BY GEAR

Item	Haul seines	Gill nets		Trammel nets	Lines, trot	Pound nets	Trap nets
		"Shoal" 2¼ to 3¾ inches	"Shoal" 4 to 7 inches				
Fishermen:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
On vessels.....	4	869	734		177	54	15
On boats and shore:							
Regular.....	71	490	335		35	287	116
Casual.....	49	364	252	2	20	89	13
Total	124	1,723	1,321	2	232	430	144
Vessels:							
Steam:							
5 to 10 tons.....		3	1				
11 to 20 tons.....		11	5		2	1	1
21 to 30 tons.....		3	3		1		
31 to 40 tons.....		2	2		1		
41 to 50 tons.....		1					
51 to 60 tons.....		1	1				
Total		21	12		4	1	1
Net tonnage		429	282		94	15	13
Motor:							
5 to 10 tons.....	2	137	97		17	18	1
11 to 20 tons.....		93	85		25		2
21 to 30 tons.....		22	24		5	1	
31 to 40 tons.....		3	2				
41 to 50 tons.....		1					
51 to 60 tons.....			1		1		
Total	2	256	209		48	19	3
Net tonnage	16	3,020	2,650		696	138	33
Total vessels	2	277	221		52	20	4
Total net tonnage	16	3,449	2,941		789	153	46
Boats:							
Motor.....	24	246	143		22	129	37
Other.....	62	220	118	2	18	112	26
Accessory boats	2	1					
Apparatus:							
Number.....	58	60,059	45,537	2	1,232	621	447
Length, yards.....	21,034						
Square yards.....		13,288,670	10,560,032	350			
Hooks.....					387,475		

Item	Fyke nets	Dip nets	Crawfish pots	Crow-foot bars	Picks	By hand	Total, exclusive of duplication
	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Fishermen:							
On vessels.....	31						1,042
On boats and shore:							
Regular.....	182						790
Casual.....	47	2	5	136	30	25	826
Total	260	2	5	136	30	25	2,658
Vessels:							
Steam:							
5 to 10 tons.....							3
11 to 20 tons.....							11
21 to 30 tons.....							5
31 to 40 tons.....							5
41 to 50 tons.....							1
51 to 60 tons.....							1
Total							24
Net tonnage							523
Motor:							
5 to 10 tons.....	11						168
11 to 20 tons.....	1						112
21 to 30 tons.....							37

Lake fisheries of the United States, 1937—Continued

OPERATING UNITS OF LAKE MICHIGAN: BY GEAR—Continued

Item	Fyke nets	Dip nets	Crawfish pots	Crow-foot bars	Picks	By hand	Total, exclusive of duplication
Vessels—Continued.							
Motor—Continued.	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
31 to 40 tons.....							3
41 to 50 tons.....							1
51 to 60 tons.....							1
Total.....	12						302
Net tonnage.....	95						3,656
Total vessels.....	12						326
Total net tonnage.....	95						4,179
Boats:							
Motor.....	83		5	81	6		493
Other.....	120		3	50	13	22	550
Accessory boats.....							3
Apparatus, number.....	1,682	1	850	181	80		

OPERATING UNITS OF LAKE SUPERIOR: BY GEAR

Item	Haul seines	Gill nets		Lines		Pound nets	Trap nets	Fyke nets	Total, exclusive of duplication
		"Shoal," 2½ to 3¾ inches	"Shoal," 4 to 7 inches	Troll	Trot				
Fishermen:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
On vessels.....		114	136		103	13	3		197
On boats and shore:									
Regular.....	22	613	395	16	273	79	24	11	770
Casual.....	10	198	128	14	60	14	7	8	360
Total.....	32	925	659	30	436	106	34	14	1,227
Vessels:									
Steam:									
21 to 30 tons.....		1	3		1	1			3
31 to 40 tons.....			1		1				1
Total.....		1	4		2	1			4
Net tonnage.....		24	109		56	24			109
Motor:									
5 to 10 tons.....		31	33		16	4	1		45
11 to 20 tons.....		6	3		8				10
21 to 30 tons.....		2	4		8				4
31 to 40 tons.....			2		1				2
Total.....		39	42		28	4	1		81
Net tonnage.....		347	436		356	23	9		626
Total vessels.....		40	46		30	5	1		65
Total net tonnage.....		371	545		392	47	9		735
Boats:									
Motor.....	7	364	259	8	173	34	9	4	468
Other.....	6	290	103		41	18	3	6	339
Accessory boats.....		5			1			1	6
Apparatus:									
Number.....	12	10,881	10,164	60	3,250	183	74	21	
Length, yards.....	1,553								
Square yards.....		2,361,396	3,330,868						
Hooks.....				400	666,110				

Lake fisheries of the United States, 1937—Continued

OPERATING UNITS OF LAKE OF THE WOODS, RAINY LAKE, AND NAMAKAN LAKE:
BY GEAR

Item	Gill nets, "shoal," 4 to 7 inches	Pound nets	Fyke nets	Total, exclusive of dupli- cation
	Number	Number	Number	Number
Fishermen, on boats and shore, regular	91	35	32	131
Boats:				
Motor	77	19	8	96
Other	14	20	12	29
Apparatus:				
Number	264	69	98	
Square yards	79,712			

CATCH: BY GEAR

Species	New York							
	Haul seines		Gill nets		Trot lines		Trap nets	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Blue pike			1,695,200	\$112,314			2,700	\$274
Bowfin							300	11
Burbot			7,500	390			26,100	1,222
Carp	98,800	\$4,487	2,300	100			11,200	396
Catfish and bullheads	1,200	117	1,300	121			42,900	3,302
Cisco			5,800	612				
Eels							10,100	505
Garfish	6,400	32						
Lake herring			108,200	12,951			15,600	2,109
Lake trout	7,000	700	4,800	613			3,500	459
Pike or pickerel (jacks)	100	4	200	18			7,700	591
Rock bass			100	1			7,400	100
Sauger			600	30				
Sheepshead							200	8
Sturgeon			1,600	640	13,500	\$4,628	32,500	108
Sucker "mullet"	7,200	409	10,600	276			30,400	981
Sunfish								685
White bass			300	12				
Whitefish, common			110,400	21,857			40,500	6,238
Yellow perch	100	5	54,700	4,600			22,900	891
Yellow pike			700	99			5,800	1,128
Total	120,800	5,734	2,004,300	154,194	13,500	4,628	263,100	18,978

Species	New York—Continued				Pennsylvania	
	Fyke Nets		Total		Gill nets	
	Pounds	Value	Pounds	Value	Pounds	Value
Blue pike			1,697,900	\$112,588	2,164,100	\$118,802
Bowfin			300	11		
Burbot	2,100	\$81	35,700	1,693	10,000	67
Carp	2,700	81	115,000	5,044		
Catfish and bullheads	24,400	2,098	69,800	5,638	1,500	75
Cisco			5,800	612	82,100	5,230
Eels			10,100	505		
Garfish			6,400	32		
Lake herring			123,800	15,060		
Lake trout			15,300	1,772	200	28
Pike or pickerel (jacks)	1,400	86	9,400	699		
Rock bass			7,500	101		
Sauger			600	30		
Sheepshead			200	8	3,600	47
Sturgeon			15,400	5,376	100	31
Sucker "mullet"	12,000	553	62,300	2,219	3,900	60
Sunfish	2,100	54	32,500	709		
White bass			300	12	4,600	201
Whitefish, common			150,900	27,595	375,800	82,171
Yellow perch	4,900	193	82,000	5,749	83,400	5,284
Yellow pike			9,600	1,227	200	23
Total	49,600	3,146	2,451,300	186,680	2,699,500	211,989

Lake fisheries of the United States, 1937—Continued

CATCH: BY GEAR—Continued

Species	Pennsylvania—Continued				Ohio			
	Pound nets		Total		Haul seines		Gill nets	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Blue pike.....	139,400	\$7,670	2,303,500	\$126,472	100	\$8	963,000	\$87,691
Burbot.....	2,000	14	12,000	81	300	3	1,200	12
Carp.....	3,200	87	3,200	57	1,196,300	20,337	11,300	193
Catfish and bullheads.....	2,800	139	4,300	214	247,300	16,076	1,500	98
Cisco.....	4,600	468	56,700	5,698	.....	.....	900	92
Goldfish.....	.....	.....	.....	.....	247,700	4,964	.....	.....
Lake trout.....	.....	.....	200	28	.....	.....	.....	.....
Mooneye.....	.....	.....	.....	.....	7,300	138	.....	.....
Sauger.....	.....	.....	.....	.....	3,800	223	374,200	21,701
Sheepshead.....	20,300	281	23,900	328	649,700	10,396	7,600	121
Sturgeon.....	300	80	400	111	.....	.....	.....	.....
Sucker "mullet".....	5,200	78	9,100	138	36,700	624	25,000	426
White bass.....	25,200	1,114	29,800	1,315	32,200	1,352	2,900	123
Whitefish, common.....	53,600	11,695	429,400	93,866	.....	.....	24,400	4,877
Yellow perch.....	21,400	1,364	104,800	6,618	900	58	970,100	61,119
Yellow pike.....	29,500	3,902	29,700	3,925	11,100	888	59,000	4,720
Total.....	307,500	26,882	3,007,000	238,851	2,433,400	55,056	2,471,100	151,073

Species	Ohio—Continued							
	Bar nets		Trap nets		Fyke nets		Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Blue pike.....	.....	.....	5,974,700	\$346,533	51,700	\$2,999	7,019,500	\$407,131
Burbot.....	.....	.....	355,700	3,557	300	3	357,500	3,576
Carp.....	110,500	\$1,879	181,900	3,092	43,700	742	1,543,700	26,243
Catfish and bullheads.....	100	6	462,000	30,030	44,100	2,870	755,000	49,080
Cisco.....	.....	.....	600	60	.....	.....	1,500	182
Goldfish.....	2,700	64	7,900	158	2,900	58	261,200	5,224
Mooneye.....	.....	.....	7,100	135	500	9	14,900	282
Sauger.....	.....	.....	768,700	44,685	25,500	1,479	1,172,200	67,988
Sheepshead.....	300	5	3,119,100	49,906	183,400	2,934	3,960,100	63,361
Sturgeon.....	.....	.....	2,300	686	.....	.....	2,300	686
Sucker "mullet".....	.....	.....	888,000	16,096	61,600	1,047	1,011,300	17,193
White bass.....	.....	.....	285,600	11,995	88,300	2,449	379,000	15,919
Whitefish, common.....	.....	.....	98,600	19,720	200	40	123,200	24,637
Yellow perch.....	.....	.....	618,000	38,934	6,800	428	1,595,800	100,539
Yellow pike.....	.....	.....	2,695,000	215,690	125,100	10,008	2,890,200	231,306
Total.....	113,600	1,944	15,465,200	780,177	604,100	25,066	21,087,400	1,013,316

Species	Michigan							
	Haul seines		Gill nets		Lines			
					Troll		Trot	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Bowfin.....	100	\$2	.....	.....	.....	.....	.....	.....
Burbot.....	100	2	5,200	\$102	.....	.....	400	\$7
Carp.....	1,115,000	33,449	14,100	423	.....	.....	400	12
Catfish and bullheads.....	50,700	2,953	400	26	.....	.....	8,900	253
Chubs.....	.....	.....	1,301,800	195,269	.....	.....	.....	.....
Lake herring.....	45,700	1,370	4,646,200	139,385	.....	.....	.....	.....
Lake trout.....	.....	.....	4,084,100	605,108	38,500	\$5,779	1,521,800	228,216
Pike or pickerel (jacks).....	400	35	1,200	98	.....	.....	.....	.....
Rock bass.....	6,800	261	100	4	.....	.....	.....	.....
Sauger.....	200	14	1,200	69	.....	.....	.....	.....
Sheepshead.....	10,600	212	100	2	.....	.....	2,500	50
Smelt.....	.....	.....	50,000	1,500	.....	.....	.....	.....
Sucker "mullet".....	141,000	4,229	406,500	12,195	.....	.....	.....	.....
White bass.....	100	10	.....	.....	.....	.....	.....	.....
Whitefish:	.....	.....	.....	.....	.....	.....	.....	.....
Common.....	.....	.....	866,100	181,892	.....	.....	.....	.....
Menominee.....	.....	.....	94,800	8,533	.....	.....	.....	.....
Yellow perch.....	25,400	2,541	529,800	52,980	.....	.....	2,900	291
Yellow pike.....	85,100	11,918	69,100	9,674	.....	.....	100	14
Total.....	1,480,900	56,996	12,020,700	1,207,260	38,500	5,779	1,531,700	228,843

Lake fisheries of the United States, 1937—Continued

CATCH: BY GEAR—Continued

Species	Michigan—Continued					
	Pound nets		Trap nets		Fyke nets	
	Pounds	Value	Pounds	Value	Pounds	Value
Bowfin			100	\$2	500	\$10
Burbot	300	\$6	1,200	24	200	4
Carp	5,600	188	141,500	4,245	303,100	9,022
Catfish and bullheads	700	41	96,300	5,584	47,700	1,690
Chubs	200	30	100	15		
Goldfish					6,200	186
Lake herring	3,590,200	107,705	1,495,300	44,860	11,600	348
Lake trout	139,600	20,949	158,600	23,692	2,400	356
Pike or pickerel (jacks)	1,700	136	17,200	1,378	11,000	878
Rock bass	1,700	68	11,700	467	9,600	386
Sauger	200	12	5,000	303	41,100	2,466
Sheepshead	3,100	62	10,400	208	57,700	1,154
Smelt	142,500	4,275	1,600	48		
Sucker "mullet"	113,100	3,391	2,912,900	87,388	326,300	9,800
White bass					25,900	2,590
Whitefish:						
Common	469,500	98,606	894,100	185,660	4,100	863
Menominee	5,200	468	19,300	1,737		
Yellow perch	20,900	2,092	449,300	44,925	106,200	10,623
Yellow pike	70,100	9,820	1,411,900	197,661	206,400	28,891
Total	4,564,600	247,829	7,606,500	598,197	1,160,000	69,337

Species	Michigan—Continued							
	Crowfoot bars		Picks		By hand		Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Bowfin							700	\$14
Burbot							7,400	145
Carp							1,579,700	47,389
Catfish and bullheads							189,700	10,547
Chubs							1,302,100	195,314
Goldfish							6,200	186
Lake herring							9,789,000	293,668
Lake trout							5,894,700	884,100
Pike or pickerel (jacks)							31,500	2,525
Rock bass							29,600	1,186
Sauger							47,700	2,804
Sheepshead							84,400	1,688
Smelt							194,100	5,823
Sucker "mullet"							3,899,800	117,003
White bass							26,000	2,600
Whitefish:								
Common							2,223,800	467,021
Menominee							119,300	10,738
Yellow perch							1,134,500	113,452
Yellow pike							1,842,700	257,978
Mussel shells ¹	396,900	\$13,320	109,100	\$3,791	75,500	\$2,731	581,500	19,842
Pearls and slugs ¹		389		71		64		524
Total	396,900	13,709	109,100	3,862	75,500	2,795	28,984,400	2,434,607

Species	Indiana						Illinois	
	Gill nets		Pound nets		Total		Gill nets	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Burbot	15,000	\$300			15,000	\$300		
Chubs	270,000	40,500			270,000	40,500	590,900	\$88,635
Lake herring	220,000	6,600	16,000	\$480	236,000	7,080	102,700	3,080
Lake trout	100,000	20,000			100,000	20,000	271,200	51,247
Smelt	100	3			100	3		
Sucker "mullet"	500	15	2,000	60	2,500	75		
Whitefish, common	100	25	3,000	600	3,100	625	700	150
Yellow perch	150,000	15,000	4,000	400	154,000	15,400	496,100	49,610
Total	755,700	82,448	25,000	1,540	780,700	83,983	1,461,600	192,722

¹ From tributary streams.

Lake fisheries of the United States, 1937—Continued

CATCH: BY GEAR—Continued

Species	Wisconsin							
	Haul seines		Gill nets		Trammel nets		Trot lines	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Burbot			13,000	\$391			2,400	\$48
Carp	1,774,100	\$53,221	73,300	2,206	200	\$6		
Catfish and bullheads	8,600	600	300	13				
Chubs			3,767,800	565,175				
Lake herring			4,601,800	187,956				
Lake trout			1,912,100	245,437			557,300	111,110
Pike or pickerel (jacks)			2,500	198				
Smelt			876,800	43,527				
Sucker "mullet"	2,800	83	406,700	12,259	100	8		
Whitefish:								
Common			66,400	13,406				
Menominee			11,800	1,178				
Yellow perch			368,600	36,893			100	10
Total	1,785,500	53,904	12,105,300	1,158,839	300	9	559,800	111,168

Species	Wisconsin—Continued							
	Pound nets		Fyke nets		Crawfish pots		Crowfoot bars	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Burbot	1,200	\$24	900	\$18				
Carp	2,200	64	50,800	1,523				
Catfish and bullheads	4,400	145	43,200	1,342				
Chubs	57,800	8,622						
Lake herring	1,077,800	32,326	3,800	114				
Lake trout	323,300	64,418						
Pike or pickerel (jacks)	19,200	1,556	1,200	94				
Sheepshead	300	6	100	2				
Smelt	338,800	17,079	16,000	804				
Sucker "mullet"	84,700	2,538	222,800	6,682				
White bass			300	30				
Whitefish:								
Common	155,000	31,069						
Menominee	1,900	190						
Yellow perch	40,200	4,031	868,100	86,801				
Crawfish					6,400	\$642		
Mussel shells ¹							238,300	\$5,018
Total	2,106,300	162,088	1,207,200	97,410	6,400	642	238,300	5,018

Species	Wisconsin—Continued				Minnesota			
	By hand		Total		Gill nets			
	Pounds	Value	Pounds	Value	Pounds	Value		
Burbot			19,500	\$381	7,600	\$112		
Carp			1,900,800	57,020	3,700	181		
Catfish and bullheads			56,800	2,100	1,700	109		
Chubs			3,828,300	573,797	56,200	4,790		
Lake herring			5,682,200	170,396	6,622,700	131,970		
Lake trout			2,792,700	520,965	257,800	31,829		
Pike or pickerel (jacks)			22,900	1,848	114,600	4,080		
Sauger					309,600	11,517		
Sheepshead			400	8				
Smelt			1,231,300	61,710				
Sucker "mullet"			719,100	21,565	87,000	1,142		
Tullibee					186,200	3,883		
White bass			300	30				
Whitefish:								
Common			221,400	44,495	53,000	6,274		
Menominee			13,700	1,368	4,600	460		
Yellow perch			1,277,300	127,735	174,400	10,638		
Yellow pike					383,000	25,626		
Crawfish								
Mussel shells ¹			26,700	\$573				
Total			26,700	573	18,035,800	1,586,651	7,261,100	232,561

¹ From tributary streams.

Lake fisheries of the United States, 1937—Continued

CATCH: BY GEAR—Continued

Species	Minnesota—Continued							
	Trot lines		Pound nets		Fyke nets		Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Burbot.....			39,000	\$593	800	\$23	47,400	\$728
Carp.....			12,100	197	1,700	23	17,800	401
Catfish and bullheads.....			2,600	281	39,900	2,666	44,200	3,046
Chubs.....							56,200	4,790
Crappie.....			100	12	100	15	200	27
Lake herring.....							5,622,700	131,970
Lake trout.....	96,000	\$10,760					353,800	42,589
Pike or pickerel (jacks).....			67,900	2,214	21,900	769	194,400	7,003
Sauger.....			77,700	3,380	27,700	1,310	415,000	16,207
Sucker "mullet".....			68,100	764	43,100	576	188,200	2,482
Tullibees.....			26,600	290	12,600	498	223,300	4,671
Whitefish:								
Common.....			22,500	3,343	200	21	75,700	9,638
Menominee.....							4,600	480
Yellow perch.....			19,400	1,103	27,700	1,742	221,500	13,483
Yellow pike.....			263,000	25,809	49,600	4,344	685,600	55,779
Total.....	96,000	10,760	667,900	37,986	226,200	11,967	8,150,200	293,274

CATCH: BY LAKES

Species	Lake Ontario		Lake Erie			
	New York		New York		Pennsylvania	
	Pounds	Value	Pounds	Value	Pounds	Value
Blue pike.....	60,100	\$4,610	1,637,800	\$107,978	2,303,600	\$126,472
Bowfin.....	300	11				
Burbot.....	35,700	1,693			12,000	61
Carp.....	86,200	3,376	28,800	1,668	3,200	57
Catfish and bullheads.....	68,700	6,541	1,100	97	4,300	214
Cisco.....			5,800	612	56,700	5,698
Eels.....	10,100	505				
Garfish.....			6,400	32		
Lake herring.....	123,800	15,060				
Lake trout.....	12,900	1,632	2,400	240	200	28
Pike or pickerel (jacks).....	9,400	699				
Rock bass.....	7,400	100	100	1		
Sauger.....			600	30		
Sheepshead.....			200	8	23,900	328
Sturgeon.....	12,300	4,348	3,100	1,028	400	111
Sucker "mullet".....	49,400	1,581	12,900	638	9,100	138
Sunfish.....	32,600	709				
White bass.....			300	12	29,800	1,315
Whitefish, common.....	56,700	8,880	94,200	18,715	429,400	93,866
Yellow perch.....	49,000	3,192	33,600	2,557	104,800	6,618
Yellow pike.....	3,900	559	5,600	668	29,700	3,925
Total.....	618,400	52,396	1,832,900	134,284	3,007,000	238,881

Lake fisheries of the United States, 1937—Continued

CATCH: BY LAKES—Continued

Species	Lake Erie—Continued					
	Ohio		Michigan		Total	
	Pounds	Value	Pounds	Value	Pounds	Value
Blue pike	7,019,500	\$407,131			10,980,800	\$641,581
Burbot	357,500	3,575	200	\$4	369,700	3,660
Carp	1,543,700	26,243	577,400	17,322	2,153,100	45,290
Cattah and bullheads	755,000	49,080	44,000	1,753	804,400	51,144
Cisco	1,500	152			64,000	6,462
Garfish					6,400	32
Goldfish	261,200	5,224	6,200	186	267,400	5,410
Lake trout					2,600	268
Mooneye	14,900	282			14,900	282
Pike or pickerel (jacks)			3,500	280	3,500	280
Rock bass			3,200	128	3,300	129
Sauger	1,172,200	67,988	41,500	2,490	1,214,300	70,508
Sheepshead	3,960,100	63,361	75,000	1,500	4,059,200	65,197
Sturgeon	2,300	686			5,800	1,825
Sucker "mullet"	1,011,300	17,193	70,000	2,100	1,103,300	20,069
White bass	379,000	15,919	26,000	2,600	435,100	19,846
Whitefish, common	123,200	24,637	700	147	647,500	137,365
Yellow perch	1,595,800	100,539	16,000	1,600	1,750,200	111,314
Yellow pike	2,890,200	231,306	134,500	18,830	3,060,000	254,729
Mussel shells ¹			7,100	229	7,100	229
Pearls and slugs ¹				28		28
Total	21,087,400	1,013,316	1,005,300	49,197	26,932,600	1,435,648

Species	Lake Huron		Lake Michigan			
	Michigan		Michigan		Indiana	
	Pounds	Value	Pounds	Value	Pounds	Value
Bowfin	700	\$14				
Burbot	800	15	5,800	\$116	15,000	\$300
Carp	978,100	29,341	24,200	726		
Cattah and bullheads	143,500	8,712	2,200	82		
Chubs	190,300	28,545	1,050,800	157,545	270,000	40,500
Lake herring	4,150,000	124,498	2,468,700	74,061	236,000	7,060
Lake trout	1,340,200	201,015	2,263,300	339,495	100,000	20,000
Pike or pickerel (jacks)	13,100	1,053	13,900	1,112		
Rock bass	24,900	998	1,500	60		
Sauger	5,800	350	300	18		
Sheepshead	4,200	84	5,200	104		
Smelt			194,100	5,823	100	3
Sucker "mullet"	1,725,900	51,777	1,725,600	51,777	2,500	75
Whitefish:						
Common	1,018,700	213,923	946,500	198,785	3,100	625
Menominee	72,100	6,490	37,000	3,330		
Yellow perch	547,600	54,764	563,000	56,300	154,000	15,400
Yellow pike	1,628,700	227,737	78,000	10,929		
Mussel shells ¹	52,400	1,737	522,000	17,876		
Pearls and slugs ¹		63		433		
Total	11,895,000	951,116	9,901,600	918,543	780,700	83,983

¹ From tributary streams.

Lake fisheries of the United States, 1937—Continued

CATCH: BY LAKES—Continued

Species	Lake Michigan—Continued					
	Illinois		Wisconsin		Total	
	Pounds	Value	Pounds	Value	Pounds	Value
Burbot			18, 700	\$365	39, 500	\$781
Carp			1, 900, 600	57, 014	1, 924, 800	57, 740
Catfish and bullheads			56, 400	2, 093	58, 600	2, 175
Chubs	590, 900	\$88, 635	3, 668, 000	550, 189	5, 579, 200	836, 869
Lake herring	102, 700	3, 080	2, 692, 100	80, 767	5, 499, 500	164, 968
Lake trout	271, 200	61, 247	2, 352, 800	435, 569	4, 987, 300	846, 311
Pike or pickerel (jacks)			100	8	14, 000	1, 120
Rock bass					1, 500	60
Sauger					800	18
Sheepshead			400	8	5, 600	112
Smelt			1, 231, 300	61, 710	1, 425, 500	67, 538
Sucker "mullet"			653, 300	19, 594	2, 381, 400	71, 446
White bass			800	30	800	80
Whitefish:						
Common	700	150	122, 300	25, 264	1, 072, 600	224, 824
Menominee			10, 300	1, 028	47, 300	4, 358
Yellow perch	496, 100	49, 610	1, 278, 200	127, 621	2, 489, 300	248, 981
Yellow pike					78, 000	10, 920
Crawfish			6, 400	642	6, 400	642
Mussel shells ¹			265, 000	5, 591	787, 000	23, 467
Pearls and slugs ¹						433
Total	1, 461, 600	192, 722	14, 254, 200	1, 367, 613	26, 398, 100	2, 562, 761

Species	Lake Superior					
	Michigan		Wisconsin		Minnesota	
	Pounds	Value	Pounds	Value	Pounds	Value
Burbot	600		800	\$16		
Carp			200	6		
Catfish and bullheads			100	7		
Chubs	61, 500	9, 224	157, 300	23, 606	56, 200	84, 790
Lake herring	3, 170, 300	95, 109	2, 991, 100	89, 629	5, 622, 700	131, 970
Lake trout	2, 291, 200	348, 690	439, 900	85, 396	363, 800	42, 589
Pike or pickerel (jacks)	1, 000	80	22, 800	1, 840	300	21
Sauger	100	6				
Sucker "mullet"	378, 300	11, 349	66, 800	1, 971	3, 000	90
Whitefish:						
Common	267, 900	54, 186	99, 100	19, 211	6, 600	1, 060
Menominee	16, 200	918	3, 400	340	4, 600	460
Yellow perch	7, 900	788	1, 100	114		
Yellow pike	3, 500	491				
Total	6, 182, 500	516, 751	3, 781, 600	222, 136	6, 047, 200	180, 970

¹ From tributary streams.

Lake fisheries of the United States, 1937—Continued
CATCH: BY LAKES—Continued

Species	Lake Superior—Contd.		Lake of the Woods, Rainy Lake, and Namakan Lake		Total, all lakes	
	Total		Minnesota			
	Pounds	Value	Pounds	Value	Pounds	Value
Blue pike.....					11,020,900	\$646,191
Bowfin.....					1,000	25
Burbot.....	1,400	\$26	47,400	\$728	494,500	6,903
Carp.....	200	6	17,600	401	5,159,900	136,154
Catfish and bullheads.....	100	7	44,200	8,046	1,119,500	70,628
Chubs.....	275,000	37,622			6,044,500	903,036
Cisco.....					64,000	6,462
Crappie.....			200	27	200	27
Eels.....					10,100	506
Garfish.....					6,400	32
Goldfish.....					267,400	5,410
Lake herring.....	11,784,100	316,708			21,587,400	621,254
Lake trout.....	3,084,900	471,575			9,427,900	1,520,701
Mooneye.....					14,900	282
Pike or pickerel (jacks).....	24,100	1,941	194,100	6,982	258,200	12,075
Rock bass.....					37,100	1,287
Sauger.....	100	6	415,000	16,207	1,635,500	87,089
Sheepshead.....					4,089,000	65,393
Smelt.....					1,426,600	67,536
Sturgeon.....					18,100	6,173
Sucker "mullet".....	447,100	13,410	185,200	2,392	5,892,300	160,675
Sunfish.....					32,500	709
Tullibees.....			223,300	4,671	223,300	4,671
White bass.....					436,400	19,876
Whitefish:						
Common.....	363,600	74,447	69,100	8,568	3,228,200	668,027
Menominee.....	18,200	1,718			187,600	12,566
Yellow perch.....	9,000	902	221,500	13,488	5,066,600	432,586
Yellow pike.....	8,500	491	685,500	55,779	5,467,600	550,215
Crawfish.....					6,400	243
Mussel shells ¹					846,500	25,433
Pearls and slugs ¹						224
Total.....	16,011,300	918,859	2,103,000	112,804	83,958,400	6,033,064

¹ From tributary streams.

Industries related to the fisheries of the Lake States, 1937
OPERATING UNITS, SALARIES, AND WAGES

Item	New York	Pennsylvania	Ohio	Indiana	Illinois	Michigan	Wisconsin	Minnesota	Total
Transporting:									
Persons engaged:	Number	Number	Number	Number	Number	Number	Number	Number	Number
On vessels.....			17			6			23
On boats.....						12			12
Total.....			17			18			35
Vessels, motor.....			11			3			14
Net tonnage.....			143			21			164
Boats.....						4			4
Wholesale and manufacturing:									
Establishments.....	20	7	52	3	45	49	41	13	230
Persons engaged:									
Proprietors.....	23	6	46	3	17	37	30	5	167
Salaried employees.....	32	7	77	2	166	71	59	31	445
Wage earners:									
Average for season.....	132	63	281	5	602	465	581	137	2,266
Average for year.....	95	43	213	5	431	171	211	58	1,277
Paid to salaried employees.....	\$42,998	\$13,127	\$181,249	\$1,920	\$429,420	\$141,712	\$99,075	\$40,118	\$940,614
Paid to wage earners.....	\$106,246	\$48,650	\$303,174	\$6,200	\$668,639	\$211,306	\$223,853	\$77,232	\$1,645,800
Total salaries and wages.....	\$149,239	\$61,777	\$484,423	\$8,120	\$1,098,059	\$353,018	\$322,928	\$117,350	\$2,586,414
Fishermen manufacturing.....			13		28	28	36	118	223

Industries related to the fisheries of the Lake States, 1937—Continued

PRODUCTS MANUFACTURED

Item	New York		Pennsylvania		Ohio		Indiana	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
By manufacturing establishments:								
Alewives, spiced.....pounds.....					(1)	(1)		
Blue pike:								
Fresh fillets.....do.....	594,656	\$136,127	189,033	\$32,336	1,211,892	\$278,356		
Frozen fillets.....do.....	72,200	17,510	80,910	13,096	300,606	74,777		
Cbubs, cisco, and tullibees, smoked.....pounds.....	(1)	(1)			(1)	(1)	72,000	\$18,100
Eels, smoked.....do.....	(1)	(1)						
Herring, lake, smoked.....do.....					(1)	(1)		
Herring, sea, spiced.....do.....	(1)	(1)						
Lake trout, smoked.....do.....							(1)	(1)
Pickerel, fresh fillets.....do.....					10,780	2,832		
Sablefish, smoked.....do.....					(1)	(1)		
Salmon, smoked.....do.....					(1)	(1)		
Sauger pike:								
Fresh fillets.....do.....	71,690	16,025			211,111	47,725		
Frozen fillets.....do.....	61,125	13,835	(1)	(1)	119,804	32,722		
Sheepshead, smoked.....do.....					16,000	1,960		
Sturgeon, smoked.....do.....	(1)	(1)						
White bass, fresh fillets.....do.....	(1)	(1)	(1)	(1)	2,016	463		
Yellow perch:								
Fresh fillets.....do.....	35,843	7,781	8,140	1,295	254,254	61,753		
Frozen fillets.....do.....			(1)	(1)	23,285	6,190		
Yellow pike:								
Fresh fillets.....do.....	29,419	7,503	(1)	(1)	35,673	9,616		
Frozen fillets.....do.....	2,890	648	(1)	(1)	(1)	(1)		
Whitefish:								
Fresh fillets.....do.....	11,180	3,890	1,725	359	(1)	(1)		
Smoked.....do.....	17,400	5,784			(1)	(1)	(1)	(1)
Unclassified products:								
Fillets, fresh and frozen pounds.....	(2)	(2)	\$ 14,155	\$ 2,704	\$ 26,328	\$ 8,989		
Smoked.....do.....	\$ 192,400	\$ 42,637			\$ 84,820	\$ 22,453	(2)	(2)
Spiced.....do.....	(2)	(2)			(2)	(2)		
Miscellaneous.....do.....	¹⁰ 330,341	¹⁰ 24,735			¹¹ 167,640	¹¹ 16,977	¹² 26,000	¹² 6,700
Total.....do.....	1,419,124	276,455	293,963	49,790	2,463,707	564,813	98,000	24,800
By fishermen:								
Blue pike, fresh fillets.....do.....					600	138		
Carp, smoked.....do.....					1,900	310		
Catfish and bullheads, smoked pounds.....								
Herring, lake, smoked.....do.....					1,150	230		
Lake trout, smoked.....do.....					1,500	300		
Mooneye, smoked.....do.....					2,900	1,015		
Mooneye, smoked.....do.....					2,950	471		
Sauger pike, fresh fillets.....do.....					2,700	620		
Sheepshead, smoked.....do.....					6,200	793		
Yellow pike:								
Fresh fillets.....do.....					1,000	230		
Smoked.....do.....					1,900	475		
Whitefish, smoked.....do.....					1,100	330		
White bass, smoked.....do.....					1,400	181		
Total.....do.....					25,800	5,093		
Grand total.....do.....	1,419,124	276,455	293,963	49,790	2,489,507	569,906	98,000	24,800

See footnotes at end of table.

Industries related to the fisheries of the Lake States, 1937—Continued

PRODUCTS MANUFACTURED—Continued

Item	Illinois		Michigan		Wisconsin		Minnesota	
	Quantity	Value	Quantity	Value	Quantity (1)	Value (1)	Quantity	Value
By manufacturing establishments:								
Alewives, spiced... pounds..	1,080,000	\$88,500						
Blue pike:								
Fresh fillets.....do.....	525,448	112,272	(1)	(1)	56,500	\$13,275		
Frozen fillets.....do.....	47,640	9,724						
Chubs, cisco, and tullibees, smoked... pounds.....	1,820,409	383,976	430,200	\$116,800	607,152	133,088	24,500	\$5,640
Eels, smoked.....do.....	16,749	4,468						
Herring, lake:								
Fresh fillets.....do.....	(1)	(1)	(1)	(1)	106,000	7,700		
Salted.....do.....			1,255,255	48,557	2,199,075	93,015	764,000	31,875
Smoked.....do.....	(1)	(1)	319,000	34,980	586,000	46,130	31,500	2,940
Herring, sea, spiced.....do.....	(1)	(1)			116,109	17,018		
Lake trout, smoked.....do.....	63,132	13,650	171,750	53,250	143,152	36,550	(1)	(1)
Pickarel, fresh fillets.....do.....	(1)	(1)						
Sablefish, smoked.....do.....	13,587	3,959	(1)	(1)	33,000	4,950		
Salmon, smoked.....do.....	659,432	250,370	277,800	69,716	155,000	30,470	(1)	(1)
Sauger pike:								
Fresh fillets.....do.....	958,465	210,759						
Frozen fillets.....do.....	309,991	67,297	(1)	(1)				
Sturgeon, smoked.....do.....	14,126	11,945						
Yellow perch:								
Fresh fillets.....do.....	121,019	27,674	(1)	(1)	173,700	40,049		
Frozen fillets.....do.....	18,747	4,348						
Yellow pike:								
Fresh fillets.....do.....	162,634	37,376			105,000	22,935		
Frozen fillets.....do.....	19,139	4,013						
Whitefish:								
Fresh fillets.....do.....	26,381	6,900						
Smoked.....do.....	(1)	(1)	48,850	12,396	(1)	(1)	(1)	(1)
Unclassified products:								
Fillets, fresh and frozen... pounds.....	(2)	(2)	(2)	(2)	(2)	(2)		
Smoked.....do.....	798,205	715,012	(2)	(2)	90,000	9,900	(2)	(2)
Spiced.....do.....	571,272	66,141			(2)	(2)		
Miscellaneous.....do.....		10,823	221,905	46,100		162,392		11,775
Total.....do.....		1,329,202	2,724,760	381,799		517,472		52,130
By fishermen:								
Chubs, smoked.....do.....	10,000	2,500	13,000	3,900	35,000	8,750		
Herring, lake:								
Salted.....do.....					157,000	6,100	198,440	7,893
Smoked.....do.....			175,000	8,750				
Lake trout, smoked.....do.....	10,000	3,000	12,500	3,750	3,000	900		
Whitefish, smoked.....do.....			2,500	850				
Whitefish, caviar, salted... pounds.....							60	60
Total.....do.....	20,000	5,500	203,000	17,250	195,000	15,750	198,500	7,953
Grand total.....do.....		1,334,702	2,927,760	399,049		533,222		60,083

1 The production of this item has been included under "Unclassified products."
 2 The production of this item has been included under "Miscellaneous."
 3 Includes fresh fillets of white bass and yellow pike; and frozen fillets of sauger pike, white bass, yellow perch, yellow pike, and whitefish.
 4 Includes fresh fillets of lake trout, whitefish, flounders, mullet and sheephead, and frozen yellow pike fillets.
 5 Includes smoked chubs, cisco, tullibees, eels, goldeyes, sea herring, and sturgeon, and kippered salmon.
 6 Includes smoked outfish and bullheads, chubs, ciscoes, tullibees, lake herring, moon-eye, sablefish, salmon, yellow pike, and whitefish.
 7 Includes smoked buffalo fish, carp, lake herring, sea herring, whitefish, and whiting, and kippered salmon.
 8 Includes smoked carp and whitefish.
 9 Includes spiced anchovies, sea herring, mackerel, and oyster and shrimp cocktail.
 10 Includes fresh fillets of lake trout and white bass; frozen fillets of lake trout; and spiced sea herring.
 11 Includes smoked carp and spiced alewives.
 12 Includes smoked lake trout and whitefish.
 13 Includes fresh fillets of carp, halibut, lake herring, lake trout, pickarel, salmon, red snapper, and suckers, and canned soft clam chowder.
 14 Includes fresh fillets of blue pike, lake herring, and yellow perch; frozen fillets of sauger pike; and smoked butterfish, carp, mackerel, and sablefish.
 15 Includes fresh lake trout fillets; spiced chub and alewives; burbot-liver oil; poultry feed and lime from fresh-water mussel shells, and canned whitefish caviar.
 16 Includes smoked lake trout, salmon and whitefish; and burbot-liver oil.

NOTE.—The total value of the manufactured products for the Lake States was as follows: By manufacturing establishments, \$3,196,461; and by fishermen, \$51,546. Some of the above products may have been manufactured from products 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 and 12 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 ¹²

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, the year for which 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 1937, appear in the following tables:

Fisheries of the Mississippi River and Tributaries, 1931

OPERATING UNITS: BY STATES

Item	Ala- bama	Arkan- sas	Illinois	Indi- ana	Iowa	Kan- sas	Ken- tucky	Louis- iana	Minne- sota
Fishermen:									
On boats and shore:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
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.....		2,900						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	87,395	1,392,200	41,800
Pound nets.....					2				27
Fyke nets.....	610	5,345	9,852	335	1,981	189	1,231	5,906	74
Dip nets.....			22		10			159	
Traps:									
Crawfish.....								18	
Shrimp.....								88	
Baskets.....			2,769						
Mussel dredges.....		426	14						
Yards at mouth.....		285	10						
Crowfoot bars.....	168	1,038	840	1,062	464		256	10	192
Tongs.....		189		72				5	
Rakes.....		70							
Forks.....		102	83	1,278		29		5	
Grabs.....								2,232	

¹² For a clearer understanding of the statistics published in this section, the reader is referred to the section in the later part of the document entitled "Statistical survey procedure."

Fisheries of the Mississippi River and Tributaries, 1931—Continued

OPERATING UNITS: BY STATES—Continued

Items	Mis- sissi- ppi	Mis- sour- i	Ne- braska	Ohio	Okla- homa	South Da- kota	Ten- nessee	Texas	Wis- con- sin	Total
Fishermen:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
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	46,637
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	8	17,129
Hooks.....	72,155	34,600		900	1,075	3,600	41,690	14,500	125	2,459,112
Pounds nets.....									345	374
Fyke nets.....	2,591	1,872	296	76	85	68	1,735	70	222	32,641
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	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
FISH								
Bowfin.....			700	\$:8	8,308	\$241		
Buffalofish.....	21,330	\$2,342	2,182,446	131,774	911,009	51,803	85,045	\$3,156
Carp.....	11,060	1,118	808,206	27,268	4,878,744	128,221	1,57,641	10,162
Catfish and bullheads.....	81,200	8,850	1,077,343	93,150	647,696	68,890	35,370	6,302
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	2,150	104,846	5,460	16,492	1,724
Quillback or "Ameri- can carp".....	7,657	875	6,830	676	17,532	608	30,312	1,436
Sheepshead.....	45,909	4,072	676,358	29,877	177,709	11,321	38,740	3,711
Sturgeon, shovelnose.....	575	70			39,766	3,448	3,013	202
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	82,894	7,328,736	105,632
Pearls.....				3,127		190		125
Slugs.....		2,444		14,401		11,835		18,788
Turtles:								
Snappers.....					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	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
FISH								
Bowfin	91,825	\$3,759					5,715	\$114
Buffalofish	746,615	50,705	24,325	\$2,222	104,558	\$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	8
Garfish							72,450	791
Mooneye	1,100	28			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	2,067	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	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
FISH								
Bowfin	16,598	\$282			17,000	\$520		
Buffalofish	257,431	15,092	1,511,126	\$63,824	178,991	10,414	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	63,804	4,841	635,049	42,384	91,430	15,487	34,174	5,136
Eels			250	20	1,055	53		
Minnows					625	200		
Paddlefish or spoonbill cat								
Quillback or "American carp"	17,246	519	158,821	5,879	40,103	2,917		
Sheepshead	152,545	7,938	2,157	42	13,672	946		
Sturgeon, shovelnose	1,634	115	106,844	2,576	38,186	3,773		
Sucker "mullet"	65,273	1,955	100	3	17,282	1,703		
					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 published by the Louisiana Department of Conservation, the catch of commercial fresh-water fish in Louisiana during 1937 was as follows: Catfish, 3,867,165 pounds, valued at \$348,046; gaspergou, 1,562,037 pounds, valued at \$78,102; spoonbill cat, 565,026 pounds, valued at \$39,552; buffalofish, 5,684,613 pounds, valued at \$284,231; terrapins 21,600 in number, valued at \$21,600; fresh-water turtles, 61,819 pounds, valued at \$9,273; frogs, 2,295,400 pounds, valued at \$573,640; fresh-water shrimp, 2,036,575 pounds, valued at \$162,926; crayfish, 2,500,000 pounds, valued at \$175,000; and "baby" green turtles, 4,700,000 in number, valued at \$47,000.

Fisheries of the Mississippi River and Tributaries, 1931—Continued

CATCH: BY STATES—Continued

Species	Ohio		Oklahoma		South Dakota		Tennessee ¹	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
FISH							14,000	\$1,680
Black bass					38,928	\$3,894	478,592	34,247
Buffalo fish	6,433	\$682	21,805	\$2,142	52,838	2,642	247,841	9,594
Carp	14,370	1,643	4,268	425	13,500	3,628	271,753	24,750
Catfish and bullheads	4,380	811	4,935	695	1,392	70	18,652	1,658
Crappie							163	25
Eels								
Paddlefish or spoonbill cat			5,332	533	400	40	5,034	301
Quillback or "American carp"					4,364	220	6,065	843
Sheepshead	1,195	119	1,950	195	697	70	197,670	10,465
Sturgeon, shovelnose	1,318	224	1,550	155			3,706	393
Sucker "mullet"	558	72			2,246	112	8,323	1,119
Sunfish	2,902	268					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		308						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	
	Pounds	Value	Pounds	Value	Pounds	Value
FISH					14,000	\$1,680
Black bass					428,316	9,299
Bowfin			288,170	\$4,355	687,288	455,399
Buffalo fish	73,000	\$2,190	268,001	13,528	11,891,761	877,798
Carp	6,900	138	777,474	23,900	41,141	2,959
Catfish and bullheads	47,800	3,824	65,539	5,825	6,978	441
Crappie					72,480	791
Eels					525	209
Garfish					3,090	153
Minnows					951,452	43,134
Mooneye					4,700	470
Paddlefish or spoonbill cat					268,438	11,286
Pike or pickerel					2,365	451
Quillback or "American carp"	500	10	66,353	2,032	3,904,844	142,938
Sauger					87,426	8,163
Sheepshead	10,300	206	84,409	3,692	314,885	12,682
Sturgeon, shovelnose					21,850	1,094
Sucker "mullet"			135,984	3,696	3,800	195
Sunfish					4,945	771
White bass						
Yellow pike						
Total	138,500	6,368	1,685,930	56,928	44,061,714	2,257,204
SHELLFISH, ETC.					29,248	292
Crawfish					48,503	3,923
Shrimp			959,200	8,946	37,254,697	421,611
Mussel shells					555	11,436
Pearls					2,012	68,216
Slugs					874,901	130,882
Frogs					19,170	391
Terrapin						
Turtles:						
Snapper					75,190	3,008
Soft-shell					19,100	394
Total			959,200	11,513	38,370,809	640,153
Grand total	138,500	6,368	2,645,130	68,441	82,382,523	2,897,357

¹ According to statistics furnished the Bureau by the office of fish technician, division of game and fish, Tennessee Department of Conservation, the catch of commercial fresh-water fish in Reelfoot Lake in Tennessee during 1937 was as follows: Bass, 5,250 pounds; buffalo fish, 206,310 pounds; bullheads, 25,338 pounds; carp, 31,798 pounds; catfish, 83,184 pounds; crappie, 59,296 pounds; drum, 34,648 pounds; eels, 274 pounds; pike, 24 pounds; sunfish, 53,878 pounds; spoonbill cat, 10,239 pounds; white bass, 92 pounds; and yellow bass, 18,762 pounds.

Industries related to the fisheries of the Mississippi River and Tributaries

OPERATING UNITS, SALARIES, AND WAGES, 1931

Item	Arkansas	Illinois	Indiana	Iowa	Kentucky	Louisiana	Minnesota and North Dakota
Transporting:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
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	13
Persons engaged:							
Proprietors.....	3	42	1	52	8	24	11
Salaried employees.....	9	3	5	79	20	14	27
Wage earners:							
Average for season.....	152	331	140	2,500	261	70	112
Average for year.....	72	235	93	2,179	159	68	112
Paid to salaried employees.....	\$11,417	\$9,520	\$6,820	\$141,346	\$33,159	\$12,400	\$55,200
Paid to wage earners.....	\$53,503	\$145,683	\$51,444	\$1,417,678	\$81,643	\$37,700	\$81,500
Total salaries and wages.....	\$64,920	\$155,203	\$58,264	\$1,559,024	\$114,802	\$50,100	\$136,700
Fishermen manufacturing.....		4	2			200	

Item	Mississippi	Missouri and Oklahoma	Nebraska and Kansas	Ohio and Pennsylvania	Tennessee	Wisconsin	Total
Transporting:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Persons engaged.....							29
Vessels, motor.....							8
Net tonnage.....							104
Wholesale and manufacturing:							
Establishments.....	6	21	3	13	11	8	217
Persons engaged:							
Proprietors.....	7	24	3	17	9	3	204
Salaried employees.....	3	125	8	37	15	10	355
Wage earners:							
Average for season.....	26	328	52	175	90	38	4,275
Average for year.....	26	261	52	145	52	29	3,483
Paid to salaried employees.....	\$16,000	\$291,874	\$17,400	\$95,878	\$34,884	\$12,998	\$738,896
Paid to wage earners.....	\$22,382	\$202,944	\$45,580	\$138,817	\$38,177	\$24,483	\$2,341,534
Total salaries and wages.....	\$38,382	\$494,818	\$62,980	\$234,695	\$73,061	\$37,481	\$3,080,430
Fishermen manufacturing.....	7	3					216

Industries related to the fisheries of the Mississippi River and Tributaries—Contd.

PRODUCTS MANUFACTURED

Item	Indiana		Illinois, Iowa, 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			12,960,342	3,751,879		
Poultry feed ² tons			4,290	26,467		
Lime ³ do			928	1,022		
Unclassified ⁴				\$ 29,412		
Unclassified, smoked..... pounds			83,000	14,440		
Total.....				3,911,160		
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		3,911,276	88,356	7,363

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)			(1)	(1)
Whitefish, smoked..... do	255,000	\$47,200			(1)	(1)
Unclassified, smoked..... do	66,600	19,793			184,900	50,555
Total.....	321,600	66,993			291,500	77,205
By fishermen, paddlefish roe, salted..... do						
			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 Data are for 1937.

³ Includes mussel-shell chips and novelties.

⁴ Includes smoked buffalo fish and tullibees.

⁵ Includes smoked eels, salmon, and sturgeon.

⁶ Includes smoked buffalo fish, 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 \$4,055,368; and by fishermen \$3,751. 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, 1937

OPERATING UNITS: BY GEAR

Item	Haul seines	Trammel nets	Trot lines	Total, exclusive of duplication
Fishermen:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Regular.....	7	13	-----	20
Casual.....	11	15	40	47
Total.....	18	28	40	67
Boats:				
Motor.....	6	12	5	23
Other.....	9	13	38	56
Apparatus:				
Number.....	7	13	40	-----
Length, yards.....	2,332	-----	-----	-----
Square yards.....	-----	21,450	-----	-----
Hooks.....	-----	-----	4,000	-----

CATCH: BY GEAR

Species	Haul seines		Trammel nets		Trot lines		Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Bowfin.....	12,200	\$122	-----	-----	-----	-----	12,200	\$122
Buffalofish.....	25,000	895	12,500	\$435	-----	-----	37,500	1,330
Carp.....	224,200	5,184	125,300	2,956	2,000	\$46	351,500	8,186
Catfish and bullheads.....	2,000	280	14,800	1,832	15,600	2,046	32,400	4,168
Sheepshead.....	22,300	912	6,600	276	2,700	135	31,600	1,323
Sucker "mullet".....	9,000	90	-----	-----	-----	-----	9,000	90
Turtles, snapper.....	-----	-----	-----	-----	600	48	600	48
Total.....	294,700	7,488	159,200	5,499	20,900	2,275	474,800	15,257

OPERATING UNITS: BY STATES

Item	Minnesota	Wisconsin	Total for lake
Fishermen:	<i>Number</i>	<i>Number</i>	<i>Number</i>
Regular.....	-----	20	20
Casual.....	9	38	47
Total.....	9	58	67
Boats:			
Motor.....	2	21	23
Other.....	7	49	56
Apparatus:			
Haul seines.....	-----	7	7
Length, yards.....	-----	2,332	2,332
Trammel nets.....	-----	13	13
Square yards.....	-----	21,450	21,450
Trot lines.....	9	31	40
Hooks.....	900	3,100	4,000

Fisheries of Lake Pepin, 1937—Continued

CATCH: BY STATES

Species	Minnesota		Wisconsin		Total for lake	
	Pounds	Value	Pounds	Value	Pounds	Value
Bowfin.....			12,200	\$122	12,200	\$122
Buffalofish.....			37,500	1,330	37,500	1,330
Carp.....	2,000	\$46	349,600	8,140	351,500	8,186
Catfish and bullheads.....	6,600	924	25,800	3,234	32,400	4,158
Sheepshead.....	2,700	135	28,900	1,188	31,600	1,323
Sucker "mullet".....			9,000	90	9,000	90
Turtles, snapper.....	600	48			600	48
Total.....	11,900	1,183	462,900	14,104	474,800	15,257

LAKE KEOKUK

Fisheries of Lake Keokuk, 1937

OPERATING UNITS: BY GEAR

Item	Haul seines	Trammel nets	Trot lines	Fyke nets	Total, exclusive of duplication
Fishermen:	Number	Number	Number	Number	Number
Regular.....	25	2	7	29	53
Casual.....	61	33	65	104	123
Total.....	86	35	72	133	176
Boats:					
Motor.....	20	16	39	91	111
Other.....	28	6	33	68	107
Apparatus:					
Number.....	24	34	224	2,205	
Length, yards.....	3,250				
Square yards.....		3,800			
Hooks.....			21,000		

CATCH: BY GEAR

Species	Haul seines		Trammel nets		Trot lines		Fyke nets		Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Bowfin.....	3,900	\$78					90,700	\$3,685	3,900	\$78
Buffalofish.....	84,800	3,393	19,500	\$780			247,100	5,183	195,000	7,758
Carp.....	231,600	4,651	49,000	980					527,700	10,814
Catfish and bullheads.....	15,600	1,664			38,200	\$3,819	116,700	11,674	170,500	17,057
Eels.....					100		100	5	100	5
Paddlefish or spoon-bill cat.....	8,700	870	2,000	200	2,000	200	500	50	13,200	1,320
Sheepshead.....	84,800	4,392	16,000	800	1,000	50	62,500	3,318	166,300	8,550
Sturgeon, shovelnose.....	300	30			1,000	100			1,300	130
Sucker "mullet".....	1,000	15							1,000	15
Turtles:										
Snapper.....	2,500	50					1,500	65	4,000	115
Soft-shell.....	500	25							500	25
Total.....	435,700	15,058	86,500	2,760	42,200	4,169	519,100	23,880	1,083,500	45,867

Fisheries of Lake Keokuk, 1937—Continued

OPERATING UNITS: BY STATES

Item	Illinois	Iowa	Total for lake
Fishermen:			
Regular.....	27	26	53
Casual.....	57	66	123
Total	84	92	176
Boats:			
Motor.....	54	57	111
Other.....	48	59	107
Apparatus:			
Haul seines.....	3	21	24
Length, yards.....	550	2,700	3,250
Trammel nets.....		34	34
Square yards.....		3,800	3,800
Trot lines.....	104	120	224
Hooks.....	12,000	9,000	21,000
Fyke nets.....	1,479	726	2,205

CATCH: BY STATES

Species	Illinois		Iowa		Total	
	Pounds	Value	Pounds	Value	Pounds	Value
Bowfin.....	900	\$18	3,000	\$60	3,900	\$78
Buffalofish.....	70,000	2,801	125,000	4,957	195,000	7,758
Carp.....	216,700	4,597	311,000	6,217	527,700	10,814
Catfish and bullheads.....	91,900	9,194	78,600	7,863	170,500	17,057
Eels.....			100	5	100	5
Paddlefish or spoonbill cat.....	8,500	860	4,700	470	13,200	1,320
Sheepshead.....	63,500	3,418	102,800	5,132	166,300	8,550
Sturgeon, shovelnose.....			1,300	130	1,300	130
Sucker "mullet".....	500	10	500	5	1,000	15
Turtles:						
Snapper.....	1,500	65	2,500	60	4,000	115
Soft-shell.....			500	25	500	25
Total	453,500	20,953	630,000	24,914	1,083,500	46,867

MISSISSIPPI RIVER BETWEEN LAKE PEPIN AND LAKE KEOKUK

Fisheries of the Mississippi River between Lake Pepin and Lake Keokuk, 1937

OPERATING UNITS: BY GEAR

Item	Haul seines	Anchor gill nets	Trammel nets	Trot lines	Pound nets	Fyke nets	Dip nets	Total, exclusive of duplication
	Number	Number	Number	Number	Number	Number	Number	Number
Fishermen:								
Regular.....	81	7	54	11	6	102		229
Casual.....	206	9	108	204	7	140	16	573
Total	287	16	162	215	13	242	16	802
Boats:								
Motor.....	97	8	63	47	5	194	1	345
Other.....	104	8	78	180	7	216	10	505
Apparatus:								
Number.....	87	9	409	378	48	5,012	16	
Length, yards.....	14,955							
Square yards.....		6,162	30,190					
Hooks.....				36,600				

Fisheries of the Mississippi River between Lake Pepin and Lake Keokuk, 1937—Con.

CATCH: BY GEAR

Species	Haul seines		Anchor gill nets		Trammel nets		Trot lines	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Bowfin	97,800	\$1,397			4,600	\$46	2,200	\$86
Buffalofish	364,000	13,720	3,500	\$131	193,100	7,803	10,600	277
Carp	891,900	22,525	16,900	432	461,300	10,517	149,300	15,251
Catfish and bullheads	17,400	1,791	2,100	252	44,500	4,624	300	30
Eels							5,600	560
Paddlefish or spoonbill cat					2,100	168	200	12
Pike or pickerel	1,700	129			51,900	2,907	11,900	601
Sheepshead	183,500	9,161			10,000	1,226	7,200	910
Sturgeon, shovelnose	800	128			2,300	46		
Sucker "mullet"	33,400	456						
Turtles:								
Snapper	1,900	80						
Soft-shell	3,300	295						
Total	1,585,700	49,682	22,500	815	769,800	27,337	187,300	17,272

Species	Pound nets		Fyke nets		Dip nets		Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Bowfin			21,800	\$303			124,200	\$1,746
Buffalofish	8,900	\$291	264,900	10,272	7,000	\$350	833,600	32,653
Carp	24,500	490	591,700	14,269	5,200	208	2,002,100	48,718
Catfish and bullheads	4,300	374	312,600	30,213			530,200	52,505
Eels			200	23			500	58
Paddlefish or spoonbill cat			3,600	356			9,200	916
Pike or pickerel			12,700	813			16,700	1,122
Sheepshead	7,400	286	163,200	8,053	4,000	200	421,900	21,208
Sturgeon, shovelnose	1,100	176	22,300	2,459			41,400	4,899
Sucker "mullet"			2,800	56			38,500	558
Turtles:								
Snapper			1,600	80			3,500	160
Soft-shell			1,600	55			4,900	350
Total	46,200	1,617	1,399,000	66,952	16,200	758	4,026,700	164,888

OPERATING UNITS: BY STATES

Item	Illinois	Iowa	Minnesota	Wisconsin	Total
	Number	Number	Number	Number	Number
Fishermen:					
Regular	54	104	6	65	229
Casual	158	241	50	124	573
Total	212	345	56	189	802
Boats:					
Motor	118	159	13	55	345
Other	108	248	44	105	505
Apparatus:					
Haul seines	16	36	5	30	87
Length, yards	2,450	5,282	998	6,225	14,955
Anchor gill nets			2,666	3,496	6,162
Square yards		46			22
Trammel nets	341	8,201		21,054	30,190
Square yards	935	218	43	44	378
Lines, trot	73	20,400	4,300	4,400	36,000
Hooks	7,500	48			48
Pound nets		2,599		326	5,012
Fyke nets	2,087	16			16
Dip nets					

Fisheries of the Mississippi River between Lake Pepin and Lake Keokuk, 1937—Con.

CATCH: BY STATES

Species	Illinois		Iowa		Minnesota		Wisconsin		Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Bowfin.....	4,200	\$44	56,300	\$668	500	\$8	63,200	\$1,026	124,200	\$1,746
Buffalofish.....	177,500	6,983	416,000	16,305	12,900	495	228,200	8,870	833,600	32,658
Carp.....	356,600	8,202	773,000	16,546	87,800	2,360	784,700	21,611	2,002,100	48,718
Catfish and bull- heads.....	146,900	14,921	276,600	25,909	27,200	2,920	80,500	8,755	530,200	52,505
Eels.....	100	12	400	41					500	53
Paddlefish or spoon- bill cat.....	3,700	266	5,500	550					9,200	916
Pike or pickerel.....			16,700	1,122					16,700	1,122
Sheepshead.....	134,500	6,626	195,000	9,676	12,500	627	79,900	4,279	421,900	21,206
Sturgeon, shovelnose.....			41,400	4,890					41,400	4,890
Bucker "mullet".....	5,500	96	17,800	275			15,200	187	38,500	558
Turtles:										
Snapper.....	600	12	2,900	148					3,500	160
Soft-shell.....	1,000	32	3,900	318					4,900	350
Total.....	830,800	37,294	1,803,500	76,456	140,900	6,410	1,251,700	44,728	4,026,700	164,888

FISHERIES OF ALASKA ¹³

The commercial catch of fishery products in Alaska during 1937, exclusive of whales, amounted to 825,783,422 pounds, valued at \$14,237,771, which is a decrease of 11 percent in quantity but an increase of 2 percent in value as compared with the catch in 1936. Of the total catch in 1937, 593,383,891 pounds, valued at \$11,876,351, consisted of salmon; 229,340,640 pounds, valued at \$2,142,306, other fish; and 3,058,891 pounds, valued at \$219,114, shellfish. In addition, 376 whales were taken. These fisheries gave employment to 11,570 fishermen, 2,159 persons on transporting craft, and 16,602 persons in fishery wholesale and manufacturing industries—a total of 30,331 persons, which is a decrease of less than one half of one percent as compared with the number employed in 1936.

¹³ 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," by Ward T. Bower, Appendix II to the report of the Commissioner of Fisheries for the fiscal year 1938.

Fisheries of Alaska, 1937

SUMMARY: BY DISTRICTS

Item	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Number	Value	Number	Value	Number	Value	Number	Value
PERSONS ENGAGED								
In fishing.....	5,278		2,989		3,303		11,570	
In transporting.....	950		745		404		2,159	
In wholesale and manufacturing industries.....	7,474		4,677		4,451		16,602	
Total	13,702		8,411		8,218		30,331	
CRAFT EMPLOYED								
Vessels fishing.....	774		87		11		872	
Boats fishing.....	2,206		1,554		1,426		5,186	
Vessels transporting.....	198		140		90		428	
Scows, houseboats, pile drivers, etc.....	311		267		197		775	
Total	3,489		2,048		1,724		7,261	
CATCH								
Fish:	<i>Pounds</i>		<i>Pounds</i>		<i>Pounds</i>		<i>Pounds</i>	
Salmon.....	252,350,760	\$4,537,572	191,902,005	\$3,512,242	149,131,126	\$3,826,537	593,383,891	\$11,876,351
Other.....	111,029,442	1,538,304	118,096,489	602,874	214,709	1,128	229,340,640	2,142,306
Shellfish.....	1,249,540	72,737	1,809,351	146,377			3,058,891	219,114
Total	364,629,742	6,148,613	311,807,845	4,261,493	149,345,835	3,827,665	825,783,422	14,237,771
Whales	<i>Number</i>		<i>Number</i>		<i>Number</i>		<i>Number</i>	
			120		256		376	
WHOLESALE AND MANUFACTURING								
Establishments.....	103		97		36		236	
PRODUCTS AS PREPARED FOR MARKET								
	<i>Pounds</i>		<i>Pounds</i>		<i>Pounds</i>		<i>Pounds</i>	
Salmon.....	157,068,189	17,794,401	107,456,903	13,773,497	74,636,380	15,006,030	339,181,472	46,573,928
Herring.....	35,957,937	1,119,410	50,750,224	1,789,908	40,275	2,536	86,748,436	2,891,854
Halibut.....	13,277,064	991,529	150,617	13,100			13,427,681	1,004,629
Cod.....			154,724	8,164	48,603	2,174	208,327	10,338
Trout.....	61,999	4,848					61,999	4,848
Sablefish.....	2,102,967	91,313					2,102,967	91,313
Smelt.....	275	8					275	8
Flounder.....	180,000	4,500					180,000	4,500
Rockfish.....	16,843	336					16,843	336
"Lingcod".....	3,007	921					3,007	921
Clam.....	3,432	977	405,039	239,415			408,471	240,392
Shrimp.....	453,521	161,098	9,804	3,835			463,325	164,933
Crab.....	216,797	80,644	494,521	195,455			711,318	278,099
Whale.....			2,419,500	128,703	6,616,000	350,418	9,035,500	479,121
Total	209,262,031	20,249,965	161,841,302	16,132,077	81,341,258	15,361,158	452,544,681	51,743,220

Fisheries of Alaska, 1937—Continued

OPERATING UNITS: BY DISTRICTS

Item	South-east Alaska	Central Alaska	Western Alaska	Total	Item	South-east Alaska	Central Alaska	Western Alaska	Total
Fishermen.....	Number 5,278	Number 2,989	Number 3,303	Number 11,570	Apparatus—Continued.	Number	Number	Number	Number
Vessels fishing:					Gill nets.....	384	1,537	2,200	4,121
Steam.....		3	3	6	Yards.....	49,920	199,140	343,562	592,622
Net tonnage.....		207	281	488	Beam trawls.....	12	1		13
Motor.....	774	84	8	866	Wheels.....			255	255
Net tonnage.....	9,638	1,962	247	11,847	Lines:				
Boats fishing:					Hand lines (cod fishery).....		21	15	36
Motor.....	1,047	605	40	1,692	Trawl lines (cod fishery).....		3	3	6
Other.....	1,159	949	1,386	3,494	Troll lines.....	3,718			3,718
Apparatus:					Skates of lines (halibut fishery).....	3,538			3,538
Traps.....	284	169		453	Crab pots.....	2,973	506		3,479
Furse seines.....	575	279	8	862	Herring pounds.....	4			4
Yards.....	196,082	62,240	4,400	262,722	Herring pound seines.....	9			9
Haul seines.....	6	203		209					
Yards.....	1,200	39,038		40,238					

CATCH: BY DISTRICTS

[Estimated round weight and value to fishermen]

Item	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
FISH								
Salmon:								
Blueback, red or sockeye.....	15,310,337	\$478,040	40,316,310	\$1,237,225	137,832,281	\$3,742,657	193,458,928	\$5,457,922
Chinook or king.....	17,589,560	439,694	2,228,140	88,686	1,617,460	20,920	21,435,160	549,300
Chum or keta.....	50,004,090	604,847	20,797,623	227,206	9,662,913	62,543	80,464,626	894,596
Humpback or pink.....	158,248,741	2,754,133	124,034,804	1,861,535	944	1	282,234,489	4,615,669
Silver or ooho.....	11,198,032	260,858	4,525,128	97,590	17,528	416	15,740,688	358,364
Herring.....	88,969,788	444,849	117,415,746	587,079	60,112	300	206,445,646	1,032,228
Halibut.....	18,762,234	991,529	211,596	13,100			18,973,830	1,004,629
Cod.....			469,147	2,695	154,597	828	623,744	3,523
Trout:								
Dolly Varden.....	55,356	3,221					55,356	3,221
Steelhead.....	22,142	1,627					22,142	1,627
Sablefish.....	2,990,272	91,313					2,990,272	91,313
Smelt.....	413	8					413	8
Flounder.....	200,000	4,500					200,000	4,500
Rockfishes.....	25,912	336					25,912	336
"Lingcod".....	3,325	921					3,325	921
Total.....	363,380,202	6,075,876	309,998,494	4,115,116	149,345,835	3,827,665	822,724,531	14,018,657
SHELLFISH								
Crabs:								
Dungeness.....	416,315	40,066	976,706	97,528			1,393,021	137,594
King.....	3,504	256	2,736	199			6,240	455
Shrimp.....	822,857	32,220	19,831	767			842,688	32,987
Clams:								
Butter.....	6,864	195	6,000	400			12,864	595
Razor.....			804,078	47,483			804,078	47,483
Total.....	1,249,540	72,737	1,809,351	146,377			3,058,891	219,114
Grand total.....	364,629,742	6,148,613	311,807,845	4,261,493	149,345,835	3,827,665	825,783,422	14,237,771

NOTE.—In addition to the above statistics, 376 whales were taken in Alaska waters. The round weight and value to fishermen cannot be determined, but the products amounted to 9,035,500 pounds, valued at \$479,121.

Industries related to the fisheries of Alaska, 1937

TRANSPORTING

Item	Southeast Alaska	Central Alaska	Western Alaska	Total	Item	Southeast Alaska	Central Alaska	Western Alaska	Total
	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>		<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Persons engaged.....	950	745	464	2,159	Vessels transporting—Continued,				
Vessels transporting:					Motor.....	198	140	83	421
Steam.....			7	7	Net tonnage.....	5,855	6,573	2,077	14,505
Net tonnage.....			23,986	23,986	Scows, houseboats, pile drivers, etc.....	311	267	197	775

WHOLESALE AND MANUFACTURING

Item	Southeast Alaska	Central Alaska	Western Alaska	Total
	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Persons engaged.....	7,474	4,677	4,451	16,602
Establishments:				
Handling fresh and frozen fish.....	49	9		58
Curing fish.....	27	48	18	93
Canning fish.....	52	49	23	124
Manufacturing byproducts.....	9	12	1	22
Total (exclusive of duplication).....	103	97	36	236

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)	3,421,129	\$292,316					3,421,129	\$292,316
Herring (for bait)	2,674,260	31,180	57,125	\$656			2,731,385	31,836
Halibut	6,136,109	419,959					6,136,109	419,959
Halibut livers	143,500	71,750	2,500	1,250			146,000	73,000
Trout	41,740	2,966					41,740	2,966
Sablefish	4,063	110					4,063	110
Sablefish livers	69,582	27,833					69,582	27,833
Flounder	180,000	4,500					180,000	4,500
"Lingcod" livers	2,264	906					2,264	906
Crabs:								
Meat	56,598	20,510	5,916	2,549			62,514	23,059
Whole, in shell	13,775	1,152	9,600	640			23,375	1,792
Shrimp:								
Meat	444,844	158,155	8,926	3,534			453,770	161,689
Whole, in shell	2,110	316	50	5			2,160	321
Total	13,190,974	1,031,653	84,117	8,634			13,274,091	1,040,287
FROZEN								
Salmon (for food)	5,344,666	431,614					5,344,666	431,614
Salmon (for bait)	59,750	634					59,750	634
Herring (for bait)	2,506,787	16,980					2,506,787	16,980
Halibut	6,996,102	499,750	148,117	11,850			7,144,219	511,600
Halibut cheeks	1,353	70					1,353	70
Trout	20,259	1,882					20,259	1,882
Sablefish	1,839,137	56,576					1,839,137	56,576
Smelt	275	8					275	8
Rockfishes	16,843	336					16,843	336
"Lingcod"	743	15					743	15
Shrimp	6,567	2,627					6,567	2,627
Total	16,792,482	1,010,492	148,117	11,850			16,940,599	1,022,342
CURED								
Salmon:								
Mild-cured	5,620,800	1,051,744			100,800	\$12,600	5,721,600	1,064,344
Pickled	18,800	1,574	290,696	37,908	455,900	61,173	765,396	100,550
Dry-salted			11,725	1,900			11,725	1,900
Dried					1,148,000	79,900	1,148,000	79,900
Herring:								
Pickled (for food), Scotch-cure	72,750	4,161	1,995,415	101,656	29,875	2,151	2,098,040	107,968
Roused					10,400	385	10,400	385
Spiced	350	75					350	75
Cod:								
Dry-salted			96,684	3,635	42,090	1,554	140,774	5,189
Pickled			34,950	1,668	5,560	468	40,510	2,136
Stockfish			21,090	2,861	953	162	22,043	3,013
Sablefish, pickled	196,185	6,794					196,185	6,794
Total	5,902,885	1,064,348	2,452,560	149,523	1,793,578	158,383	10,149,023	1,372,254

Industries related to the fisheries of Alaska, 1937—Continued

PRODUCTS AS PREPARED FOR MARKET—Continued

Item	Southeast Alaska		Central Alaska		Western Alaska		Total	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
CANNED								
Salmon:								
Blueback, red or sockeye	8,051,712	\$1,873,980	22,187,568	\$4,820,456	70,880,832	\$14,619,402	101,120,112	\$21,313,838
Chinook or king	1,473,264	282,133	1,518,912	341,519	342,288	66,887	3,334,464	690,539
Chum or keta	24,180,768	2,320,377	9,197,280	890,584	1,701,888	165,033	35,079,936	3,375,994
Humpback or pink	102,872,064	10,763,188	71,146,080	7,286,290		5	174,018,192	18,049,483
Silver or coho	4,249,200	738,507	2,335,392	378,378	6,624	1,030	6,591,216	1,117,915
Kippered salmon	7,536	1,794					7,536	1,794
Clams	3,432	977	405,039	239,415			408,471	240,392
Crabs	146,424	58,962	479,005	192,266			625,429	251,248
Shrimp			888	296			888	296
Total	140,984,400	16,039,938	107,270,164	14,149,204	72,931,680	14,852,357	321,186,244	45,041,499
BYPRODUCTS								
Meal:								
Salmon	1,400,000	21,000	572,000	8,151			1,972,000	29,151
Whale			660,000	8,730	1,750,000	24,075	2,410,000	32,805
Herring	15,899,608	277,997	21,732,926	351,272			37,632,534	629,269
Oil:								
Salmon	388,500	15,540	197,250	8,416			585,750	23,956
Herring	14,904,182	789,017	26,964,758	1,316,324			41,768,940	2,105,341
Whale			1,463,125	109,172	3,901,500	291,312	5,363,625	400,484
Sperm			297,375	10,801	964,500	35,031	1,261,875	45,832
Total	32,492,290	1,103,554	51,836,434	1,812,866	6,616,000	350,418	90,994,724	3,266,838
Grand total	209,362,031	20,249,985	161,841,392	16,132,077	81,341,258	15,361,158	452,544,681	51,743,220

NOTE.—The output of fresh and frozen halibut includes all fares of the Alaska fleet, some of which were landed at other than Alaska ports. The amount of livers landed by the Alaska fleet has not been reported, and the quantity shown herein is the estimated amount landed in Alaska. The total landings of halibut, other than livers, in Alaska in 1937 mounted to 8,706,204 pounds, valued at \$557,911 (including 3,000 pounds, valued at \$190, 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.....	167,744	\$1,873,980	462,241	\$4,820,458	1,476,684	\$14,619,402	2,106,669	\$21,313,838
Chinook or king.....	30,693	282,133	31,644	341,519	7,131	66,887	69,468	690,539
Chum or keta.....	503,766	2,330,377	191,610	890,584	35,455	166,033	730,832	3,375,994
Humpback or pink.....	2,143,168	10,763,188	1,482,210	7,286,290	1	5	3,625,379	18,049,483
Silver or coho.....	88,625	738,567	48,654	378,378	138	1,030	137,317	1,117,915
Kippered salmon.....	157	1,794					157	1,794
Clams.....	229	977	27,002	239,415			27,231	240,392
Crabs.....	3,051	58,982	9,979	192,266			13,030	251,248
Shrimp.....			51	296			51	296
Total.....	2,937,333	16,039,938	2,253,391	14,149,204	1,519,410	14,852,357	6,710,134	45,041,499

¹ The pack of salmon, kippered salmon, 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 5/8-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
Meal:								
Salmon..... tons	700	\$21,000	286	\$8,151			986	\$29,151
Whale..... do			330	8,730	875	\$24,075	1,206	32,805
Herring..... do	7,950	277,997	10,866	361,272			18,816	629,269
Oil:								
Salmon..... gallons	51,800	15,540	26,300	8,416			78,100	23,956
Herring..... do	1,973,891	789,017	3,595,301	1,316,324			5,569,192	2,105,341
Whale..... do			194,950	109,172	520,200	291,312	715,150	400,484
Sperm..... do			39,650	10,801	128,600	35,031	168,250	45,832
Total.....		1,103,554		1,812,866		350,418		3,266,838

WHALING ¹⁴

The history of whaling presents one of the most romantic chapters in the annals of seafaring life. Since its inception, in the Bay of Biscay early in the twelfth century, whaling has been carried on at one time or another in all the oceans of the world.

At the beginning of the eighteenth century the New England colonists became prominent in the industry, and by 1846 there were 735 American vessels engaged in the fishery.

The American fishery continued to expand and flourish until the discovery of petroleum in the United States about 1850. Due to lower production costs, the distillation products of petroleum quickly replaced whale oil for illumination purposes. In 1871 practically the entire Arctic fleet was destroyed by ice. This catastrophe, followed by the substitution of steel for whalebone, marked the end of American supremacy.

The relentless, unrestricted pursuit of these huge marine mammals led inevitably to the virtual extermination of certain species in first one sea and then another. In 1887 new impetus was given the stricken industry by the invention of the harpoon gun by a Norwegian sailor, Svend Foyn. The harpoon gun, shooting a heavy harpoon with an exploding bomb, and mounted on the bow of fast boats of 100 to 150 tons, made it possible to capture the large finback, blue, sei, and humpback whales, which previously had been too speedy and dangerous to hunt. A few years later a violent controversy, which culminated in a successful protest by the Norwegian cod fishery, closed Norwegian waters to whaling (Norwegian Fisheries Act of Jan. 7, 1904). This led to the exploitation of distant fields, the establishment of new shore stations, and ultimately to the introduction of the huge modern factory ship. With the advent of the factory ship the Antarctic, hitherto unexplored, was invaded.

Shortly after the beginning of the twentieth century, oil chemists learned the manner of converting whale oil into hardened fat. Later, the World War created a demand for glycerine and once more whale oil returned as an important product of commerce.

By 1930 Antarctic whaling had developed to such amazing proportions that for the first time leaders in the industry were forced to heed the warnings of eminent biologists and conservationists who had long followed with misgivings this unremitting warfare against these creatures. In 1931 the League of Nations provided for a committee of experts to consider the question. This committee adopted a Convention for the Regulation of Whaling. The Convention was signed by 26 nations, including the United States. In the United States, the Whaling Treaty Act of May 1, 1936, and the Joint Regulations of the Secretary of the Treasury and the Secretary of Commerce, of October 9, 1936, promulgated thereunder, gave effect to this Convention.

An International Whaling Conference, held in London, England, on June 8, 1937, drafted an Agreement to supplement and extend the International Convention for the Regulation of Whaling. This agreement was ratified by the United States and the new Joint

¹⁴ This section was prepared by Ralph A. Ferrandini, Special Whaling Agent, Law Enforcement Division.

Regulations of the Secretary of the Treasury and the Secretary of Commerce were signed by the President December 20, 1938.

The original Convention and subsequent legislation, among other things, prohibited the killing of right and gray whales; set definite limits on various other species, required the licensing of all shore stations, factory ships, and killer boats, and the collection of statistical and biological data on all whales killed.

In general it may be stated that there are virtually two groups of whales. All have their young in the tropical waters; then, accompanied by their calves, one group migrates to the Antarctic and the other to the Arctic. The Northern group leaves the tropical waters of the Caribbean Sea and Lower California in the spring or early summer, travels to the Arctic Seas, and returns along the same general route in the fall. Thus, whaling in Northern waters usually starts in May or June and ends in October.

The seasons are reversed in the Southern Hemisphere; therefore, the Southern group leaves the tropical waters off the coasts of Africa, South America, and Australia in the Antarctic spring, i. e., October, migrates to the Antarctic polar seas during the Antarctic summer and returns to tropical waters in autumn (March and April). Whaling in the Antarctic is restricted to a definite season. The season opens December 8 and closes March 7. During 1937-38 the season was extended to March 15.

The American whaling industries operated for the first time under these new regulations during the 1937-38 season. The value of the whale products are conservatively estimated at \$6,000,000, and fees for whaling licenses yielded \$10,250 to the Federal Government.

A Coast Guard inspector was assigned to each shore station and factory ship. Uniform methods for the collection of statistical and biological data were inaugurated by the Bureau of Fisheries. Samples of stomach contents were taken when practicable and a comprehensive report containing the results of the analyses of stomach contents, as well as detailed information concerning all American whaling operations, was prepared by the Bureau and forwarded through the State Department to the International Bureau for Whaling Statistics, Oslo, Norway.

The following tables show the extent of American participation in whaling during the 1937-38 season, as well as the total production of whale products by areas:

Whaling, 1937-38¹
OPERATING UNITS: BY AREAS

Area	Shore stations		Factory ships		Killer boats		Total persons employed
	Number	Persons employed	Number	Crew	Number	Crew	
Alaska.....	2	129	1	215	6	69	198
Antarctic.....			2	328	9	121	336
West Australia.....			1	31	15	198	524
California.....					2	22	53
Total.....	2	129	3	(²)	28	(²)	(²)

¹ Includes the operations of shore stations, factory ships, and killer boats licensed by the United States.

² Exclusive of duplication.

³ Data on total persons employed, exclusive of duplication, not available.

NOTE.—Data on the operations of plants in Alaska and California are for the summer of 1937, while those for West Australia and the Antarctic are for the winter of 1937-38.

Whaling, 1937-38—Continued

CATCH: BY SPECIES AND AREAS

Area	Blue	Hump-back	Sperm	Finback	Sei	Right	Total
	Number	Number	Number	Number	Number	Number	Number
Alaska.....	45	104	56	170	1		376
Antarctic.....	554	47		937		1	1,639
West Australia.....		3,242	3	1			3,246
California.....	8	3		14	12		37
Total.....	607	3,396	59	1,122	13	1	5,198

PRODUCTS MANUFACTURED: BY AREAS

Area	Oil	Meat		Meal	
		Fresh	Frozen	Meat	Bone
		Pounds	Pounds	Tons	Tons
Alaska.....	Barrels 15,698			770	435
Antarctic.....	111,444				
West Australia.....	125,044				
California.....	1,010	488,500	136,400		10
Total.....	253,166	488,500	136,400	770	445

OPERATING UNITS: ALASKA

Station, factory ship or killer boat	Type of license	Length, feet	Tonnage		Number men in crew
			Gross	Net	
Akutan.....	Shore station.....				70
Kortik.....	Killer boat.....	100	148	101	11
Unimak.....	do.....	100	148	101	11
Paterson.....	do.....	87.3	120	81	12
Port Hobron.....	Shore station.....				59
Moran.....	Killer boat.....	87.3	120	77	11
Aberdeen.....	do.....	88	116	59	12
Tanginak.....	do.....	97.9	151	71	12
Total.....			803	490	198

OPERATING UNITS: ANTARCTIC

S. S. Ulysses.....	Factory ship.....	514	10,781	6,791	215
H. J. Bull.....	Killer boat.....	151	569	204	16
Kos I.....	do.....	115.7	248	88	13
Kos II.....	do.....	115.7	248	88	13
Kos VI.....	do.....	115.7	248	88	13
Kos VII.....	do.....	115.7	248	88	13
Kos IX.....	do.....	115.1	248	84	13
Kos XI.....	do.....	119.7	258	93	13
Kos XIV.....	do.....	119.7	258	93	13
Kos XXIII.....	do.....	143.5	353	125	14
Total.....			13,469	7,742	336

Whaling, 1937-38—Continued

OPERATING UNITS: WEST AUSTRALIA

Station, factory ship or killer boat	Type of license	Length, feet	Tonnage		Number men in crew
			Gross	Net	
S. S. Frango.....	Factory ship.....	400.8	6,331	3,869	116
Thorfinn.....	Killer boat.....	115.7	249	84	13
Hauken.....	do.....	111.9	251	86	13
Femern.....	do.....	116.3	257	87	13
Gvas II.....	do.....	111.9	251	86	13
Pol I.....	do.....	111.8	205	67	13
Pcl V.....	do.....	111.2	221	83	13
S. S. Ulysses.....	Factory ship.....	514	10,781	6,791	210
Kos I.....	Killer boat.....	115.7	248	88	13
Kos II.....	do.....	115.7	248	88	13
Kos IX.....	do.....	115.1	248	84	13
Hval I.....	do.....	109.8	221	77	13
Ross I.....	do.....	111.2	221	83	13
A-N I.....	do.....	109.4	223	76	13
A-N IV.....	do.....	110.1	223	81	13
A-N V.....	do.....	116.8	246	108	13
H. J. Bull.....	do.....	151	569	204	16
Total.....			20,993	12,042	524

OPERATING UNITS: CALIFORNIA

S. S. California.....	Factory ship.....	194.7	953	475	31
Hawk.....	Killer boat.....	93.2	113	29	11
Port Saunders.....	do.....	92.7	112	12	11
Total.....			1,178	516	53

CATCH: ALASKA

Species	Male	Female	Total animals	Males per 100 females	Average size	
					Male	Female
					Feet	Feet
Blue.....	25	20	45	125	76.2	77.7
Humpback.....	51	53	104	96	38.8	40.3
Sperm.....	56		56		48	
Finback.....	95	75	170	127	57.8	58.5
Seal.....		1	1			48
Total.....	227	149	376			

CATCH: ANTARCTIC

Blue.....	276	278	554	99	78.7	81.4
Humpback.....	20	27	47	74	37.9	41.5
Finback.....	500	437	937	114	67.1	70.2
Right.....	1		1		45	
Total.....	797	742	1,539			

CATCH: WEST AUSTRALIA

Humpback.....	2,069	1,173	3,242	176	39.3	40.2
Sperm.....	3		3		46.5	
Finback.....	1		1		57	
Total.....	2,073	1,173	3,246			

* Operated in Antarctic after close of season in West Australia.
 † Taken for scientific purposes.

U. S. BUREAU OF FISHERIES

Whaling, 1937-38—Continued

CATCH: CALIFORNIA

Species	Male	Female	Total animals	Males per 100 females	Average size	
					Male	Female
	Number	Number	Number	Number	Feet	Feet
Blue.....	2	6	8	33	75	71.3
Humpback.....	1	2	3	50	45	41.5
Finback.....	5	9	14	55	55	55.7
Sel.....	5	7	12	71	45	47.2
Total.....	13	24	37			

CATCH: UNDER-SIZED HUMPBACK WHALES⁴

Whaling area	Male	Female	Total animals	Average size		Smallest killed	
				Male	Female	Male	Female
	Number	Number	Number	Feet	Feet	Feet	Feet
Alaska.....	8	4	12	32.6	32.2	29	30
Antarctic.....	3	1	4	32.3	30	30	30
West Australia.....	53	63	116	30.6	31.4	25	25
Total.....	64	68	132				

⁴ In addition 7 under-sized finback whales consisting of 4 males, averaging 47.75 feet in length, and 3 females, averaging 47.66 feet in length, were taken in Alaska waters.

STATISTICAL SURVEY PROCEDURE

In order that those who use the statistical data contained in this 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. Complete data on the catch and operating units for all sections, excluding the Mississippi River and its tributaries, 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 by-products surveys. Complete general canvasses were made of the Chesapeake and Pacific States for the years from 1933 to 1937, inclusive, the New England and Middle Atlantic States for 1933, 1935, and 1937, and the South Atlantic, Gulf, and Lake States for 1934, 1936, and 1937. Complete data on the catch of the fisheries of the Lake States were also collected for 1933 and 1935.

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, 1935, and 1937. 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, 1935, and 1937. 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, and for all the years from 1929 to 1937, inclusive. 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, 1934, 1936, and 1937. 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 1937, 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 1937, 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 1937, 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 1937, inclusive, and of the fisheries of the Mississippi River between Lakes Pepin and Keokuk for the years 1929 to 1937, 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. In the main they are college graduates and were recruited through civil-service examination. While in college, many 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 motorboats, 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 data on 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 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 vessels, 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.

Statistics on the quantity of gear operated indicate the maximum number of units fished at any one time during the year. Gear carried in reserve for replacement is not enumerated.

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 required 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 motortrucking 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 groundfish, 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 lands 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 United States 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.

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 1937, 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 1937, inclusive, while data for the shad fishery of the Potomac River are available for 1896, 1901, 1904, 1909, 1915, and from 1919 to 1937, inclusive. Statistics of the alewife fishery of the Potomac River are available for 1896, 1909, 1915, and from 1919 to 1937, 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 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 1937, 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 1937, 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 classifications, 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 1937, 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, or 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

State	Capacity of State bushel	Variation from U. S. standard bushel		Market oysters	
		Cubic inches	Percent	Yield per State bushel	Yield per standard bushel
				Pounds of meats	Pounds of meats
Massachusetts	2,150.4	.....	.....	6.57	6.57
Rhode Island	2,150.4	.....	.....	7.05	7.05
Connecticut	2,150.4	.....	.....	7.70	7.70
New York	2,150.4	.....	.....	7.00	7.00
New Jersey	2,257.3	+106.9	+5.0	6.05	5.76
Delaware	2,257.3	+106.9	+5.0	7.00	6.67
Maryland	2,801.5	+651.1	+30.3	5.98	4.59
Virginia	3,003.4	+853.0	+39.7	6.06	4.34
North Carolina	2,801.9	+651.5	+30.3	5.52	4.24
South Carolina	4,071.6	+1,921.1	+49.3	5.87	3.10
Georgia	5,343.9	+3,193.5	+148.5	6.21	2.50
Florida	3,214.1	+1,063.7	+49.4	5.49	3.67
Alabama	2,826.2	+675.8	+31.4	5.13	3.90
Mississippi	2,826.2	+675.8	+31.4	4.95	3.78
Louisiana	2,148.4	-2.0	-.1	4.09	4.09
Texas	2,700.0	+549.6	+25.6	5.64	4.49

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 State bushel

State	Clams, hard	Clams, soft	Clams, surf	Clams, razor	Mus-sels, sea	Peri-winkles and cockles	Scal-lops, bay	Scal-lops, sea	Conchs
Maine	11	15			12	18	6	6	
New Hampshire		15							
Massachusetts	11.01	14.15	17	30.2		18	6.07	6	
Rhode Island	12	20	12		13	18	6.19	6	
Connecticut	12.12	20					6.2		19.75
New York	8	16	12		10		5	6	18
New Jersey	8.07	20	17.8					6	
Delaware	10				12				
Maryland	8								
Virginia	8				12			6	
North Carolina	8						7.68		
South Carolina	8								
Florida	8						4.17		

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 (Connecticut, Rhode Island, New York, Delaware, Maryland, and Virginia). To convert number of crabs to weight in pounds, divide by 4.
 - Crabs, soft and peelers (North Carolina). To convert number of crabs to weight in pounds, divide by 7.
 - Crabs, soft and peelers (Louisiana). To convert number of crabs to weight in pounds, divide by 2.96.
 - Crabs, soft and peelers (other States). To convert number of crabs to weight in pounds, divide by 3.
 - Crabs, hard (Maine)..... To convert number of crabs to weight in pounds, divide by 3.32.
 - Crabs, hard (Massachusetts)..... To convert number of crabs to weight in pounds, divide by 4.
 - Crabs, hard (Connecticut)..... To convert number of crabs to weight in pounds, divide by 2.8.
 - Crabs, hard (North Carolina). To convert number of crabs to weight in pounds, divide by 2.95.
 - Crabs, hard (South Carolina). 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 2.08.
 - Crabs, hard (Alabama and Georgia). To convert number of crabs to weight in pounds, divide by 2.1.
 - Crabs, hard (Mississippi).... To convert number of crabs to weight in pounds, divide by 2.09.
 - Crabs, hard (Louisiana)..... To convert number of crabs to weight in pounds, divide by 2.16.
 - Crabs, hard (Texas)..... To convert number of crabs to weight in pounds, divide by 1.96.
 - Crabs, hard (other Atlantic Coast States). To convert number of crabs to weight in pounds, divide by 3.

Crustaceans—Continued	
Crabs, rock.....	To convert number of crabs to weight in pounds, divide by 10.
Crabs, stone.....	To convert number of crabs to weight in pounds, multiply by 1.2.
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 7.
Medium and small wool.....	To convert number of bunches to weight in pounds, multiply by 3.
Wool rags.....	To convert number of bunches to weight in pounds, multiply by 4.5
Grass.....	To convert number of bunches to weight in pounds, multiply by 1.5.
Wire and yellow.....	To convert number of bunches to weight in pounds, multiply by 2.

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).....	<i>Germo alalunga.</i>
Alewife.....	{Branch herring, wall-eyed or big-eyed herring.	<i>Pomolobus pseudoharengus.</i>
Amberjack.....	{Blueback, glut herring.....	<i>Pomolobus eschscholtzi.</i>
Anchovy.....		<i>Berlola species.</i>
Angelfish.....		{ <i>Engraulis mordax.</i>
Barracuda.....		{ <i>Anchoiella delicatissima.</i>
Black bass.....	{Smallmouth bass.....	{ <i>Anchoiella compressa.</i>
Bluefish.....	{Largemouth bass.....	{ <i>Pomacanthus arcuatus.</i>
Blue pike.....	Tailor.....	{ <i>Holacanthus isabelita.</i>
Blue runner or hardtail.....	Pike perch, blue pickerel (Canada).....	<i>Sphyræna argentea.</i>
Bonito.....	Runner.....	<i>Micropterus dolomieu.</i>
Bowfin.....		<i>Micropterus salmoides.</i>
Buffalofish.....		<i>Pomatomus saltatrix.</i>
Butterfish.....		<i>Stizostedion glaucum.</i>
Burbot.....	Lawyer, ling.....	<i>Caranx crysos.</i>
Cabio.....	Coalfish, crab eater, cobia.....	{ <i>Sarda sarda.</i>
Cabrilla.....	Rock bass.....	{ <i>Sarda chilensis.</i>
		<i>Amia calva.</i>
		<i>Ictiobus species.</i>
		<i>Peronotus triacanthus.</i>
		<i>Lota maculosa.</i>
		<i>Rachycentron canadus.</i>
		<i>Epinephelus analogus</i> (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
Carp	German carp	<i>Cyprinus carpio</i> . (<i>Ameiurus</i> species.)
Catfish and bullheads		<i>Ictalurus</i> species. <i>Leptost. olivaris</i> .
Cero	Painted mackerel	<i>Scomberomorus regalis</i> .
Chub	Tullibee in Canada; longjaw, bluefin, blackfin in United States.	All <i>Leucichthys</i> except <i>artedi</i> (in Great Lakes).
Cigarfish	Scad	<i>Decapterus punctatus</i> .
Cisco	Herring in Canada	<i>Leucichthys artedi</i> (Lake Erie only).
Cod	Codfish	(<i>Gadus macrocephalus</i> (Pacific coast). <i>Gadus callarias</i> (Atlantic coast). <i>Pomoxis annularis</i> . <i>Pomoxis sparoides</i> .)
Crappie	{ White crappie. Black crappie, strawberry bass, calico bass.	<i>Caranx hippos</i> . <i>Micropogon undulatus</i> .
Crevalle		<i>Tautoglabrus adspersus</i> .
Croaker	Crocus, hardhead	<i>Brosme brosme</i> .
Cunner	Chogset, blue perch, bergail	<i>Sebastes parkeri</i> .
Cusk		<i>Coryphaena hippurus</i> .
Dolly Varden trout	Salmon trout, bull trout	
Dolphin		
Drum:		
Black		<i>Pogonias cromis</i> .
Red	Channel bass, redfish, spotted bass	<i>Sciaenops ocellatus</i> .
Eel:		
Common		<i>Anguilla rostrata</i> .
Couger		<i>Leptocephalus conger</i> .
Flounder:		
Gray sole		<i>Glyptocephalus cynoglossus</i> .
Lemon sole		<i>Pseudopleuronectes dignabilis</i> . <i>Limanda ferruginea</i> . <i>Hippoglossoides platessoides</i> .
Yellowtail and dab		<i>Pseudopleuronectes americanus</i> . <i>Paralichthys dentatus</i> .
Blackback		<i>Pleuronectidae</i> species (Pacific coast).
Fluke		<i>Paralichthys californicus</i> .
" Sole"		<i>Pleuronectidae</i> species.
California halibut		<i>Cypsilurus californicus</i> .
Unclassified		<i>Auzis thazard</i> . <i>Tylosurus</i> species.
Flyingfish		<i>Dorosoma cepedianum</i> .
Frigate mackerel	"Boo Hoo"	<i>Carassius auratus</i> . <i>Lophius piscatorius</i> .
Garfish		<i>Squalus sucklii</i> (Pacific coast).
Gizzard shad	Nanny shad, mud shad	<i>Squalus acanthias</i> .
Goldfish	Sand perch	<i>Mustelus mustelus</i> .
Goosefish	Allmouth	(<i>Ephinephelus</i> species.)
Grayfish	{ Dogfish. Spiny dog. Smooth dog	<i>Myceteropercia</i> species. <i>Haemulon</i> species.
Grouper	"Sea bass"	<i>Melanogrammus aeglefinus</i> .
Grunt	Margatefish, sailors choice (Key West)	<i>Urophycis</i> species (Atlantic coast).
Haddock	{ Squirrel hake, Boston hake, ling, black hake, mud hake. Merluccio	<i>Merluccius productus</i> (Pacific coast). <i>Hippoglossus hippoglossus</i> .
Hake		<i>Orthodon microlepidotus</i> (Pacific coast). <i>Peprilus aletoidotus</i> .
Halibut		
Hardhead		
Harvestfish	Starfish, dollarfish, pappyfish, butterfish (N. C.)	
Herring:		
Lake	Herring	<i>Leucichthys artedi</i> (Great Lakes, except Erie).
Round		<i>Eyrumeus sadina</i> . (<i>Clupea harengus</i> (Atlantic coast). <i>Clupea pallasii</i> (Pacific coast). <i>Argentina silus</i> .)
Sea		<i>Pomolobus mediocris</i> . <i>Achirus fasciatus</i> .
Herring smelt	Sea smelt	<i>Lachnolaimus maximus</i> (Florida). <i>Trachurus symmetricus</i> .
Hickory shad	Tailor shad, skip	<i>Promicrops itaiara</i> . <i>Scomberomorus cavalla</i> (Atlantic coast). <i>Scomberomorus regalis</i> (Atlantic coast). <i>Geyonemus lineatus</i> (California). <i>Menticirrhus</i> species.
Hogchoker		<i>Cristiomer mamayush</i> .
Hogfish	Capitaine, perro perro	<i>Petromyzon marinus</i> .
Horse mackerel	{ Pacific. Atlantic—(See tuna.)	<i>Anumodytes americanus</i> . <i>Ophiodon elongatus</i> .
Jewfish		<i>Scomber scombrus</i> (Atlantic coast). <i>Scomber diego</i> (Pacific coast).
Kingfish	{ King mackerel, cero Little roncador, croaker	
King whiting	Northern whiting, kingfish, sea mink	
Lake trout		
Lamprey		
Launce	Sand eel, fant, sand launce	
"Linecod"	Cultus cod, blue cod, buffalo cod, ling	
Mackerel		

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
Marlin	Spearfish	<i>Tetrapturus mitsukurii</i> (Pacific coast).
Menhaden	Mossbunker, pogy, fatback	<i>Brevoortia tyrannus</i> .
Minnow		Cyprinidae species.
Mojarra		Gerridae species.
Mooneye	Toothed herring	Hiodon species.
Moonfish		<i>Vomer setipinnis</i> .
Mullet	Jumping mullet	<i>Selene vomer</i> .
Mummichog	Mayfish, killifish	Mugil species.
Muttonfish		Fundulus species.
Paddlefish	Spoonbill cat	<i>Lutjanus analis</i> .
Perch (California)	See surffishes.	<i>Polyodon spathula</i> .
Permit	See pompano.	
Pigfish	Hogfish (N. C.)	
Pike or pickerel	Great Lakes pike	<i>Orthopristis chrysopterus</i> .
Pilchard	Sardine	<i>Esox reticulatus</i> .
Pilotfish		<i>Esox lucius</i> .
Pinfish	Bream, salt-water bream	<i>Sardinia caerulea</i> .
Pollock	Permit, great pompano	<i>Naucrates ductor</i> .
Pompano		<i>Seriola</i> species.
Porgy	Porgee	<i>Lagodon rhomboides</i> .
Porkfish	Sisl	<i>Pollachius virens</i> .
Quillback	Spearfish or skimpfish	<i>Trachinotus goodii</i> .
Roach	Golden Shiner	<i>Trachinotus</i> species (Atlantic coast).
Rock bass	Redeye, goggle-eye	<i>Palometa simillima</i> (Pacific coast).
Rockfish	Groupers	Calamus species.
Rosefish	Rock cod	<i>Ariachromis virgineus</i> .
Rudderfish	Blue bass, greenfish	Carpilodes species.
Sablefish	Halfmoon	<i>Notemigonus crysoleucas</i> .
Salmon:	Black cod	<i>Ambloplites rupestris</i> (Mississippi River to Atlantic seaboard).
Atlantic		<i>Paralabrax nebulifer</i> (Pacific coast).
Pacific:		<i>Sebastes</i> species (Pacific coast).
Blueback, red or sockeye.		<i>Sebastes marinus</i> .
Chinook or king		<i>Girella nigricans</i> (Pacific coast).
Chum or keta		<i>Medialuna californiensis</i> (Pacific coast).
Humpback or pink.		<i>Anoplopoma fimbria</i> .
Silver or coho		<i>Salmo salar</i> (Atlantic coast).
Steelhead	(See steelhead trout.)	
Sauger	Sand pike	<i>Oncorhynchus nerka</i> .
Sculpin		<i>Oncorhynchus tshawytscha</i> .
Scup		<i>Oncorhynchus keta</i> .
Sea bass	Paugy or porgy, fair maid	<i>Oncorhynchus gorbuscha</i> .
Black jowfish or black sea bass		<i>Oncorhynchus kisutch</i> .
Black sea bass, blackfish		<i>Stizostedion canadense</i> .
White sea bass		Cottidae species.
Gafftopsall		Stenotomus species.
Sea catfish		<i>Stereolepis gigas</i> (Pacific coast).
Sea robin		<i>Centropristea striatus</i> (Atlantic coast).
Shad		<i>Cynoscion nobilis</i> (Pacific coast).
Shark	American shad	<i>Bagre marina</i> .
		Prionotus species.
		<i>Aloea sapidiastima</i> .
		Carcharodon species; Mustelus species;
		Carcharhinus species; Sphyrna species.
		<i>Archosargus probatocephalus</i> (Atlantic coast).
		<i>Archosargus unimaculatus</i> (Florida).
		<i>Aplodinotus grunniens</i> (fresh water).
		<i>Pimelomelopus pulcher</i> .
		<i>Bairdiella chrysura</i> .
		Mendia species.
		Raja species.
		<i>Scomberesox saurus</i> .
		<i>Omerus mordax</i> (Atlantic coast).
		Argentinidae species (Pacific coast).
		<i>Thaleichthys pacificus</i> .
Sheepshead		
Sheepshead, California	Drum, fresh water	
Silver perch	Redfish, fathead	
Sand perch	Spearing	
Silver side		
Skate		
Rkipper	Billfish	
Smelt	Eulachon	
Snapper:		
Mangrove	Gray snapper	<i>Lutjanus griseus</i> .
Red		<i>Lutjanus blackfordii</i> .
Snook	Robalo, sergeantfish	<i>Centropomus undecimalis</i> .
Spadefish	Porgy (N. C.)	<i>Chaetodipterus faber</i> .
Spanish mackerel		<i>Scomberomorus maculatus</i> .
Spittail		<i>Pogonichthys macrolepidotus</i> .
Spot	Lafayette, goody	<i>Leiostomus xanthurus</i> .
Squawfish	Sacramento pike	<i>Ptychocheilus grandis</i> .

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
Squeteague:		
Gray	Gray trout, weakfish, trout	<i>Cynoscion regalis</i> .
Spotted	Spotted weakfish, spotted trout	<i>Cynoscion nebulosus</i> .
White	Sand trout	<i>Cynoscion arenarius</i> .
Squirrel hake	(See hake.)	
Steelhead trout	Salmon trout	<i>Salmo gairdnerii</i> .
Striped bass	Rockfish, rock	<i>Roccus saxatilis</i> .
Sturgeon		<i>Acipenser</i> species.
Sturgeon, shovelnose		<i>Scaphirhynchus platyrhynchus</i> .
Sucker	Fresh-water mullet	Catostomidae species.
Sunfish	Bream, perch	Centrarchidae species.
Surfsh	Perch	Embletooidae species.
Swellfish	Puffer, swell toad, balloonfish, globe-fish.	<i>Spheroides maculatus</i> .
Swordfish		<i>Xiphias gladius</i> .
Tautog	Blackfish, oysterfish	<i>Tautoga onitis</i> .
Tenpounder	Elope, big-eyed herring	<i>Elops saurus</i> .
Thimble-eyed mackerel	Bullseye	<i>Scomber callus</i> .
Tilefish		<i>Lopholatilus chamaeleonticeps</i> .
Tomcod		<i>Microgadus tomcod</i> (Atlantic coast).
Tripletail		<i>Microgadus proximus</i> (Pacific coast).
Tullibee	(See chub.)	<i>Lobotes surinamensis</i> .
Tuna and tunalike fishes:		
Albacore	Longfin tuna	<i>Germo alalunga</i> .
Bluefin	Tuna	<i>Thunnus caliensis</i> .
Bonito		<i>Thunnus thynnus</i> .
Skipjack	Striped tuna	<i>Thunnus secundadorsalis</i> .
Yellowfin		<i>Sarda sarda</i> (Atlantic coast).
Turbot	Greenland halibut	<i>Sarda chilensis</i> (Pacific coast).
Wahoo	American turbot, triggerfish	<i>Euthynnus pelayma</i> .
White bass	White lake bass	<i>Neothynnus macropterus</i> .
Whitebait	Small fry of several species.	<i>Reinhardtius hippoglossoides</i> (off New England).
Whitefish:		<i>Pallies carolinensis</i> (off Florida).
Common		<i>Acanthocybium solandri</i> .
Menominee		<i>Roccus chrysops</i> .
White perch		<i>Coregonus clupeiformis</i> (Great Lakes).
Whiting	Silver hake	<i>Caulolatilus princeps</i> (Pacific coast).
Wolfsh		<i>Prosopium quadrilaterale</i> .
Yellow perch		<i>Morone americana</i> (Atlantic coast).
Yellow pike	Wall-eyed pike, pike perch, dore	<i>Merluccius bilinearis</i> .
Yellowtail		<i>Anarhichas lupus</i> .
Crab:		<i>Perca flarescens</i> .
Hard	Hard-shell crab, blue crab	<i>Sizostedion vitreum</i> .
Soft and peelers	Dungeness crab	<i>Ocyurus chrysurus</i> (Atlantic coast).
King	Rock crab, hard crab	<i>Seriola dorsalis</i> (Pacific coast).
King or horsehoe	Soft-shelled crab, blue crab	<i>Callinectes sapidus</i> .
Rock		<i>Paralithodes camtschatica</i> (Pacific coast).
Stoue		<i>Limulus</i> (Atlantic coast).
Crawfish:		<i>Cancer irroratus</i> .
Fresh water	Crayfish	<i>Menippi mercenaria</i> .
Sea	Rock lobster, crayfish	<i>Cambarus</i> species (Atlantic coast).
Lobster:		<i>Astacus</i> species (Pacific coast).
Common		<i>Panulirus argus</i> (Atlantic coast).
Spiny	(See sea crawfish.)	<i>Panulirus interruptus</i> (Pacific coast).
Shrimp		<i>Homarus americanus</i> (Atlantic coast).
Abalone		<i>Peneus setiferus</i> .
		<i>Peneus brasiliensis</i> (Atlantic and Gulf coasts).
		<i>Pandalus</i> species (Pacific coast).
		<i>Pandalopsis</i> species (Pacific coast).
		<i>Crangon</i> species (Pacific coast).
		<i>Halotis</i> 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
Clam:		
Cockle	Butter	<i>Cardium corbis</i> (Pacific coast). <i>Saxidomus nuttall</i> .
Hard	Round clam, cherrystone, quahog, little neck.	<i>Tivela stultorum</i> (Pacific coast). <i>Venus mercenaria</i> (Atlantic coast). <i>Venus mortoni</i> (Florida coast). <i>Tivela stultorum</i> (Pacific coast).
Pismo		<i>Ensis</i> species (Atlantic coast).
Razor		<i>Siliqua patula</i> (Pacific coast).
Soft	Soft shell clam, sand clam, nannynose, maninose.	<i>Mya arenaria</i> .
Surf	Skimmer	<i>Macra solidissimo</i> .
Cockle	Moonshell	<i>Natica heros</i> (Atlantic coast).
Conch		<i>Strombus</i> species. <i>Busycos</i> species.
Coquina	Pompano shells	<i>Donax variabilis</i> .
Mussel:		
Sea		<i>Mytilus californianus</i> (Pacific coast). <i>Mytilus edulis</i> . Quadrula species. Lampsilis species. Unio species. Symphynota species.
Fresh water		<i>Octopus punctatus</i> (Pacific coast).
Octopus		
Oyster:		
Eastern		<i>Ostrea virginica</i> .
Western	Olympia	<i>Ostrea lurida</i> (Pacific coast).
Japanese (introduced)	Pacific	<i>Ostrea giga</i> .
Periwinkle		Littorina species.
Scallop:		
Bay		<i>Pecten irradians</i> (Atlantic coast).
Sea		<i>Pecten aequilicatus</i> (Pacific coast). <i>Pecten magellanicus</i> .
Squid		<i>Loligo opalescens</i> (Pacific coast). <i>Loligo pealei</i> (Atlantic coast).
Sea urchin		Echinoidae class.
Starfish		Asteroidae class.
Terrapin	Diamond-back terrapin	<i>Malaclemmys</i> species.
Turtle:		
Green		<i>Chelonia mydas</i> .
Loggerhead		<i>Thalassochelys caretta</i> .
Hawksbill		<i>Chelonia inebriata</i> .
Snapping	Hard shell, alligator turtle	<i>Chelydra serpentina</i> .
Soft shell		<i>Macrochelys lacertina</i> . Trionyx species.
Frog		Rana species.
Irish moss		<i>Chondrus crispus</i> .
Kelp		Macrocystis species; Nerocystis species; Pelagophycus species; Alaria species.
Bloodworm		<i>Glycera dibranchiata</i> .
Sandworm		<i>Nereis virens</i> .
Sponge:		
Glove		<i>Spongia graminea</i> (Hyatt) <i>Euspongia officianalis</i> (L.).
Grass		<i>Hippospongia equina cerebriformis</i> .
Sheepswool		<i>Hippospongia canaliculata gossypina</i> .
Yellow		<i>Hippospongia equina elastica</i> .
Trepang	Sea cucumber	<i>Cucumaris frondosa</i> . <i>Thyone briareus</i> .

U. S. DEPARTMENT OF COMMERCE
HARRY L. HOPKINS, Secretary
BUREAU OF FISHERIES
CHARLES E. JACKSON, Acting Commissioner

Administrative Report No. 38

PROPAGATION AND DISTRIBUTION OF FOOD FISHES

FISCAL YEAR 1939

By GLEN C. LEACH, M. C. JAMES
and E. J. DOUGLASS

APPENDIX IV TO REPORT OF COMMISSIONER OF FISHERIES
FOR THE FISCAL YEAR 1939



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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 1939¹

By GLENN C. LEACH, *Chief*, M. C. JAMES, *Assistant Chief*, and E. J. DOUGLASS, *Superintendent of Distribution, Division of Fish Culture*

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INTRODUCTION

In announcing the gross production of 8,024,540,685 fish and eggs at Federal fish hatcheries during the fiscal year 1939, the Bureau recognizes that the significance of such a contribution is obscured without further analysis in the form of a report of hatchery production in terms of pounds of fish. However, no such treatment can be followed in handling the billions of fry and eggs of commercial marine species, but it is expected to place in operation during the fiscal year 1940 a system of weighing all the game fish distributed. Again, the production of a few hundred thousand fry or fingerlings of a species which is subject to intense fishing pressure, such as certain species of Pacific salmon, is of greater importance than the distribution of millions of fish of lesser economic value, such as the yellow perch.

It may well be asked why these figures are not reversed and maximum production maintained with the varieties which exhibit the greatest need for restorative measures. This question can be answered by pointing out that, broadly speaking, artificial propagation must be

¹ Administrative Report No. 38, Appendix IV to the Report of the U. S. Commissioner of Fisheries for the fiscal year 1939. Approved for publication April 23, 1940.

geared to the egg supply, and a depleted species is its own limiting factor upon the scope of artificial replenishment measures.

Fish-cultural technology extends from the production of an entirely "synthetic" fish, such as game trout, to a process of byproduct recovery as exemplified in the propagation of shad. A brook trout may be hatched from an egg obtained from a domesticated brood stock held at a private commercial hatchery and may be reared to a size permitting its capture by the angler immediately after its release from the hatchery. This is a synthetic but definite increment of a recreational resource.

On the other hand, migrating shad, when caught for market, may be carrying over 30,000 mature eggs which can be incubated in a hatchery and released as fry. The survival ratio of these fry cannot now be accurately determined, but it is known that without the intervention of the hatchery, the reproductive contribution of the parent fish would be zero.

Hatcheries have failed to stem the depletion of certain species, such as the whitefish, but their role as an elemental factor in conserving the majority of the food and game species is widely conceded. The administration of this activity requires attention to the methods and technique of hatching, rearing, feeding, and transporting fish; to the maintenance and upkeep of the physical plant and equipment; and to the construction of new facilities. The year under review has shown tangible progress in all these aspects. While it has been possible to continue the services rendered to the general public by the stocking of public waters, much of the increased production attained in recent years has been diverted to maintaining the stock of fish in areas under direct Federal ownership or control.

Complete transition to this type of activity is not anticipated, however, as long as the present unbalanced ratio between fishing demand and fish populations in State waters exists. The succeeding tabulations and comments are presented with the purpose of clarifying the significance of the various types of fish-cultural functions carried on by the Bureau.

SPECIES PROPAGATED

During 1939 there were handled at the hatcheries and rescue stations 47 species, the majority of which are fresh-water types. No attempt has been made to propagate a dozen or more important food fishes which are found in the coastal waters. No practicable methods for propagating certain of these forms have been developed, and there is further doubt as to whether results would be sufficiently valuable to warrant the effort.

In addition to the varieties listed in the table, there are propagated forage fishes comprising some half dozen species of minnows and shiners. These are utilized as food for bass, etc., at the hatcheries and are not available for general distribution or listed in the production records.

No carp, humpback salmon, or Atlantic salmon were handled during the year although these forms were propagated previously. The carp were dropped because of the desire to devote available funds to the propagation of more valuable forms. The "off year" for humpback salmon made it impracticable to obtain eggs of this species and no Atlantic salmon eggs were available from any source.

Kentucky, or spotted bass were distributed for the first time, and the hatching of mackerel was resumed on a limited scale.

The hatchery records reveal interesting facts regarding the popularity of different game species. There appears to be no "All-American" fish, but the largemouth bass most closely approaches this classification. The popularity of the trouts is sectional, with the species native to the different regions rated highest in popularity in their respective sections. The smallmouth bass is highly popular although somewhat restricted in range and has, in the past, presented a production problem which is being rapidly overcome.

The commercial species which have been distributed are those which are most amenable to artificial propagation and are not necessarily those which are of the highest economic value.

Catfishes (*Siluridae*):

- Catfish (*Leptops olivaris*).
- Spotted channel catfish (*Ictalurus punctatus*).
- Bullhead (*Ameiurus nebulosus*).

Buffalofish (*Catostomidae*): Common buffaloes (*Ictiobus* sp.).

Shad and herring (*Clupeidae*):

- Shad (*Alosa sapidissima*).
- Glut herring (*Pomolobus aestivalis*).

Whitefishes and Lake herring (*Coregonidae*):

- Common whitefish (*Coregonus clupeaformis*).
- Lake herring, cisco (*Leucichthys* sp.).

Salmons and trouts (*Salmonidae*):

- Chinook, king, or quinnat salmon (*Oncorhynchus tshawytscha*).
- Chum salmon (*Oncorhynchus keta*).
- Coho salmon, silver salmon (*Oncorhynchus kisutch*).
- Red Salmon, sockeye, or blueback salmon (*Oncorhynchus nerka*).
- Landlocked sockeye salmon, silver trout (*Oncorhynchus kernerlyi*).
- Steelhead trout (*Salmo gairdnerii*).
- Landlocked salmon (*Salmo sebago*).
- Rainbow trout (*Salmo irideus*).
- Black-spotted trout, cut-throat trout (*Salmo clarki*).
- Brown or Loch Leven trout (*Salmo fario* var.).
- Lake trout, mackinaw trout (*Cristivomer namaycush*).
- Brook trout (*Salvelinus fontinalis*).
- Golden trout (*Salmo aqua-bonita*).

Grayling (*Thymallidae*): Montana grayling (*Thymallus montanus*).

Pikes (*Esoxidae*): Pike and pickerel (*Esox* sp.).

Sunfishes (*Centrarchidae*):

- Crappie (*Pomoxis annularis* and *P. sparoides*).
- Largemouth blackbass (*Micropterus salmoides*).
- Smallmouth black bass (*Micropterus dolomieu*).
- Kentucky bass (*Micropterus pseudoplites*).
- 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*).

Mojarras de rio (*Cichlidae*):

- 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 saxatilis*).
- White perch (*Morone americana*).

Cods (*Gadidae*):Cod (*Gadus callarias*).Haddock (*Melanogrammus aeglefinus*).Pollock (*Pollachius virens*).Mackerel (*Scombridae*): Common mackerel (*Scomber scombrus*).Flounders (*Pleuronectidae*): Winter flounder (*Pseudopleuronectes americanus*).Lobster (*Homaridae*): Lobster (*Homarus americanus*).

Summary, by species, of the output of fish and fish eggs during the fiscal year ending
June 30, 1939

Species	Eggs	Fry	Fingerlings	Total
Catfish		10,000	417,865	427,865
Buffalofish			800	78,682,300
Shad	78,681,500	39,323,220		39,323,220
Whitefish	32,960,000	920,000		33,880,000
Lake herring		3,000,000		3,000,000
Striped bass		1,797,950		1,797,950
Chinook salmon	5,607,200	21,812,610	26,499,400	53,889,210
Chum salmon	1,369,000	7,594,900	375,250	9,339,150
Silver salmon			716,675	716,675
Sockeye salmon	75,000		2,343,505	2,418,505
Sockeye salmon, landlocked	122,960		444,156	567,116
Steelhead trout	35,000		935,255	970,255
Landlocked salmon			5,990	5,990
Rainbow trout	4,320,850	238,140	10,402,915	14,970,905
Blackspotted trout	26,362,290	2,328,440	11,436,040	40,126,770
Loch Leven trout	77,400		1,421,035	1,498,525
Lake trout	276,280	1,636,750	103,670	2,016,700
Brook trout	5,000	1,410,500	10,308,065	11,723,565
Golden trout	6,100		71,040	77,140
Grayling	1,799,800	4,490,750	258,050	6,554,600
Pike and pickerel	1,643,150			1,643,150
Crappie			430,745	430,745
Black bass, largemouth		3,787,650	8,668,965	12,456,615
smallmouth		1,400,500	325,360	1,725,860
Kentucky bass		7,000	3,350	10,350
Rock bass			121,060	121,060
Warmouth bass			91,415	91,415
Sunfish			8,788,400	8,788,400
Rio Grande perch			175,760	175,760
Pike perch	4,271,950	330,490,000		334,761,950
White perch		4,300,000	260	4,300,260
Yellow perch		300,695,000	17,030	300,683,030
Mackerel		11,060,000		11,060,000
Cod	3,047,863,760	132,605,200		3,180,468,960
Haddock	1,172,796,700	5,768,300		1,178,565,000
Flatfish (flounder)		1,185,940,100		1,185,940,100
Pollock	1,446,519,100	50,762,700		1,497,281,800
Lobster		4,048,950		4,048,950
Total	5,824,802,070	2,115,405,660	84,332,955	8,024,540,685

PRODUCTION

The 1939 output of 8,024,540,685 fish and eggs was an insignificant reduction from the production for the previous year of 8,121,131,985. The former figure presents a yield derived almost 100 percent from the hatcheries, in comparison with the situation during previous years when an average of over 50 million fish was obtained from rescue and salvage operations. The negligible number of salvaged fish in the 1939 record is responsible for the noticeable decline in the distribution of fingerlings and larger fish. These amounted to 84,332,955 in comparison with 119,184,705 for 1938. All the fish formerly collected from the overflow areas of the upper Mississippi River were from 4 to 6 months old, and this stock must hereafter be replaced by fish reared in the hatchery ponds.

Sixteen varieties were propagated in larger numbers than during the previous year; among them the important chinook salmon, shad, lake trout, grayling, largemouth and smallmouth bass, pike perch, cod and haddock.

There was included in the total a production of 102,366,985 game and pan species, a percentage of approximately 1.3. As has been previously asserted, practically all the species propagated by the Bureau are sought by anglers to some degree. However, in designating "game and pan species" the Bureau is guided by the classifications of the State fisheries laws and by the determination of whether a given species supports an extensive commercial fishery. If such is the case, it is listed as a non-game species.

The most important point to be considered in analyzing the production records is the difference between gross and net output. The aggregate production of the individual hatcheries is greater than the actual or net plantings of fish because of the fact that transfers are made between different stations. The station hatching and shipping fish must of necessity be given credit for this production; and the station which subsequently rears and plants the fish is likewise entitled to credit for the number distributed. It is further evident that this involves a duplication in the summary or grand total. During 1939 there were 833,335 fish transferred between the stations. Deducting this from the grand total by species leaves a net distribution of 2,198,905,280 fish and 5,824,802,070 eggs as an actual increment to the fish population resulting from the Division's activities. For the same reason the record of distribution by States (see p. 596) will not check in its totals with the summary by species.

While extensive repair and improvement work was under way throughout the year at most of the stations, in very few instances did this interfere materially with the fish production. The Bureau has not as yet achieved its objective for the production of a greater proportion of trout and bass of legal size. Costs, both for fish food and personnel, as well as the increased expense of distributing larger fish, remain the chief limiting agents.

CONSTRUCTION ACTIVITIES

Shortly before the start of the fiscal year the Division received an allotment of \$808,500 from the Public Works Administration and \$544,856 from the Works Progress Administration. The former was intended largely for the procurement of materials and supplies, while the latter was solely for labor. These amounts were reallocated to the various projects as listed in the following table:

Stations receiving P. W. A. and W. P. A. allotments during the fiscal year 1939

Location	Amount of P. W. A. project	Amount of W. P. A. project	Location	Amount of P. W. A. project	Amount of W. P. A. project
Alabama: Marion.....	\$15,000	\$10,920	Iowa:		
Arkansas: Mammoth Spring.....	5,000	3,500	Fairport	\$3,000	\$1,230
California:			Guttenberg.....	30,000	13,300
Battle Creek	5,000	3,500	Manchester.....	15,000	10,000
Mill Creek	5,000	3,000	Kentucky: Louisville.....	3,500	4,306
Colorado:			Louisiana: Natchitoches.....	10,000	15,000
Creede.....	3,500		Maine:		
Leadville.....	7,500	6,500	Boothbay Harbor	5,000	2,500
Florida: Welaka.....	30,000	23,000	East Orland.....	5,000	3,600
Georgia:			Massachusetts:		
Lake Park.....	15,000	10,000	Gloucester.....	15,000	5,000
Warm Springs.....	15,000	10,000	Hartsville.....	5,000	5,000
Cohutta.....		3,000	Woods Hole.....	15,000	10,000
Idaho:			Michigan:		
Haegerman.....	10,000	5,000	Charlevoix.....	10,000	5,000
Salmon.....	5,000	5,000	Northville.....	15,000	10,000
Indiana: Rochester.....	18,000		Minnesota: Duluth.....	7,500	2,500

Stations receiving P. W. A. and W. P. A. allotments during the fiscal year 1939—
Continued

Location	Amount of P. W. A. project	Amount of W. P. A. project	Location	Amount of P. W. A. project	Amount of W. P. A. project
Mississippi: Tupelo.....	\$10,000	\$5,000	Texas—Continued.		
Missouri: Neosho.....	10,000		San Angelo.....	\$5,000	\$10,000
Montana:			San Marcos.....	5,000	5,000
Bozeman.....	10,000	5,000	Uvalde.....	15,000	10,000
Ennis.....	15,000	10,000	Utah:		
Nebraska: Crawford.....	5,000	5,000	Laketown.....	10,000	5,000
New Hampshire:			Springville.....	8,000	7,000
Nashua.....	5,000	10,000	Vermont:		
York Pond (Berlin).....	10,000	18,000	Pittsford.....	3,500	2,500
New Mexico:			St. Johnsbury.....	5,000	5,000
Dexter.....	10,000	5,000	Swanton (Lakeland).....	3,500	2,500
Santa Rosa.....	5,000	5,000	Virginia:		
New York:			Fort Belvoir.....	10,000	
Cape Vincent.....	15,000	12,400	Wytheville.....	15,000	
Cortland.....	15,000	10,000	Washington:		
North Carolina:			Big White Salmon.....	5,000	5,000
Edenton.....	5,000	2,500	Birdsview.....	10,000	10,000
Hoffman.....	12,000	3,500	Carson.....	10,000	10,000
Oklahoma: Reagan (near			Little White Salmon.....	15,000	5,000
Tishomingo).....	15,000	25,000	Quibault.....	6,000	5,000
Oregon:			Spokane.....	5,000	5,000
Butte Falls.....	15,000		West Virginia:		
Clackamas.....	15,000	12,500	Leetown.....	48,000	51,600
Pennsylvania: Lamar.....	15,000	25,000	White Sulphur Springs.....	8,000	7,000
South Carolina:			Wisconsin:		
Orangeburg.....	5,000	12,500	Genoa.....	25,000	
Walhalla.....	3,000	3,000	LaCrosse.....	10,000	5,000
South Dakota: Spearfish.....	10,000	8,000	Lake Mills.....	8,000	
Tennessee:			Wyoming: Saratoga.....	8,000	3,500
Erwin.....	10,000	5,000			
Flintville.....	7,500	17,500	Total.....	808,500	544,856
Texas:					
Fort Worth.....	40,000	20,000			
Inks Dam (Austin).....	35,000	(¹)			

¹ N. Y. A. labor furnished.

Certain supplementary W. P. A. allotments were received later in the year, increasing the amount available for labor. The work involved replacement of pipe lines; complete construction of new water-supply systems; construction, repair, and improvement of buildings; construction of ponds; installation of new equipment; and general landscaping. In some instances there was a 100-percent increase in the productive capacity of a station through such improvements.

The principal development of an entirely new nature was the construction of a pondfish hatchery at the Roy Inks Dam, on the lower Colorado River in Texas. The site was furnished by the Lower Colorado River Authority and construction was supervised by the Bureau. It was financed by a portion of the P. W. A. allotment and by the assignment of N. Y. A. labor. At the close of the year this project was virtually complete and some of the ponds were stocked with fingerling bass. The output of the establishment is planned for distribution in the series of reservoirs created on the Colorado River.

Noticeable improvements were effected at the Fort Worth (Tex.) station, where an additional tract of land was donated by the city of Fort Worth and utilized for the development of additional ponds. The Charlevoix (Mich.) Hatchery, which had been closed since 1933, was entirely rehabilitated and equipped for the rearing of lake trout fingerlings. In several instances State W. P. A. projects were also in effect and made possible additional improvements. An outstanding

example of this was at Guttenberg, Iowa, where initial work on a large-scale pondfish hatchery, within the Upper Mississippi River Wildlife and Fish Refuge, was undertaken.

Curtailment of the scope of the Civilian Conservation Corps resulted in some restriction on the construction work prosecuted by this agency for the Bureau. A limited number of assignees were held on at Lamar, Pa., but the C. C. C. development program at the York Pond (N. H.) station was terminated, although the work was continued by the utilization of other funds.

At Arcadia, R. I., development of a bass hatchery by the Bureau and the Soil Conservation Service of the Department of Agriculture continued. This had been originally started as a recreational project under the Farm Security Administration and the major part of the construction has been continued by the successor to that agency. The Bureau contributed supervision and limited funds for the purchase of materials and equipment. Due to shortage of funds the work was suspended at the close of the year with the expectation that it would be resumed early in the fiscal year 1940.

The National Park Service secured an allotment of emergency funds for the construction of a new hatchery at Creston, near Kalispell, Mont. This establishment is intended to replace the obsolete Glacier Park fish hatchery, although it is located outside the boundaries of the park itself. The work, which was started in the spring, was being prosecuted by the National Park Service, with the Bureau represented in an advisory capacity. The operation of this hatchery is to be taken over by the Bureau upon completion.

In addition to the improvements made possible by direct cash allotments to the Bureau, the Appropriation Act for 1939 carried the sum of \$155,000 providing for the construction of new hatcheries in Kansas, North Dakota, Minnesota, and Ohio. Early in the year a suitable site was located at Valley City, N. Dak., and construction work was started in the late fall. At the close of the year the hatchery was approximately 75 percent completed, although not in readiness for operation. At this point a State W. P. A. project was of material help in securing maximum returns from the appropriation available.

After a careful survey the three remaining hatcheries were designated for sites at Hebron, Ohio, Farlington, Kans., and New London, Minn. Various difficulties were encountered in acquiring clear titles to these sites, with resultant delay in starting actual construction. However, at the close of the year preparations were being made to initiate the construction phase at each of these locations, although no actual development had been undertaken. The appropriations made for these hatcheries were continued available during the fiscal year 1940.

The construction activities summarized above have resulted not only in actual increase of hatchery facilities but have also made it possible to take care of maintenance and rehabilitation work, the need for which has been accumulating over a number of years.

COOPERATION WITH OTHER CONSERVATION AGENCIES

Much of the most effective work performed during the year has been in cooperation with one or more other public or private agencies whose functions relate to the conservation of fish life. Such coordination has been applied in matters as simple as the delivery of a consignment

of fish or as complex as the development of a program for preserving the salmon run in the Columbia and the Sacramento Rivers, where the survival of the species is threatened by huge dam construction projects.

In working out the details of these various joint undertakings, frequent contact has been maintained with Federal departments, bureaus and agencies, with more than 30 State conservation departments, with several municipalities and county governments, and with innumerable sportsmen's and conservation organizations of a semi-public nature. The mechanism for coordination has consisted of broad general agreements, such as have been set up with the United States Forest Service, the National Park Service, the Tennessee Valley Authority, and several of the States. There have also been specific written agreements covering individual problems or projects as well as informal understandings reached by conference between field employees or headquarters officials. In the latter case the meetings of the National Planning Council of Fish and Game Commissioners have afforded an opportunity for channeling Federal and State fish-cultural activities toward maximum efficiency and utility.

As an indication of the manner in which conservation activities have been prosecuted on a joint basis, there are cited below various instances and examples. These do not present the full scope of such undertakings but space limitations necessitate many omissions.

The relationships maintained with the counties of Monroe and Onondaga, N. Y., for the purpose of propagating and distributing fish in local waters, have served as a model for a similar undertaking with the city of Danville, Va. Initial steps have been taken whereby the Bureau will supply fish for the maintenance of angling in lakes and streams developed by the city for hydroelectric purposes. The city will, according to plans, meet the costs of developing necessary facilities and caring for the fish.

The exchange of eggs and fish has been of material benefit, particularly in Michigan, Minnesota, and in some of the Western States, such as Oregon.

In the Tennessee Valley area three-way agreements between the Bureau of Fisheries, the Tennessee Valley Authority, and the States of Alabama, Tennessee, and North Carolina have been made effective or are being negotiated. The Tennessee Valley Authority had practically completed on June 30 a large pondfish hatchery on the Elk River in Alabama, and the Bureau was making arrangements to establish personnel and take over the operation. This is in addition to the hatchery already operated at Norris, Tenn., which is scheduled for enlargement. The fish produced at these facilities are to be distributed by the States in that part of the Tennessee Valley area which is included in the respective State boundaries.

In addition to cooperating with the National Park Service in the stocking of National Park waters, a brief reconnaissance and survey was made on the Chesapeake and Ohio Canal on the Potomac River above Washington, D. C. This property had been acquired by the National Park Service for recreational purposes, and it is expected that angling will be one of the outstanding recreational features. Agreement has been formulated whereby the Bureau will work with the Park Service in building up the angling.

In view of the tremendous responsibility of the Forest Service, of the Department of Agriculture, for the maintenance of fishing in the

national forests, there has been need for unusual cooperation with that agency. A new trout-rearing unit was under construction in the Alleghany National Forest in Pennsylvania, in accordance with plans developed and approved by the Bureau, with the expectation that the unit would be operated by this Bureau upon completion.

The North Dakota Fish and Game Department donated to the Bureau the site for the new hatchery at Valley City, and further local assistance was received by the donation of pipe, a pump, etc. The North Carolina Fish and Game Department has contacted the Bureau freely and frequently relative to mutual problems, and it has been possible to render reciprocal assistance in the propagation of shad, the selection and inspection of hatchery sites for State development, and in the distribution of trout. A very large part of the production of the Marion (Ala.) station has been transported in State distribution trucks.

At St. Louis, Mo., the city officials have approved the construction, at no cost to the Bureau, of a modern administration and service building in the Forest Park hatchery. The series of ponds in the municipal park system was taken over by the Bureau for operation shortly before the start of the fiscal year 1939, and results have been most gratifying.

The State of Minnesota exhibited splendid cooperative spirit in donating to the Bureau a tract of land, together with the water rights, for the proposed hatchery at New London, and made available the services of its surveyors and engineers in acquiring additional property. Local interests raised a sum of money for the purchase of some of the additional acreage needed for the hatchery. The same cooperative assistance was obtained in Kansas, where the State Fish and Game Department donated water rights to a State-owned lake which is to serve as the primary water supply for the hatchery ponds.

Ohio purchased and donated to the Bureau a splendid location for the new hatchery to be constructed in that State. In consideration of this courtesy the Bureau approved the relinquishment to the State of the Federal hatchery property at Put in Bay. However, such action requires Congressional sanction, and the necessary legislation had not been passed at the close of the year.

Organized sportsmen's groups throughout the country have sought technical advice on stocking problems and have submitted many applications for fish to be reared in nursery ponds sponsored and maintained by these organizations.

ASSIGNMENTS OF FISH AND FISH EGGS TO STATES, TERRITORIES, AND FOREIGN COUNTRIES

The transfer of approximately 166,000,000 fish and eggs to other fish-cultural agencies in the United States and its possessions was closely in line with the scope of such shipments in previous years. Forty States were the recipients of this form of Federal aid. In a number of cases the transfer was handled on an exchange basis, the Bureau being compensated by the State furnishing eggs or fish of needed species. The benefits in this procedure lie in the fact that many States were thus able to procure species which would be unobtainable from other sources. Also, where State hatchery facilities are limited in capacity, the Bureau's assignments have been the back-

bone of the States' stocking programs. Some lobsters were turned over to Maine for rearing in the new State rearing station. Flounder fry were allocated to New Jersey from the Woods Hole (Mass.) station. Nebraska received a few grayling eggs, which would have been difficult to obtain elsewhere.

The Bureau had a surplus of certain species in some areas and has established the policy of disposing of such surpluses to nearby States whenever possible. The assignments reported in the following table should not be confused with the listing of Distribution by States, since the latter also covers fish delivered on applications or planted directly by Bureau employees.

Assignments of fish and fish eggs to State fish commissions, fiscal year 1939

States and species	Eggs	Fry	Fingerlings, etc.	Total
Alabama:				
Black bass, largemouth		19,000	92,925	111,925
Sunfish			507,720	507,720
Arizona:				
Blackspotted trout	800,300			800,300
Grayling	100,000			100,000
Colorado:				
Blackspotted trout	1,000,000			1,000,000
Brook trout			65,650	65,650
Rainbow trout			52,250	52,250
Connecticut:				
Black bass, smallmouth		386,000		386,000
Brook trout			15,000	15,000
Rainbow trout	52,000			52,000
Florida: Black bass, largemouth		6,000	15,550	21,550
Georgia:				
Black bass, largemouth		35,970	7,280	43,250
Crappie			900	900
Sunfish			165,500	165,500
Idaho:				
Blackspotted trout	450,000		98,700	548,700
Brook trout			1,500	1,500
Rainbow trout			135,730	135,730
Sockeye salmon, landlocked	122,900		318,200	441,100
Illinois:				
Black bass, largemouth			4,000	4,000
Black bass, smallmouth		50,000		50,000
Pike perch		1,500,000		1,500,000
Sunfish			24,000	24,000
Indiana:				
Black bass, largemouth			50,500	50,500
Brook trout			75,000	75,000
Loch Leven trout			88,140	88,140
Rainbow trout			69,250	69,250
Rock bass			19,500	19,500
Sunfish			123,000	123,000
Iowa:				
Black bass, largemouth			5,355	5,355
Rock bass			1,000	1,000
Sunfish			114,940	114,940
Kentucky: Black bass, smallmouth		140,000	1,200	141,200
Maine: Lobster		46,450		46,450
Maryland:				
Black bass, largemouth			35,125	35,125
Rainbow trout			43,235	43,235
Massachusetts:				
Brook trout			75,000	75,000
Lobster		40,000		40,000
Rainbow trout	100,000			100,000
Michigan:				
Grayling	100,500			100,500
Rainbow trout	509,500			509,500
Sunfish			25,000	25,000
Minnesota:				
Black bass, largemouth			154,550	154,550
Crappie			10,125	10,125
Loch Leven trout	25,000			25,000
Rainbow trout	314,500			314,500
Sunfish			22,600	22,600
Missouri: Black bass, smallmouth		100,000		100,000

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Assignments of fish and fish eggs to State fish commissions, fiscal year 1939—Con.

States and species	Eggs	Fry	Fingerlings, etc.	Total
Montana:				
Black bass, largemouth			900	900
Blackspotted trout	2,500,800			2,500,800
Brook trout			42,600	42,600
Catfish			7,750	7,750
Crappie			1,330	1,330
Chum salmon	361,000			361,000
Golden trout			10,000	10,000
Grayling			26,700	26,700
Loch Leven trout			61,000	61,000
Rainbow trout	515,200		1,625	516,825
Nebraska:				
Grayling	25,000		2,770	27,770
Pike perch	4,000,000			4,000,000
Rainbow trout			8,500	8,500
Nevada: Chum salmon				
	252,000			252,000
New Hampshire: Brook trout				
		167,500		167,500
New Jersey:				
Flounder		11,774,000		11,774,000
Rainbow trout	155,000		17,400	172,400
New Mexico:				
Black bass, largemouth			130,525	130,525
Black bass, smallmouth			9,500	9,500
Blackspotted trout	1,100,500			1,100,500
Cattfish			9,410	9,410
Crappie			24,310	24,310
Rainbow trout	1,000,800			1,000,800
Sunfish			424,050	424,050
New York: Rainbow trout				
	240,000			240,000
North Carolina:				
Black bass, largemouth		12,500	30,650	43,150
Crappie			10,200	10,200
Rainbow trout	514,200		60,085	574,285
Striped bass		693,750		693,750
Sunfish			4,700	4,700
North Dakota:				
Black bass, largemouth			49,040	49,040
Crappie			23,470	23,470
Sunfish			19,000	19,000
Ohio:				
Black bass, largemouth			8,000	8,000
Loch Leven trout			25,000	25,000
Rainbow trout			25,150	25,150
Rock bass			7,500	7,500
Sunfish			30,000	30,000
Oregon:				
Blackspotted trout	500,100			500,100
Brook trout			385,145	385,145
Chinook salmon			40,000	40,000
Rainbow trout			140,000	140,000
Steelhead trout			63,030	63,030
Pennsylvania: Rainbow trout				
			60,000	60,000
Rhode Island: Flounder				
		121,445,000		121,445,000
South Carolina:				
Black bass, largemouth			32,900	32,900
Rainbow trout	200,000		40,000	240,000
South Dakota:				
Black bass, largemouth			14,000	14,000
Blackspotted trout			22,000	22,000
Catfish			20,800	20,800
Crappie			8,000	8,000
Loch Leven trout			12,500	12,500
Rainbow trout			60,000	60,000
Sunfish			20,000	20,000
Tennessee:				
Brook trout			6,980	6,980
Loch Leven trout	52,490			52,490
Rainbow trout			36,000	36,000
Rock bass			1,800	1,800
Sunfish			6,500	6,500
Utah:				
Black bass, largemouth			325	325
Blackspotted trout	700,400			700,400
Chum salmon	753,000			753,000
Grayling	994,300			994,300
Vermont:				
Brook trout		725,000		725,000
Virginia: Rainbow trout				
			5,990	5,990
			200,755	200,755

Assignments of fish and fish eggs to State fish commissions, fiscal year 1939—Con.

States and species	Eggs	Fry	Fingerlings, etc.	Total
Washington:				
Blackspotted trout.....	750,900		26,180	777,080
Brook trout.....			97,000	97,000
Sockeye salmon.....	75,000			75,000
Rainbow trout.....			90,345	90,345
West Virginia:				
Black bass, largemouth.....			9,250	9,250
Black bass, smallmouth.....			5,000	5,000
Crappie.....			10,610	10,610
Loch Leven trout.....			4,695	4,695
Rainbow trout.....			152,685	152,685
Sunfish.....			93,050	93,050
White perch.....			260	260
Wisconsin:				
Black bass, largemouth.....			46,700	46,700
Loch Leven trout.....			20,000	20,000
Wyoming:				
Blackspotted trout.....	4,231,300			4,231,300
Brook trout.....			15,600	15,600
Grayling.....	305,000		10,000	315,000
Rainbow trout.....			30,000	30,000
Total.....	22,804,750	137,151,170	5,227,660	165,233,580

The shipment of fish and eggs to foreign countries has been an interesting but unimportant activity of the Division for many years. While such consignments have been furnished gratis from available hatchery stocks, no expense has been incurred in forwarding the shipments. During the past year an initial shipment of 250,000 lake trout eggs was sent to Peru, as a start on a program of establishing this species in Lake Titicaca. Due to insufficient time for the necessary preparation and scheduling of the shipment, the eggs were a total loss. Rainbow eggs were sent to England as a means of introducing new blood into the existent stocks of the species in that country. Rainbow trout eggs and fry were sent to Costa Rica and Colombia as an experiment, with little success. As usual, rainbow eggs were forwarded to Puerto Rico in line with plans to develop angling as a means of attracting tourists to that island.

There were additional inquiries from several other countries relative to securing some species of American fishes, but for various reasons no action was taken.

Shipments of fish and fish eggs to territories and foreign countries, fiscal year 1939

Destination and species	Shipping station	Eggs	Fry	Fingerlings, etc.	Total
Colombia:					
Brook trout.....	New York Aquarium.....		150		150
Rainbow trout.....	do.....		150		150
Do.....	Leetown, W. Va.....			100	100
Costa Rica: Rainbow trout.....	Neosho, Mo.....	25,000			25,000
England: Rainbow trout.....	White Sulphur Springs, W. Va.....	50,000			50,000
Peru: Lake trout.....	Cape Vincent, N. Y.....	250,000			250,000
Puerto Rico:					
Rainbow trout.....	Bourbon, Mo.....	250,000			250,000
Do.....	Eagle Nest, N. Mex.....	151,000			151,000
Total.....		728,000	300	100	728,400

TRANSFER OF EGGS BETWEEN STATIONS

The economy of concentrating upon egg production at 3 or 4 stations, from which shipments can be made to other points, has frequently been emphasized. This practice was continued throughout the past year and over 43 million eggs of 10 different species were transferred between various stations. The following table sets forth in detail all such transfers.

Transfer of eggs between stations, fiscal year 1939

Species	Number of eggs	From—	To—
Blackspotted trout	200,340	Saratoga, Wyo.	Jackson, Wyo.
	200,300	Yellowstone Park, Wyo.	Baker Lake, Wash.
	300,100	do	Birdsview, Wash.
	2,625,300	do	Bozeman, Mont.
	600,200	do	Carson, Wash.
	250,100	do	Clackamas, Oreg.
	1,150,200	do	Crawford, Nebr.
	400,200	do	Creede, Colo.
	100,100	do	Eagle Nest, N. Mex.
	811,400	do	Ennis, Mont.
	3,000,800	do	Glacier Park, Mont.
	725,400	do	Hagerman, Idaho.
	1,000,300	do	Jackson, Wyo.
	100,100	do	Laketown, Utah.
	575,400	do	Leadville, Colo.
	25,200	do	Lectown, W. Va.
	650,400	do	Mount Rainier, Wash.
	300,100	do	Quilcoene, Wash.
	200,000	do	Quinault, Wash.
	475,400	do	Salmon, Idaho.
	800,300	do	Saratoga, Wyo.
	50,200	do	Spearfish, S. Dak.
	300,200	do	Spokane, Wash.
1,025,500	do	Springville, Utah.	
Brook trout	358,500	Cape Vincent, N. Y.	Barneveld, N. Y.
	300,000	do	Cortland, N. Y.
	50,000	Craig Brook, Maine	Cape Vincent, N. Y.
	250,000	do	Cortland, N. Y.
	600,000	do	Lamar, Pa.
	225,000	do	Nashua, N. H.
	500,000	do	Walhalla, S. C.
	300,000	do	White Sulphur Springs, W. Va.
	500,000	do	Wytheville, Va.
	100,000	Leadville, Colo.	Hagerman, Idaho.
	100,000	do	Laketown, Utah.
	100,000	do	Saratoga, Wyo.
	100,000	Creede, Colo.	Laketown, Utah.
	100,000	do	Spearfish, S. Dak.
	382,000	do	Springville, Utah.
	300,000	National Forest of New Hampshire	La Crosse, Wis.
	Chinook salmon	386,750	do	St. Johnsbury, Vt.
100,000		do	Walhalla, S. C.
150,000		Pittsford, Vt.	Lectown, W. Va.
2,878,000		Little White Salmon	Carson, Wash.
Chum salmon	233,470	Quilcene, Wash.	Laketown, Utah.
	3,475,000	Walcott Sloughs, Wash.	Duckabush, Wash.
Grayling	4,630,000	do	Quilcoene, Wash.
	300,000	Yellowstone Park, Wyo.	Bozeman, Mont.
	250,100	do	Ennis, Mont.
	100,000	do	Jackson, Wyo.
	275,500	do	Springville, Utah.
Lake trout	50,000	Cape Vincent, N. Y.	Craig Brook, Maine.
	83,000	do	Rochester, N. Y.
	201,000	Duluth, Minn.	Cape Vincent, N. Y.
	25,920	do	Laketown, Utah.
Loch Leven trout	25,000	do	Leadville, Colo.
	57,450	Cape Vincent, N. Y.	Barneveld, N. Y.
	60,880	do	Cortland, N. Y.
Pike perch	525,000	Put in Bay, Ohio	Norris, Tenn.
	525,000	do	Wytheville, Va.
Rainbow trout	200,000	Eagle Nest, N. Mex.	Crawford, Nebr.
	500,000	do	Creede, Colo.
	250,000	do	Bozeman, Mont.
	600,000	do	Leadville, Colo.
	238,000	do	Springville, Utah.

Transfer of eggs between stations, fiscal year 1939—Continued

Species	Number of eggs	From—	To—
Rainbow trout.....	5, 250	Leetown, W. Va.....	Aquarium, Washington, D. C.
	104, 100	do.....	Barneveld, N. Y.
	51, 030	do.....	Craig Brook, Maine.
	50, 540	do.....	Hartsville, Mass.
	201, 000	do.....	Lamar, Pa.
	311, 100	Manchester, Iowa.....	Bozeman, Mont.
	328, 200	do.....	Crawford, Nebr.
	102, 000	do.....	Duluth, Minn.
	203, 800	do.....	LaCrosse, Wis.
	76, 900	do.....	Lake Mills, Wis.
	102, 000	do.....	Northville, Mich.
	25, 000	Neosho, Mo.....	Cortland, N. Y.
	121, 000	do.....	Erwin, Tenn.
	108, 000	do.....	Lamar, Pa.
	1, 109, 500	do.....	Saratoga, Wyo.
	412, 000	do.....	Smokemont, N. C.
	317, 000	do.....	Walhalla, S. C.
	75, 000	Salmon, Idaho.....	Birdsview, Wash.
	170, 000	do.....	Carson, Wash.
	158, 000	do.....	Hagerman, Idaho.
	100, 000	do.....	Smokemont, N. C.
	200, 000	do.....	Spokane, Wash.
	250, 000	Springville, Utah.....	Carson, Wash.
	50, 000	do.....	Hagerman, Idaho.
	100, 000	do.....	Laketown, Utah.
	15, 100	do.....	Seattle, Wash.
	190, 100	do.....	Spokane, Wash.
	100, 000	White Sulphur Springs, W. Va.....	Cortland, N. Y.
	100, 000	do.....	Craig Brook, Maine.
	50, 000	do.....	Hartsville, Mass.
	50, 000	do.....	Nashua, N. H.
	250, 000	Wytheville, Va.....	Flintville, Tenn.
	100, 000	do.....	LaCrosse, Wis.
	75, 000	do.....	Rochester, N. Y.
	825, 000	Yellowstone Park, Wyo.....	Ennis, Mont.
	400, 200	do.....	Glacier Park, Mont.
Steelhead trout.....	25, 000	Birdsview, Wash.....	Leadville, Colo.

STATION OUTPUT

The following list of producing units represents an increase of 6 stations over the previous year. The 1939 production was obtained from a total of 52 main stations and 46 substations located in 39 States. Although the output of each of these units is primarily intended for the restocking of waters in contiguous areas, the production of any of them may, nevertheless, reach 2 or 3 different States.

The Marianna (Fla.), Las Vegas (Nev.), Cohutta (Ga.), and Lyman (Miss.), stations, which were constructed during the fiscal year 1938, as authorized by the act of May 21, 1930, were among those that contributed for the first time this season.

The Genoa (Wis.), unit, which is being constructed in the Upper Mississippi Wild Life and Fish Refuge, was completed to such an extent that three ponds, with an area of approximately 60 acres, were placed under production in the spring of 1939. During the month of June there were collected and distributed from these ponds approximately 2 million fingerling black bass. The Palestine (W. Va.) station, which is owned by the West Virginia Conservation Commission, was operated in cooperation with that agency for the stocking of waters in the western part of West Virginia, and therefore appears in the following summary. The Clark Fork (Idaho) unit was constructed as a W. P. A. project sponsored by the Idaho Fish and Game Department on land donated by the Bonner County

Sportsmen's Association. After being turned over to the Bureau on September 11, 1938, it was immediately placed on a productive basis. The Carpenter's Brook (N. Y.) station, which is operated in cooperation with the Onondaga County sportsmen, was nearly completed and an output of trout was attained.

Due to the development of the 9-foot channel in the upper Mississippi River, rescue operations were discontinued from the Lynxville (Wis.) and Homer (Minn.) stations. The latter unit was maintained as a repair shop and supply depot.

Stations and substations operated and the output of each, fiscal year 1939

Stations, substations, and species	Eggs	Fry	Fingerlings	Total
Berlin, N. H.:				
Brook trout		67,500	325,915	393,415
Lake trout			3,500	3,500
Rainbow trout			1,100	1,100
St. Johnsbury, Vt.:				
Black bass, largemouth			1,275	1,275
Brook trout		1,235,000		1,235,000
Landlocked salmon			5,990	5,990
Birdsview, Wash.:				
Blackspotted trout			209,500	209,500
Brook trout			97,000	97,000
Rainbow trout	10,000		178,700	188,700
Steelhead trout	35,000		813,700	848,700
Chum salmon			140,000	140,000
Silver salmon			382,000	382,000
Sockeye salmon			27,370	27,370
Mount Rainier, Wash.:				
Blackspotted trout			5,000	5,000
Spokane, Wash.:				
Blackspotted trout			64,390	64,390
Brook trout			3,000	3,000
Rainbow trout			161,375	161,375
Boothbay Harbor, Maine:				
Cod	1,419,860,000			1,419,860,000
Flatfish		603,000,000		603,000,000
Haddock	417,832,000			417,832,000
Lobster		2,900,450		2,900,450
Pollock	517,305,000			517,305,000
Bozeman, Mont.:				
Blackspotted trout	4,000		1,193,080	1,197,080
Brook trout			283,260	283,260
Golden trout	6,100		71,040	77,140
Loch Leven trout	25,000			25,000
Rainbow trout	515,200		345,660	860,860
Grayling			231,050	231,050
Glacier Park, Mont.:				
Blackspotted trout		1,858,820		1,858,820
Rainbow trout		238,140		238,140
Ennis, Mont.:				
Blackspotted trout			448,040	448,040
Loch Leven trout			288,400	288,400
Rainbow trout			609,000	609,000
Grayling		200,000	27,000	227,000
Miles City, Mont.:				
Black bass, largemouth			20,505	20,505
Sunfish			114,680	114,680
Catfish			45,065	45,065
Crappie			69,250	69,250
Cape Vincent, N. Y.:				
Black bass, smallmouth		64,400	27,735	92,135
Brook trout		108,000		108,000
Lake trout	250,000	759,000		1,009,000
Loch Leven trout			1,000	1,000
Whitefish		20,000		20,000
Barneveid, N. Y.:				
Brook trout			142,800	142,800
Loch Leven trout			44,490	44,490
Rainbow trout			15,430	15,430
Cortland, N. Y.:				
Brook trout			325,600	325,600
Lake trout			9,870	9,870
Loch Leven trout			12,600	12,600
Rainbow trout			22,755	22,755

NOTE.—Stations *italicized* are substations of the preceding station in roman type.

Stations and substations operated and the output of each, fiscal year 1939—Continued

Stations, substations, and species	Eggs	Fry	Fingerlings	Total
Watertown, N. Y.:				
Brook trout.....			41, 290	41, 290
Lake trout.....			300	300
Loch Leven trout.....			17, 625	17, 625
Rainbow trout.....			16, 055	16, 055
Carson, Wash.:				
Blackspotted trout.....			254, 000	254, 000
Brook trout.....			294, 750	294, 750
Rainbow trout.....			228, 000	228, 000
Chinook salmon.....		1, 998, 710	674, 430	2, 673, 140
Little White Salmon, Wash.:				
Chinook salmon.....	5, 060, 000	9, 216, 000	1, 750, 000	16, 026, 000
Big White Salmon, Wash.:				
Brook trout.....			174, 000	174, 000
Chinook salmon.....	25, 000	10, 597, 900	3, 875, 300	14, 498, 200
Clackamas, Oreg.:				
Brook trout.....			508, 145	508, 145
Chinook salmon.....	2, 200		1, 029, 250	1, 031, 450
Rainbow trout.....			87, 000	87, 000
Battle Creek, Calif.:				
Chinook salmon.....	520, 000		10, 736, 505	11, 256, 505
Butte Falls, Oreg.:				
Chinook salmon.....			917, 030	917, 030
Rainbow trout.....			140, 000	140, 000
Steelhead trout.....			63, 000	63, 000
Mill Creek, Calif.:				
Chinook salmon.....			7, 352, 000	7, 352, 000
Clark Fork, Idaho:				
Blackspotted trout.....			225, 000	225, 000
Sockeye salmon, landlocked.....	122, 960		318, 200	441, 160
Craig Brook, Maine:				
Brook trout.....			553, 620	553, 620
Lake trout.....			67, 800	67, 800
Rainbow trout.....			4, 800	4, 800
Crawford, Nebr.:				
Blackspotted trout.....			398, 000	398, 000
Brook trout.....			374, 350	374, 350
Rainbow trout.....			568, 080	568, 080
Black bass, largemouth.....			67, 450	67, 450
Rock bass.....			5, 115	5, 115
Sunfish.....			13, 150	13, 150
Catfish.....			72, 625	72, 625
Crappie.....			28, 775	28, 775
Yellow perch.....			10, 000	10, 000
Dexter, N. Mex.:				
Black bass, largemouth.....			471, 350	471, 350
Sunfish.....			468, 600	468, 600
Catfish.....			19, 090	19, 090
Crappie.....			29, 310	29, 310
Santa Rosa, N. Mex.:				
Black bass, largemouth.....			48, 200	48, 200
Black bass, smallmouth.....			11, 000	11, 000
Sunfish.....			63, 050	63, 050
Catfish.....			1, 940	1, 940
Crappie.....			3, 320	3, 320
Duluth, Minn.:				
Brook trout.....			174, 000	174, 000
Lake trout.....	26, 280	877, 750		904, 030
Loch Leven trout.....			47, 000	47, 000
Rainbow trout.....			20, 000	20, 000
Lake herring.....		3, 000, 000		3, 000, 000
Pike perch.....		13, 640, 000		13, 640, 000
Whitefish.....		900, 000		900, 000
Edenton, N. C.:				
Black bass, largemouth.....		112, 000	70, 200	182, 200
Sunfish.....			8, 000	8, 000
Crappie.....			4, 625	4, 625
Shad.....		6, 615, 000		6, 615, 000
Yellow perch.....		988, 000	140	988, 140
White perch.....		4, 300, 000		4, 300, 000
Weldon, N. C.:				
Striped bass.....		1, 797, 950		1, 797, 950
Elephant Butte, N. Mex.:				
Black bass, largemouth.....			373, 750	373, 750
Sunfish.....			142, 500	142, 500
Crappie.....			8, 400	8, 400
Erwin, Tenn.:				
Black bass, largemouth.....		985, 500	78, 235	1, 063, 735
Black bass, smallmouth.....			24, 000	24, 000
Rock bass.....			8, 575	8, 575
Sunfish.....			40, 630	40, 630
Brook trout.....			191, 755	191, 755
Rainbow trout.....			450, 830	450, 830

PROPAGATION AND DISTRIBUTION OF FOOD FISHES, 1939 571

Stations and substations operated and the output of each, fiscal year 1939—Continued

Stations, substations, and species	Eggs	Fry	Fingerlings	Total
Fairport, Iowa:				
Black bass, largemouth		18,000	103,410	121,410
Black bass, smallmouth			3,600	3,600
Buffalofish	38,850,000		800	38,850,800
Catfish		10,000	224,135	234,135
Crappie			9,300	9,300
Sunfish			300,240	360,240
Flintville, Tenn.:				
Black bass, largemouth			6,600	6,600
Black bass, smallmouth			4,750	4,750
Rock bass			1,200	1,200
Crappie			550	550
Brook trout			5,600	5,600
Rainbow trout			119,450	119,450
Sunfish			22,550	22,550
Fort Belvoir, Va.:				
Black bass, largemouth			500	500
Catfish			50	50
Crappie			200	200
Shad		26,000,000		26,000,000
Sunfish			20,590	20,590
Yellow perch		299,668,000	1,850	299,669,850
Gloucester, Mass.:				
Cod	1,628,003,700	132,805,200		1,760,808,900
Flatfish		14,410,100		14,410,100
Haddock	754,964,700	5,768,300		760,733,000
Lobster		1,148,500		1,148,500
Follock	929,214,100	50,762,700		979,976,800
Hagerman, Idaho:				
Blackspotted trout			245,200	245,200
Brook trout			115,545	115,545
Rainbow trout			473,660	473,660
Sockeye salmon			159,870	159,870
Salmon, Idaho:				
Blackspotted trout			137,900	137,900
Rainbow trout			1,078,920	1,078,920
Steelhead trout			17,360	17,360
Hartsville, Mass.:				
Black bass, smallmouth		773,000		773,000
Brook trout			363,755	363,755
Rainbow trout			27,345	27,345
LaCrosse, Wis.:				
Black bass, largemouth			66,550	66,550
Brook trout			615,100	615,100
Loch Leven trout			232,700	232,700
Rainbow trout			234,800	234,800
Crappie			1,225	1,225
Sunfish			1,500	1,500
Yellow perch			50	50
Bellevue, Iowa:				
Buffalofish	39,191,500			39,191,500
Genoa, Wis.:				
Black bass, largemouth			1,926,220	1,926,220
Black bass, smallmouth			15,345	15,345
Catfish			6,300	6,300
Crappie			18,265	18,265
Sunfish			25,175	25,175
Yellow perch			600	600
Guttenberg, Iowa:				
Black bass, largemouth			2,620	2,620
Black bass, smallmouth			1,000	1,000
Buffalofish	640,000			640,000
Catfish			14,700	14,700
Crappie			57,370	57,370
Pike and pickerel	1,643,150			1,643,150
Pike perch	271,950			271,950
Sunfish			48,100	48,100
Lake Mills, Wis.:				
Black bass, largemouth			216,875	216,875
Black bass, smallmouth			6,625	6,625
Crappie			2,200	2,200
Brook trout			85,050	85,050
Loch Leven trout			63,320	63,320
Rainbow trout			63,200	63,200
Marquette, Iowa:				
Black bass, largemouth			6,040	6,040
Crappie			5,035	5,035
Sunfish			1,205	1,205
Lake Park, Ga.:				
Black bass, largemouth			26,600	26,600
Catfish			2,050	2,050
Crappie			900	900
Sunfish			101,300	101,300

Stations and substations operated and the output of each, fiscal year 1939—Continued

Stations, substations, and species	Eggs	Fry	Fingerlings	Total
Lamar, Pa.:				
Brook trout.....			263, 140	263, 140
Loch Leven trout.....			112, 090	112, 090
Rainbow trout.....			256, 650	256, 650
Ogletown, Pa.:				
Brook trout.....			17, 050	17, 050
Las Vegas, Nev.:				
Black bass, largemouth.....			80, 000	80, 000
Leadville, Colo.:				
Blackspotted trout.....			500, 400	500, 400
Brook trout.....			659, 200	659, 200
Loch Leven trout.....			102, 800	102, 800
Rainbow trout.....			527, 570	527, 570
Creede, Colo.:				
Blackspotted trout.....			391, 500	391, 500
Brook trout.....			1, 292, 900	1, 292, 900
Rainbow trout.....			487, 600	487, 600
Eagle Nest, N. Mex.:				
Blackspotted trout.....			93, 000	93, 000
Brook trout.....			57, 900	57, 900
Rainbow trout.....	1, 151, 800		429, 500	1, 581, 300
Leetown, W. Va.:				
Black bass, largemouth.....			9, 040	9, 040
Black bass, smallmouth.....			9, 070	9, 070
Brook trout.....	5, 000		25, 850	30, 850
Loch Leven trout.....	52, 500		58, 945	111, 445
Rainbow trout.....	3, 000		540, 940	543, 940
Sunfish.....			10, 950	10, 950
Louisville, Ky.:				
Black bass, largemouth.....		48, 000	15, 680	63, 680
Black bass, smallmouth.....		323, 600	10, 980	334, 580
Rock bass.....			17, 400	17, 400
Crappie.....			300	300
Sunfish.....			11, 475	11, 475
Mammoth Spring, Ark.:				
Black bass, largemouth.....			202, 050	202, 050
Black bass, smallmouth.....		237, 000	150, 000	387, 000
Rock bass.....			5, 600	5, 600
Sunfish.....			22, 000	22, 000
Manchester, Iowa:				
Black bass, largemouth.....			950	950
Rock bass.....			14, 000	14, 000
Brook trout.....			173, 700	173, 700
Loch Leven trout.....			139, 700	139, 700
Rainbow trout.....	1, 338, 200		120, 225	1, 458, 425
Marion, Ala.:				
Black bass, largemouth.....		504, 000	563, 590	1, 067, 590
Rock bass.....			1, 770	1, 770
Crappie.....			420	420
Sunfish.....			2, 158, 610	2, 158, 610
Cohutta, Ga.:				
Black bass, largemouth.....		6, 000	16, 000	22, 000
Black bass, smallmouth.....		2, 500		2, 500
Kentucky bass.....		5, 000	2, 250	7, 250
Lymas, Miss.:				
Black bass, largemouth.....			162, 690	162, 690
Sunfish.....			521, 200	521, 200
Marianna, Fla.:				
Black bass, largemouth.....		114, 000	92, 650	206, 650
Tupelo, Miss.:				
Black bass, largemouth.....		198, 000	383, 485	581, 485
Sunfish.....			271, 905	271, 905
Warm Springs, Ga.:				
Black bass, largemouth.....		250, 000	24, 380	274, 380
Catfish.....			7, 220	7, 220
Sunfish.....			172, 185	172, 185
Nashua, N. H.:				
Brook trout.....			173, 060	173, 060
Loch Leven trout.....			3, 400	3, 400
Rainbow trout.....			8, 815	8, 815
Catfish.....			200	200
Neosho, Mo.:				
Black bass, largemouth.....		496, 000	97, 515	593, 515
Rock bass.....			9, 900	9, 900
Catfish.....			4, 750	4, 750
Crappie.....			32, 900	32, 900
Rainbow trout.....	53, 500		59, 545	113, 045
Sunfish.....			20, 790	20, 790
Forest Park, Mo.:				
Black bass, largemouth.....			239, 220	239, 220
Crappie.....			19, 850	19, 850
Catfish.....			5, 300	5, 300
Sunfish.....			126, 200	126, 200

PROPAGATION AND DISTRIBUTION OF FOOD FISHES, 1939 573

Stations and substations operated and the output of each, fiscal year 1939—Continued

Stations, substations, and species	Eggs	Fry	Fingerlings	Total
<i>Natchitoches, La.:</i>				
Black bass, largemouth		117, 000	188, 330	805, 330
Warmouth bass			42, 115	42, 115
Sunfish			601, 200	601, 200
<i>Tishomingo, Okla.:</i>				
Black bass, largemouth			81, 500	81, 500
Crapple			26, 830	26, 830
Sunfish			608, 650	608, 650
<i>Northville, Mich.:</i>				
Black bass, largemouth			6, 395	6, 395
Black bass, smallmouth			9, 225	9, 225
Brook trout			725, 070	725, 070
Loch Leven trout			71, 240	71, 240
Rainbow trout			184, 185	184, 185
Sunfish			120, 050	120, 050
<i>Orangeburg, S. C.:</i>				
Black bass, largemouth			512, 395	512, 395
Warmouth bass			12, 200	12, 200
Catfish			500	500
Crapple			815	815
Sunfish			481, 475	481, 475
Yellow perch			1, 800	1, 800
<i>Jacksonboro, S. C.:</i>				
Shad		1, 534, 000		1, 534, 000
<i>Hoffman, N. C.:</i>				
Black bass, largemouth		25, 000	193, 700	218, 700
Warmouth bass			36, 000	36, 000
Crapple			54, 050	54, 050
Sunfish			534, 365	534, 365
<i>Faestline, W. Va.:</i>				
Black bass, largemouth			10, 250	10, 250
Black bass, smallmouth			5, 050	5, 050
Sunfish			147, 150	147, 150
Crapple			18, 800	18, 800
White perch			260	260
<i>Pisgah Forest, N. C.:</i>				
Brook trout			14, 200	14, 200
Loch Leven trout			13, 145	13, 145
Rainbow trout			22, 620	22, 620
<i>Pittsford, Vt.:</i>				
Brook trout			40, 530	40, 530
Rainbow trout			3, 800	3, 800
<i>Put in Bay, Ohio:</i>				
Pike perch	4, 000, 000	316, 000, 000		320, 000, 000
Whitefish	32, 960, 000			32, 960, 000
<i>Quinalt, Wash.:</i>				
Chinook salmon			116, 250	116, 250
Silver salmon			140, 510	140, 510
Sockeye salmon	75, 000		1, 926, 665	2, 001, 665
Blackspotted trout			81, 040	81, 040
Rainbow trout			24, 125	24, 125
Steelhead trout			2, 175	2, 175
<i>Duckabush, Wash.:</i>				
Chum salmon		4, 762, 900		4, 762, 900
Silver salmon			89, 670	89, 670
<i>Quilcene, Wash.:</i>				
Chinook salmon			18, 635	18, 635
Chum salmon	1, 369, 000	2, 832, 000	141, 170	4, 342, 170
Silver salmon			124, 495	124, 495
Sockeye salmon			41, 520	41, 520
Blackspotted trout			90, 545	90, 545
Brook trout			53, 000	53, 000
Rainbow trout			1, 030	1, 030
Steelhead trout			39, 020	39, 020
<i>Rochester, Ind.:</i>				
Black bass, largemouth			1, 255, 225	1, 255, 225
Black bass, smallmouth			37, 070	37, 070
Rock bass			37, 600	37, 600
Catfish			4, 340	4, 340
Crapple			6, 750	6, 750
Sunfish			684, 100	684, 100
Yellow perch			2, 590	2, 590
<i>Rochester, N. Y.:</i>				
Black bass, largemouth			10, 000	10, 000
Black bass, smallmouth			6, 200	6, 200
Brook trout			37, 335	37, 335
Loch Leven trout			160, 425	160, 425
Rainbow trout			97, 040	97, 040
<i>Carpenter's Brook, N. Y.:</i>				
Brook trout			31, 035	31, 035
Loch Leven trout			3, 320	3, 320
Rainbow trout			30, 515	30, 515

Stations and substations operated and the output of each, fiscal year 1939—Continued

Stations, substations, and species	Eggs	Fry	Fingerlings	Total
Saratoga, Wyo.:				
Blackspotted trout.....			415, 830	415, 830
Brook trout.....			474, 930	474, 930
Lake trout.....			14, 700	14, 700
Rainbow trout.....			268, 750	268, 750
Spearfish, S. Dak.:				
Brook trout.....			117, 785	117, 785
Blackspotted trout.....			22, 000	22, 000
Loch Leven trout.....			52, 500	52, 500
Rainbow trout.....	58, 140		660, 660	718, 800
Springville, Utah:				
Black bass, largemouth.....			1, 095	1, 095
Blackspotted trout.....			574, 720	574, 720
Brook trout.....			344, 530	344, 530
Rainbow trout.....	100, 000		652, 595	752, 595
Sockeye salmon.....			188, 080	188, 080
Grayling.....	275, 000			275, 000
Bear Lake, Utah:				
Blackspotted trout.....			90, 440	90, 440
Brook trout.....			173, 480	173, 480
Rainbow trout.....			79, 500	79, 500
Chum salmon.....			94, 080	94, 080
Sockeye salmon, landlocked.....			125, 955	125, 955
Uvalde, Tex.:				
Black bass, largemouth.....		393, 950	357, 290	751, 240
Catfish.....			1, 200	1, 200
Crappie.....			240	240
Rio Grande perch.....			162, 060	162, 060
Sunfish.....			517, 505	517, 505
Fort Worth, Tex.:				
Black bass, largemouth.....			74, 900	74, 900
Warmouth bass.....			1, 100	1, 100
Crappie.....			7, 000	7, 000
Catfish.....			2, 500	2, 500
Sunfish.....			24, 350	24, 350
San Angelo, Tex.:				
Black bass, largemouth.....			146, 600	146, 600
Crappie.....			3, 000	3, 000
Sunfish.....			120, 395	120, 395
San Marcos, Tex.:				
Black bass, largemouth.....		285, 700	161, 840	447, 540
Rock bass.....			5, 300	5, 300
Catfish.....			4, 900	4, 900
Crappie.....			15, 550	15, 550
Rio Grande perch.....			13, 700	13, 700
Sunfish.....			92, 055	92, 055
Walhalla, S. C.:				
Brook trout.....			387, 605	387, 605
Rainbow trout.....			261, 970	261, 970
Welaka, Fla.:				
Black bass, largemouth.....		88, 000	284, 920	372, 920
Sunfish.....			11, 600	11, 600
White Sulphur Springs, W. Va.:				
Black bass, largemouth.....			2, 000	2, 000
Rock bass.....			1, 000	1, 000
Brook trout.....			353, 935	353, 935
Loch Leven trout.....			16, 335	16, 335
Rainbow trout.....	392, 000		102, 140	494, 140
Woods Hole, Mass.:				
Flatfish.....		568, 530, 000		568, 530, 000
Mackerel.....		11, 060, 000		11, 060, 000
Wytheville, Va.:				
Black bass, smallmouth.....			3, 710	3, 710
Rock bass.....			14, 500	14, 500
Brook trout.....			32, 190	32, 190
Rainbow trout.....	708, 000		461, 575	1, 169, 575
Pike perch.....		400, 000		400, 000
Sunfish.....			33, 050	33, 050
Harrison Lake, Va.:				
Black bass, largemouth.....		83, 500	4, 670	88, 170
Crappie.....			5, 485	5, 485
Shad.....		5, 174, 220		5, 174, 220
Sunfish.....			64, 370	64, 370
Norris, Tenn.:				
Black bass, largemouth.....		63, 000	4, 225	67, 225
Kentucky bass.....		2, 000	1, 100	3, 100
Pike perch.....		450, 000		450, 000
Rainbow trout.....			250	250
Sunfish.....			2, 500	2, 500
Smokemont, N. C.:				
Brook trout.....			142, 005	142, 005
Rainbow trout.....			184, 545	184, 545

Stations and substations operated and the output of each, fiscal year 1939—Continued

Stations, substations, and species	Eggs	Fry	Fingerlings	Total
Yellowstone Park, Wyo.:				
Blackspotted trout.....	26, 258, 290		5, 895, 445	32, 153, 735
Grayling.....	1, 524, 800	4, 195, 270		5, 720, 070
Jackson, Wyo.:				
Blackspotted trout.....	100, 000	469, 620	101, 020	670, 640
Brook trout.....			13, 200	13, 200
Lake trout.....			7, 500	7, 500
Rainbow trout.....			70, 310	70, 310
Grayling.....		101, 480		101, 480
Total.....	5, 824, 802, 070	2, 115, 405, 660	84, 332, 955	8, 024, 540, 685

EGG COLLECTIONS

In spite of a slight reduction in hatchery output for 1939 the collections of eggs for that period exceeded the 1938 figure by some 355 million. This is explained in part by the fact that a considerable number of fingerlings, particularly of salmon, are being held for distribution during the succeeding fiscal year, and the 1939 distribution was in part achieved from the 1938 egg collections. The greatest increase was in the collection of cod eggs, which were increased by approximately 825 million, and in the pike perch work, where the increase was about 710 million. Mortalities in hatching these eggs may vary widely, with the consequent possibility of a reduction in the production of fry in spite of an increased take of eggs.

Comparison of egg collections, fiscal years 1938 and 1939

Species	1938	1939	Species	1938	1939
Shad.....	27, 523, 000	48, 257, 000	Yellow perch.....	331, 425, 000	301, 668, 000
Whitefish.....	123, 711, 000	52, 464, 000	White perch.....	6, 400, 000	8, 300, 000
Chinook salmon.....	41, 336, 400	63, 124, 000	Cod.....	2, 372, 773, 100	3, 197, 555, 700
Chum salmon.....	16, 187, 000	11, 196, 800	Haddock.....	1, 037, 330, 500	1, 178, 993, 700
Silver salmon.....	1, 300, 000	3, 060, 000	Pollock.....	2, 116, 821, 200	1, 560, 497, 100
Sockeye salmon.....	3, 180, 000	2, 969, 000	Flatfish (flounder).....	1, 402, 749, 000	1, 318, 397, 100
Humpback salmon.....	5, 111, 000		Mackerel.....		11, 060, 000
Rainbow trout.....	28, 241, 300	30, 155, 900	Lake herring.....	2, 200, 000	5, 325, 000
Blackspotted trout.....	31, 048, 500	42, 896, 600	Glut herring.....	2, 960, 000	8, 140, 000
Loch Leven trout.....	1, 777, 500	899, 500	Striped bass.....	646, 000	3, 413, 000
Lake trout.....	1, 536, 900	2, 852, 000	Carp.....	329, 200, 000	
Brook trout.....	31, 061, 800	11, 678, 700	Buffalofish.....	387, 445, 000	78, 681, 500
Steelhead trout.....	1, 588, 800	3, 396, 900	Lobster.....	8, 444, 000	12, 991, 600
Grayling.....	5, 837, 000	5, 117, 600			
Golden trout.....		18, 200	Total.....	8, 574, 205, 000	8, 929, 774, 000
Pike perch.....	256, 371, 000	966, 765, 100			

NOTES ON OPERATIONS

COMMERCIAL SPECIES

Pacific salmon.—It is recognized that the run of chinook salmon, which is the most valuable species of the Pacific salmon in the Columbia and Sacramento Rivers, is facing a very serious situation because of the construction of dams on these rivers. Millions of dollars are being spent by the Pacific Coast States and the Federal Government to maintain the run of this species. During the year 1939 the output of chinook salmon fingerlings from the Bureau's hatcheries was approximately 14 million over that of 1938.

In the Puget Sound territory, the Birdview (Wash.) station handled fewer eggs and fish than during the previous season but reared the

greater percentage of its output to a larger size before releasing them. This recession was largely due to the fact that no humpback salmon eggs were taken, whereas last year 4,305,000 were collected during the largest run of this species in the Skagit River in 25 years. The output comprised 4 species of trout and 3 varieties of Pacific salmon. No chum salmon were propagated. Twenty small concrete rearing ponds which had been in use since the origin of the station were dismantled, and an entire new concrete pond system consisting of 8 ponds 13½ feet wide by 56 feet long was constructed. The capacity of each pond is about 250,000 2- to 3-inch fish. Cottage No. 1 was renovated and all other buildings repaired and painted. A new machinery shed 24 by 60 feet, with open front, was constructed for use in storing station machinery and equipment.

The total number of eggs collected by the Clackamas (Oreg.) station and its auxiliaries amounted to approximately 22,700,000, as compared with 20,000,000 during the past year—an increase of nearly 12 percent. This total was due to the abnormally large collections of fall chinook salmon eggs at the Battle Creek and Mill Creek (Calif.) substations. The collection of spring chinook salmon eggs was below normal at both the Clackamas and Butte Falls units. The low collection of eggs at the latter point is ascribed to the late installation of the headrack across Rogue River, which was due to the late runoff of snow water from the upper sources of this stream. A new permanent rack and trap in Butte Creek yielded more than 1½ million steelhead trout eggs. However, the collection of silver salmon eggs from this body of water proved a complete failure. The Clackamas station supplemented its salmon work by handling brook and rainbow trout. The pond system at the Delph Creek rearing station was repaired, rearranged and enlarged. Construction of a frame hatchery building was started. At Clackamas the old combination workshop and dwelling was remodeled. A laboratory building, 32 by 45 feet, for use by the Division of Scientific Inquiry, was practically completed. A chlorinating system was installed for the purpose of sterilizing the water supply before it enters the two reservoirs with the expectation that previous heavy mortality of fish would be eliminated. The two residences under construction at the Butte Falls station were completed during the year.

The development of the hatchery at Carson, Wash., was continued under the auspices of the P. W. A. and W. P. A. and with the co-operation of the United States Forest Service. This unit does not as yet have a pond system of sufficient capacity to rear its fish to a large size before releasing them. Plans have been drawn up for increasing the pond space. Chinook salmon and brook, rainbow, and black-spotted trout were handled during the year. All of the trout were assigned to the Forest Service for the stocking of waters under the control of that agency.

Due to the development of the Bonneville Dam on the Columbia River, the Little White Salmon and Big White Salmon substations had to locate new seining grounds and clear the debris from such areas in order to facilitate the capturing of adult salmon. Nevertheless, the former station collected 20,443,000 chinook salmon eggs, which is a normal take, and the latter unit secured 18,250,000 eggs of this species, which was its largest collection since the season of 1932. While the Little White Salmon station was solely engaged in the

propagation of chinook salmon, the Big White Salmon station augmented its salmon work by handling brook and rainbow trout. New buildings were constructed at both points and numerous repairs made to old structures.

The Quinault (Wash.) station collected its quota of sockeye salmon eggs for hatching, which is 2,000,000, and secured an additional 200,000 for transfer to the Washington State Fisheries Department. This unit also handled chinook and silver salmon and steelhead, rainbow, brook, and blackspotted trout. The eggs for all species propagated, except the latter two, were collected locally. Approximately 3,350,000 eggs were handled and the resultant fish were all reared to fingerlings before being liberated. The Humptulips trap, which is located on the West Fork of Humptulips River, was completed and operated during the chinook salmon and steelhead trout runs. Other construction work consisted of the following: Food room rebuilt, hatchery building reroofed, new office in hatchery constructed, large cold-storage room built, new concrete walks and stairways poured, and grounds landscaped.

The major fish-cultural activity at the Duckabush and Quilcene (Wash.) substations was the propagation of chum salmon. Due to stream-improvement work at the mouth of the Big Quilcene River at the height of the spawning season of the early run, the latter station was unable to secure any chum eggs from this source. However, the Duckabush unit collected 2,870,000 eggs from the early run in Duckabush River and both stations secured from the late run in the Walcott slough field more than 8,000,000 eggs. The spawned-out adults were transferred to the Quilcene dehydrating plant, and the dry salmon-meal was utilized at a number of trout hatcheries for fish food. The Quilcene hatchery supplemented its salmon work by concentrating on the production of trout fingerlings during the summer months for the stocking of local waters. At this station a new building was constructed and the necessary troughs and equipment were installed for conducting pathological studies.

MARINE SPECIES

The Boothbay Harbor (Maine) station collected 1,419,860,000 cod, 517,305,000 pollock, and 417,832,000 haddock eggs which, after being fertilized, were liberated upon the natural spawning grounds of the respective species. From 670,000,000 flounder eggs incubated in the hatchery, a hatch of 90 percent was attained. The number of eggs of this species handled was in excess of last season's by 76,000,000. In cooperation with the Sea and Shore Fisheries Commission of Maine, lobster culture was continued. Near the Bureau's hatchery this agency constructed a rearing station that is equipped with 500 lobster-rearing compartments. It is believed that when all details have been completed this unit will have facilities for rearing 1,000,000 lobsters to the fourth larval stage. There were on hand at the beginning of the year 327,400 lobster fry from which a number of fourth-stage lobsters were raised and liberated at different points along the coast of Maine. During the spring of 1939, 3,915 adult egg-bearing lobsters were secured. Some of these adults were placed in cod boxes which had been rearranged in order that the young lobsters could

hatch normally. Eggs were stripped from the others and placed in McDonald hatching jars for incubation. On June 30, there had been hatched 3,899,000 lobster fry, of which 1,045,000 were placed in the rearing station, the remainder being liberated.

On September 21, 1938, the Woods Hole (Mass.) station was struck by a hurricane and tidal wave which destroyed windows, lattice work, slate shingles on the roofs, docks, sea wall, salt-water suction pipe line, and other property. The wooden portion of the east dock and sea wall was razed. Considerable time and funds will be required to rehabilitate this unit. The new suction line has been installed and other necessary repairs were made in order that the station could carry on its flounder work. Approximately 633,987,000 flounder eggs were collected and 568,530,000 fry were hatched and distributed. Approximately 50 percent of these fry were liberated in the coastal waters of Massachusetts—the remainder being planted along the coasts of New Jersey and Rhode Island, and in Long Island Sound and Narragansett Bay. Through the cooperation of the local commercial fishermen, there were collected 13,484,000 mackerel eggs from which 11,060,000 fry were hatched and liberated in Vineyard Sound and Buzzards Bay.

The fish-cultural activities at the Gloucester (Mass.) station consisted of the propagation of pollock, flounder, haddock, cod, and lobster. There was a noticeable decrease in the production of the three former species, whereas there was a slight increase in the number of cod handled. Several spawn-takers were assigned to commercial fishing vessels for the purpose of collecting pollock, haddock, and cod eggs, a large percentage of which, after fertilization, were planted on the spawning grounds. The hatchery was also operated to capacity when eggs were obtainable. The total number of eggs collected was slightly in excess of $3\frac{1}{2}$ billion. The lobster-cultural work was carried on in cooperation with the Massachusetts Department of Conservation, the same as last year. Four hundred and ten seed lobsters produced 3,221,600 eggs which were incubated in McDonald hatching jars. Due to insufficient feeding equipment, it was necessary to liberate the greater percentage of the young lobsters in the third larval stage. Under the auspices of the P. W. A. and W. P. A., the buildings and equipment at this point were reconditioned and overhauled. Major changes consisted of the following: 15,000-gallon storage tank constructed, main hatchery building, storehouse and workshops reroofed, extension constructed on southwest side of boiler room to provide additional space for new boiler, new boiler installed as a replacement for the obsolete boiler, wharf repaired, new concrete floor poured in hatchery building, and all buildings given one coat of paint.

GREAT LAKES SPECIES

As Michigan maintains a closed season during the height of the spawning period for whitefish and lake trout, the collection of eggs of these species by the Duluth (Minn.) station was restricted to collecting fields in that section of Lake Superior not controlled by the State of Michigan. All lake trout and whitefish eggs obtained in Michigan waters were taken either before or after the closed season, and were of an inferior quality, with a resultant poor hatch. About 5,325,000 lake herring eggs were obtained from commercial fishermen from which

3,000,000 fry were liberated in Minnesota waters. The collecting of pike perch eggs was carried on in cooperation with the United States Forest Service. From 21,500,000 eggs of this species collected, 13,640,000 fry were distributed. Brook, rainbow, and brown trout eggs were hatched at this station for the stocking of local trout waters and for the Cascade rearing ponds in the Superior National Forest. The low temperature of the hatchery water supply induced high mortality among the trout eggs. Repairs and improvements were made to buildings and equipment by P. W. A. and W. P. A. workers.

Because of the high water temperatures which existed at the normal spawning period, the whitefish spawning season on Lake Erie in the vicinity of the Put in Bay (Ohio) hatchery was unusually late. However, more than 48,200,000 whitefish eggs were collected and placed in the hatchery. On December 29 the water-supply line to the hatchery froze, necessitating the planting of all eggs in the lake. There were 943,340,000 pike perch eggs collected from the 6 fields worked—one of the largest collections in the history of this station. The most productive field was at Port Clinton, where more than 500,000,000 eggs were secured. The propagation of both species was carried on in cooperation with the Ohio Conservation Division.

Due to the shortage of funds, the Cape Vincent (N. Y.) station was unable to send spawn-takers into the field. Therefore, it was necessary to depend upon the local commercial fishermen for the supply of lake trout and whitefish eggs. There were 1,108,800 lake trout eggs handled, while 70,000 whitefish eggs of poor quality were received. The major activities are the propagation of game fish, particularly smallmouth black bass, and the operation of substations for the rearing of trout. This phase of the work is discussed elsewhere in this report. At the Swanton (Vt.) substation all buildings were reroofed and painted, but there were no fish-cultural activities carried on. This unit has, in previous years, handled pike perch and yellow perch.

ANADROMOUS SPECIES, ATLANTIC COAST

The Edenton (N. C.) hatchery surpassed its 1938 collection of shad eggs by taking 11,134,000 from which 7,134,000 fry were hatched. All of these fry were planted in Albemarle Sound and its tributaries, with the exception of 500,000 which were planted in hatchery ponds for investigation and study. A culture of daphnia was maintained in the ponds until the shad were seen swimming along the shoreline, at which time artificial food was given them. The food consisted largely of ground fresh fish and shrimp meal. A new field was located on the other side of the sound near Mackeys, from which 8,300,000 white perch eggs were collected. A limited number of yellow-perch eggs were secured. The Edenton station propagates pondfish for the stocking of inland waters, supplementing its work with the commercial species. This unit was favored with W. P. A. and P. W. A. projects, which resulted in the completion of several ponds, a residence and other improvements. The Weldon (N. C.) substation was operated in cooperation with the Conservation Department of North Carolina for the hatching of striped bass, and 3,413,000 eggs of this species were collected.

The Orangeburg (S. C.) station operated an auxiliary hatchery on the Edisto River near Jacksonboro for the propagation of shad.

There were 1,876,000 eggs collected, from which 1,534,000 fry were liberated in the Edisto and Ashepoo Rivers. While this number does not equal the records of previous seasons, it does represent an increase of one-half million fry over last year.

At the Fort Belvoir (Va.) hatchery, located on the Potomac River, the main fish-cultural activities were the collecting and hatching of shad and yellow-perch eggs. The collection of shad eggs exceeded that of last season by more than 10 million, while there was a slight recession in the number of yellow-perch eggs secured. A one and one-half story, five-room, brick-veneer residence was constructed, and the marine railway and carriages were rebuilt.

GAME-FISH PROPAGATION

One would consider practically the entire output of the Bureau's hatcheries as coming within this category, since all species propagated, except lobster, whitefish, herring and shad, are at some time or place sought by sportsmen.

Never in the history of the Bureau have the demands been so great for game fish. This may be ascribed in part to the large number of reservoirs constructed by the Department of Agriculture in its soil-conservation program, the impounding of large bodies of water by hydro-electric projects, the flooding of areas by the Bureau of Biological Survey to create migratory bird refuges, and to the prosecuting of stocking programs formulated by various Federal and State agencies. However, the innate popularity of angling among all classes is probably the most comprehensive explanation for the demand.

The following data cover the activities of the stations handling the families Centrarchidae and Cichlidae and the species of the Salmonidae found largely in inland waters.

ROCKY MOUNTAIN TERRITORY

Due to adverse weather during the spawning season, and water shortage throughout the summer, the output of pondfish from the Dexter (N. Mex.) station was below normal. Approximately 121,000 of the fish distributed ranged from 5 inches in length to legal size. In cooperation with the New Mexico Department of Game and Fish, a stocking program was formulated for the waters of that State. This program was adhered to as much as possible, although a portion of Dexter's production was utilized for the stocking of Arizona, Colorado, and Texas waters. Heretofore, predatory birds have devoured large numbers of this unit's brood stock each winter and a network of wires was attached to cables over some of the ponds in order to frighten such visitors. A concrete cistern of 30,000 gallons capacity, for storing water for domestic use, was constructed. The metal fish tanks were removed from the holding house and replaced with 14 concrete tanks. All station buildings were repaired and painted and a large cactus garden was planted near the entrance to the station.

The output of fish from the Santa Rosa (N. Mex.) substation was practically the same as that of the previous season. A number of choice smallmouth black bass fingerlings were saved out of last year's hatch, and it is anticipated that the 1940 output of this species will be greatly increased. The number of food organisms produced in the ponds appeared to justify the expense involved in fertilizing them

with a mixture of sheep manure, superphosphate, and cottonseed meal. This unit's pond system was increased by 6 ponds during the year.

At the Elephant Butte (N. Mex.) station all buildings and ponds were completed by the Reclamation Service and placed in operation. From 13.4 acres of water more than $\frac{1}{2}$ million fingerling pondfish were produced, of which 373,750 were largemouth black bass. A stock of crappie, which are reported to have reached a size of 3 pounds in the warmer waters of the Pecos Valley watershed, was secured for the purpose of introducing a large-size strain of this species into the waters of the Rio Grande.

In the Utah field the Springville station distributed 1 $\frac{1}{2}$ million fingerling fish and shipped 980,000 trout eggs to other hatcheries. The production of largemouth black bass was negligible. Experiments were conducted to determine the effect of diet upon the fertility of rainbow trout eggs. The old wood-pipe hatchery-water supply line was replaced with a 10-inch asbestos-wrapped 12-gage spiral-welded steel line.

At the Bear Lake (Utah) substation 5 species of trout and chum salmon were handled. This unit collected 1,174,000 eggs from local trap sites and received 657,820 eggs from other stations. In addition to the construction of a new residence, all buildings were painted by W. P. A. and P. W. A. employees.

All buildings and ponds were completed at the Las Vegas (Nev.) unit. During the early spring this station secured an ample stock of brood fish from which 80,000 fingerling black bass were planted in Lake Mead prior to the close of the year.

On September 11, 1938, the Bureau took charge of the Clark Fork (Idaho) hatchery, which was constructed as a W. P. A. project sponsored by the Idaho Fish and Game Department on land donated by the Bonner County Sportsmen's Association. Gratifying results were obtained from the eggs handled and it was possible to liberate more than $\frac{1}{2}$ million fingerling silver and blackspotted trout during the latter part of the year.

In the Colorado territory the Leadville station continued to cooperate with local parties in the collecting of trout eggs. The Bureau received several million eggs from such sources at a nominal cost, thereby eliminating the necessity of maintaining a brood stock at this unit. Several thousand trout were transferred to the Crystal Lake Nursery to be reared to a larger size before liberation. There were 4,300,000 rainbow eggs collected from Eagle Nest Lake during April and the early part of May. More than 1 million of these eggs were assigned to the New Mexico Department of Game and Fish for hatching and subsequent planting in the waters of the northern part of the State. The hatchery building and 2 cottages at Leadville were reroofed and a two-car garage was built. A new cottage was constructed at Turquoise Lake from lumber milled by W. P. A. labor.

An average production of fingerling trout was obtained at the Creede (Colo.) substation. Due to the scarcity of spawners, the collection of brook and rainbow trout eggs from Lake San Cristobal was materially below that of 1938. However, the eggs obtained were of very high quality, eyeing up to 98 and 99 percent respectively. Three old concrete ponds were dismantled and 4 new concrete ponds were constructed in the same area. A two-car garage was built and

the river bank in front of the hatchery building was ripped with rock.

In the Idaho field the number of eggs taken from the brood stock at the Hagerman station was disappointing, due to the large number of barren females. The reason for this large percentage of barren females is not definitely known, but it is ascribed to diet. Experiments are being conducted to ascertain if this assumption is correct. Approximately 1 million large fingerling trout were produced. The rearing-pond system was greatly increased during the year by W. P. A. and P. W. A. employees.

The substation at Salmon, Idaho, which heretofore had been operated on a seasonal basis, was operated during the entire year in cooperation with the Idaho Fish and Game Department primarily for handling the rainbow eggs collected at Williams Lake and other local waters. Extensive repairs and improvements, including the rearranging of the hatching and rearing equipment in the hatchery, were made during the winter.

The distribution of rainbow trout from the Bozeman (Mont.) station was somewhat limited, due to the high mortality among this species during the latter part of the previous year. Normal success was attained with the other species of trout and grayling handled. Elk carcasses received from Yellowstone Park were utilized for fish food. This station was the beneficiary of P. W. A., W. P. A., and N. Y. A. projects which made possible extensive repairs and improvements to buildings, grounds, and equipment.

The Glacier Park (Mont.) substation received 2,501,480 black-spotted trout and 400,000 rainbow trout eggs from the Yellowstone Park unit and planted the resultant fish in the advanced fry stage in Park waters. The water-temperature range is too great for successful hatchery operation at this point. In view of this and the need for a new and improved hatchery for producing larger fish for the stocking of waters of the Glacier National Park, an alternative site was located 2 miles west of Creston. This unit, as planned, will consist of a 48-trough hatchery building of frame construction, containing an office, laboratory, 2 lavatories, and a storage room. There will be 12 concrete raceway ponds, each 107 by 10 feet; 10 Foster-Lucas concrete ponds of oval shape, each 56 by 13½ feet; 1 utility building and several residences. The grounds are to be landscaped and provision will be made for a picnic area which will be supervised by the Park Service. The construction of this hatchery was started on March 1, 1939, under the auspices of the W. P. A., P. W. A., and N. P. S., with the Bureau furnishing technical advice. Due to adverse weather conditions and unforeseen construction difficulties the work is somewhat behind schedule, but it is anticipated that this station will be ready for operation in the spring of 1940.

The production of the Ennis (Mont.) substation was largely utilized in the restocking of waters of the Madison Valley watershed in an effort to reestablish the excellent sport fishing of the past years. The scarcity of adult rainbow and Loch Leven trout ascending the Madison River during the spawning season was more acute than ever. Consequently, this station had to rely on other sources for practically all of the eggs of these species. The major construction activities were erection of a four-room cottage, the extension of the water-supply main, installation of a hydroelectric turbine and generator unit, the

installation of a steam-heating plant in the hatchery building, and the fencing of station grounds.

Although the bass production was small, the total output of the 4 species of fingerling fish handled at the Miles City (Mont.) substation was larger than during either of the 2 preceding years. The small production was attributed to an inadequate supply of mature brood fish and the delay in harvesting, which was caused by very hot weather prevailing after a large amount of the water had been drawn from the large lake. However, the large size of the fingerling bass collected compensated for the small number taken. The large number of reservoirs built by the Farm Security Administration in this section of the country is creating a bigger demand for pondfishes, especially catfish, and special effort is being made to increase the production of this species. From the Nebraska Conservation Commission 1,900 adults, 10,000 fry, and 40,000 channel catfish eggs, green and eyed, were received in exchange for grayling eggs.

Inasmuch as the work at the Yellowstone Park station covered the midsummer months extending into parts of 2 fiscal years, the data furnished here cover the season of 1938. Because of high-water conditions, much difficulty was experienced in maintaining the fish traps. For instance, the trap in Pelican Creek, which was by far the largest producing trap in 1937, could not be operated from May 25 to June 10 because of extremely high water. Notwithstanding these conditions, the take of eggs was more than 37 million, which is considered an average collection although it was approximately 10 million less than during the season of 1937. There was an increase in the number of fish reported as being taken from the waters of the Yellowstone Park this year, while the number of Park visitors was slightly less than last year. In 1938 there were 163,859 fish reported at the checking stations, while the number reported in 1937 was 135,654.

The Jackson Hole (Wyo.) substation, which was operated on a seasonal basis, produced approximately 870,000 blackspotted, lake, rainbow, and brook trout, and grayling for stocking waters of the Grand Teton National Park and the Teton National Forest. A C. C. C. project permitted development of a number of improvements, including the repairing of 4 circular concrete ponds, the construction of 2 rectangular ponds, and the landscaping of station grounds.

A new three-stall garage was constructed and all buildings were painted at the Saratoga (Wyo.) station. The pond system was enlarged by the construction of 2 concrete ponds 100 by 10 feet, 2 concrete ponds 60 by 6 feet, and one dirt pond with concrete ends. Fish-cultural work was carried on along usual lines and normal success was attained in the production and distribution of trout fingerlings.

The Baker Lake (Wash.) station, which was formerly used for the propagation of salmon, was remodeled for the purpose of rearing trout to stock Baker Lake and tributary waters. During the early part of the year C. C. C. enrollees from a local camp assisted in the laying of pipe lines, rebuilding the intake dam, etc. This unit was operated on a fish-cultural basis only from June 1 to June 30. The fish which were received by transfer from other stations are being reared to a larger size before planting. Consequently, no distribution was made from this hatchery during the fiscal year.

From the 12 circular rearing ponds operated at the Spokane, (Wash.) substation, approximately 230,000 large fingerling brook, rainbow, and blackspotted trout were distributed. All except 6,000 of these fish were planted by the Conservation Departments of Washington and Idaho. A four-room, frame, one-story cottage, with concrete basement, was constructed. A concrete foundation for a hatchery building 38 by 54 feet was poured and fill made within the foundation walls preparatory to the laying of a concrete floor. At present, this station utilizes trough space in the local State hatchery for incubating its trout eggs.

As there was no stock of eggs or fish on hand at the Mount Rainier (Wash.) substation at the beginning of the year, the entire unit, including water-supply lines, ponds, troughs, feeding tanks, and all fish-cultural tools and appliances, was thoroughly sterilized with calcium hypochlorite to eradicate fish parasites and diseases which had prevailed. When the shipments of eggs were received, they were sterilized by submerging them in a 1:2,000 solution of acriflavine for 20 minutes before they were placed in the hatching troughs. As a result of this precaution, the stock of fish at this hatchery remained free of all diseases during the year. This station collected rainbow trout eggs from Mowich Lake and received approximately 850,000 eggs of rainbow, brook, and blackspotted trout from other points. The greater percentage of the resultant fish were planted in the waters of the Mount Rainier National Park and the Snoqualmie National Forest.

The Spearfish (S. Dak.) station installed 4-foot red and green Neon lights under the surface of the water in some of the trout ponds to attract insects for fish food. One cottage was constructed and many repairs and improvements were made to the buildings, equipment, ponds, and water-supply system. The egg-take from the station brood stock was only about 50 percent of that of the past season, due to the large number of barren females among the rainbows and the heavy mortality of the Loch Leven stock prior to the spawning season. The small laboratory continued to be a very important unit at this station. Through weekly microscopic examination of all lots of fish many diseases are diagnosed and checked before they cause serious trouble.

NEW ENGLAND TROUT STATIONS

Owing to the appearance of furunculosis the latter part of last year, and the consequent disposition and destruction of all fish on hand, fish-cultural operations at the National Forest (N. H.) station were suspended until the receipt of eggs during the fall of 1938. The States of Vermont and New Hampshire furnished 1 million brook trout eggs with the understanding that the Bureau would provide food equal to their value. To supplement these eggs, approximately 1½ million were collected from yearling and 2-year-old fish held in the Whitefield rearing ponds of the New Hampshire Fish and Game Department. Repairs and improvements were prosecuted by W. P. A. and P. W. A. workers. The pond system was enlarged by the construction of additional raceways 3 feet wide by 165 feet long, in three equal sections with falls between. These ponds are arranged in such a way that four different water supplies may be utilized if necessary.

The hurricane which raged through the New England States on September 21 did little damage to the St. Johnsbury (Vt.) station other than blowing down some of the trees in the pine plantation. With the assistance of the W. P. A. and P. W. A. much valuable work was accomplished, not only in repairs to ponds, buildings, drainage lines, water supply, etc., but by the addition of several new raceways. A concrete intake dam in Sleepers River was constructed to replace an obsolete plank structure, thereby assuring a constant water supply at all times. As usual, the major fish-cultural activity was the hatching of approximately 1½ million brook trout eggs. At the beginning of the year the entire stock of brown trout and landlocked salmon fingerlings was wiped out by the parasite *ichthyophthirius multifiliis*. The fish-cultural work of this station is carried on in cooperation with the Fish and Game Service of Vermont.

The Pittsford (Vt.) station continued its experiments in selective breeding of trout and conducted various other investigations. This year the adults yielded eggs at the rate of 1,424 per pound of fish. As the average fish-culturist recognizes 1,000 eggs per pound of trout as the normal production, the effect of selective breeding is obvious. This station was favored with W. P. A. and P. W. A. projects for the repairing and improving of buildings, equipment, and roadways.

The Craig Brook (Maine) hatchery collected 4,300,000 brook trout eggs, of which number approximately 2½ million were shipped to other Bureau stations. Shipments of rainbow and lake trout eggs were received, from which several thousand fingerlings were distributed. In accordance with an agreement between the National Park Service and the Bureau, the Acadia National Park was allotted 185,000 large fingerling brook trout for the stocking of waters under its control. Repairs and improvements were made to buildings, ponds, drainage and supply lines, roadways, etc., by P. W. A. and W. P. A. workers.

In order to facilitate the repairing of old ponds and enlarging the pond system, the Hartsville (Mass.) hatchery disposed of its brood stock of trout. Consequently no eggs were taken at this point. Approximately 400,000 brook and 27,000 rainbow trout fingerlings, ranging in size from 1½ to 4½ inches, were distributed. In cooperation with the State of Connecticut, 773,000 smallmouth black bass fry were collected from Wangum Lake; one-half of which were assigned to the State of Connecticut.

As the Nashua (N. H.) station was struck by a hurricane in September, a large amount of time has been spent by the personnel in rehabilitating it. In addition to this work, a garage and 4 concrete ponds were constructed. This unit suffered high losses among all species of fingerling and yearling trout the latter part of the year.

COMBINATION TROUT AND PONDFISH STATIONS

Although most of the establishments in this category have heretofore been primarily concerned with the propagation of trout, several of them have enlarged their facilities for the propagation of warm-water species. In some cases the production of spiny-rayed fishes is almost equal to the output of some of the smaller units which are exclusively engaged in the handling of pondfishes.

At the Lamar (Pa.) station the hatchery building was completed during October and the necessary equipment placed therein, enabling

this unit to incubate trout eggs. More than 1 million brook, brown, and rainbow eggs were hatched. In addition to the furnishing of fish for rearing at the Ogletown substation, several thousand trout were allotted to conservation clubs to stock their nursery ponds. Nine ponds, ranging in size from $\frac{1}{2}$ to 2 acres in area, for the propagation of warm-water fishes, were completed in time to be stocked with brood fish during the spring. C. C. C. enrollees assisted in the above construction work as well as in the landscaping of grounds and the building of roads.

The Northville (Mich.) station's combined output of trout and pondfishes was in excess of one million. Approximately 660,000 trout were delivered to 5 cooperative feeding stations, 2 of which are within the boundaries of National Forests. Several thousand trout were consigned to the conservation departments of Indiana and Ohio for the stocking of suitable waters in their respective States. New outlet kettles were constructed in the 9 warm-water fishponds, and the ponds were graded. The hatchery water supply was materially increased by the construction of a concrete retaining wall across the southwest side of the spring pond. After repairs and alterations were made to all station buildings, they were painted.

The Powder Mill Park (N. Y.) hatchery, which is operated in cooperation with the Monroe County Park officials, reared several thousand trout to legal size before releasing them. This station also handled smallmouth and largemouth black bass for the stocking of Monroe County waters.

The 65,000 trout liberated by the Carpenter's Brook (N. Y.) station, which is operated in cooperation with Onondaga County sportsmen, were all 5 to 7 inches in length. At the close of the year this unit was feeding more than 200,000 fingerling and yearling brook, rainbow, brown, and lake trout. No output of smallmouth black bass was recorded, as the ponds to be utilized for this species were not completed until during the fall months. Brood stock of this species was collected and placed in the ponds this spring.

The Manchester (Iowa) station collected 2,992,000 rainbow trout eggs of which 89 percent were eyed. All of these eggs, with the exception of approximately 200,000, were shipped to other Bureau and State hatcheries. The production of smallmouth black bass was negligible, which was ascribed to the stocking of the rearing ponds with forage minnows previous to the introduction of bass fry. A new dwelling was constructed and residence No. 3 was moved to a new location and provided with a basement. Two 25-foot circular concrete ponds were built and a new main-supply pipe line was laid from the spring to the hatchery.

In an effort to step up the production of warm-water fish at the Flintville (Tenn.) station, 5 new ponds were excavated. Four of these are approximately 1 acre in area, the other being 2 acres. This brings the number of ponds up to 16, with a total area of $17\frac{1}{4}$ acres. The reservoir from which these ponds receive their water supply was enlarged. From 250,000 eyed rainbow eggs received by transfer, sufficient fish were produced to meet the requirements for this species in that territory.

The most outstanding feature of the fish-cultural work at the Erwin (Tenn.) unit was the production of more than 1,000,000 pondfish. The output of trout was on a level with that of last year. A new residence was constructed and the pond system enlarged.

Although the total number of rainbow trout eggs collected at the Neosho (Mo.) station was approximately 570,000 less than last year, the number shipped, due to the superior vitality of the eggs, nearly equaled that of last season. The selected brood stock of rainbow trout produced 1,305 eggs per pound of fish. Due to favorable weather during the pondfish spawning season, the output of warm-water species was the largest in the history of the station. Two rectangular trout ponds east of the hatchery building were razed and replaced by 3 circular concrete ponds. A concrete roadway was built and considerable landscaping was accomplished by W. P. A. laborers.

At the Bourbon (Mo.) substation, which is operated on a cooperative basis for the sole purpose of producing rainbow trout eggs, there was a material increase in the yield.

The collection of rainbow trout eggs from the Wytheville (Va.) station's brood stock amounted to 2,152,000 green eggs, which was slightly less than the previous season when 2,237,000 were collected. Approximately 1,133,000 of these eggs were shipped to other Federal and State hatcheries. The production of brook trout was the lowest in recent years, due to a gill infection which practically wiped out this species. The smallmouth black bass yield was also negligible, due to sudden changes in the temperature during the spawning season. The output of bream and rock bass was normal. The fry resulting from the pike perch eggs received from the Put in Bay (Ohio) unit were liberated in New River. Both hatchery buildings were reroofed and approximately 3,000 feet of pipe were laid to the ponds which are utilized for propagating spiny-rayed fishes. A new six-car garage was constructed, and eight brood trout ponds were rebuilt.

The inferior quality of the rainbow and Loch Leven trout eggs collected at the White Sulphur Springs (W. Va.) hatchery was ascribed to the food fed the brood stock. Due to the rebuilding of ponds utilized for the propagation of warm-water fishes, the output of bass was insufficient to meet the demands in that locality. The painting of all buildings except the work shop was completed. A number of new troughs were constructed and installed in the hatchery building. At the close of the year the spring pond and supply ditch were being walled up with stone, and the surrounding grounds landscaped.

At the Leetown (W. Va.) station results in trout-cultural work this year were gratifying, both as to the size and numbers of fish produced. A total of 625,735 fingerling brook, brown, and rainbow trout, of which number approximately 70,000 were in excess of 5 inches in length, were distributed. However, the percentage of hatch obtained from the 3,244,000 trout eggs collected from the station's brood stock was very low. Several thousand trout were assigned to the Monongahela and George Washington National Forests for the stocking of waters within their boundaries. Experiments in the feeding of fish meal, cod liver oil, and kelp meal to trout were carried on in order to further test their value as fish food. Other experiments were made to determine the effects of over- and underfeeding of trout. The production of spiny-rayed fishes was quadruple that of last season. The experiments in the stocking of warm-water rearing ponds with black-head minnows were continued for the purpose of determining how many forage minnows should be stocked per acre of water, and the time of year that they should be introduced into the rearing ponds. Three new residences were completed, and a sewerage system, which is for the combined use of the residences and the new dormitory, was

put into operation. Eleven ponds, 500 feet long by 50 feet wide, and a series of 15 small ponds, none of which was in excess of 150 feet in length, were excavated and part of them were placed in operation. A new 11-car garage with an oil-drain pit was built and a cold-storage room with a quick freeze compartment was constructed as an addition to the old garage building. In addition to the above construction work, pond outlet kettles were poured, drainage and supply lines were laid, old buildings were repaired and painted, and considerable landscaping was accomplished.

The output of trout from the Cape Vincent (N. Y.) station and its auxiliaries at Cortland, Watertown, and Barneveld was in excess of 1,500,000. Although the production of smallmouth black bass at Cape Vincent was 92,000, this number was inadequate to meet the demands in that locality. In order to increase the output of this species, additional ponds are being constructed. At the close of the year four were nearing completion and one other was partly excavated. At the Cortland unit the circular pools were completed and both hatchery buildings were enlarged.

The Lake Mills (Wis.) station established an all-time record in the production of pondfishes; largemouth black bass being the major species handled. The output of trout was normal, approximately 232,000 fingerling brook, brown, and rainbows being distributed for the restocking of waters in that vicinity. During the year, ponds were excavated as follows: 2 ponds 4 acres in area; 1 pond 1 acre in area; and 5 ponds ranging from $\frac{1}{2}$ to $\frac{1}{3}$ of an acre. Outlet kettles and the necessary supply and drainage lines were installed in these ponds. The exteriors of all buildings were given 2 coats of paint and the interior of the hatchery building was painted.

APPALACHIAN AND BLUE RIDGE TROUT STATIONS

The Smokemont (N. C.) station produced 326,000 rainbow and brook trout, ranging in size from 3 to 7 inches, for the stocking of waters in the Great Smoky Mountain National Park and the Cherokee Indian Reservation. A built-in refrigerator for the storage of fish food was constructed and the necessary refrigerating machinery installed.

The Pisgah Forest (N. C.) unit, which is located on the Davidson River in the Pisgah National Forest, reared its output of approximately 50,000 brook, brown, and rainbow trout to a large size before releasing them. Fishing records maintained for the season would indicate that better catches are now being made from the waters of the Pisgah Forest. This is attributed to the stocking and stream management programs formulated.

The Wallhalla (S. C.) station conducted its fish-cultural activities along routine lines and attained normal success in the production and distribution of brook and rainbow trout fingerlings. A hydroelectric unit was installed to provide power and lights for station operations. The trout reared in the ponds at the Franklin (N. C.) and Clayton (Ga.) substations were liberated in the waters of the Nantahala and Chattahoochee Forests, respectively.

POND FISH STATIONS

Although records indicate that there has been a larger number of pondfish distributed in previous years, a large percentage of such fish were obtained from rescue operations along the Mississippi River. The actual number of warm-water fish produced at the various hatcheries sets an all-time record. The largest increase was in the production of largemouth black bass. Notwithstanding the fact that weather and other conditions, over which there is no control, influence the production of pondfish, the principal requirement for a large output of bass and other warm-water species is space. Therefore, in an endeavor to properly stock waters which are suitable for such species, the Bureau is constructing new hatcheries, and pond acreage at the old-established units is being enlarged as funds will permit.

The total production of largemouth black bass, sunfish, and crappie at the Harrison Lake hatchery, located at Roxbury, Va., was practically the same as last year. Efforts are being made to increase the natural food by introducing aquatic plants in the ponds. Pond dikes were straightened, raised, and regraded, and grounds were landscaped by enrollees of a nearby C. C. C. camp.

For some unknown reason the production of each species, forage as well as game, handled at the Lake Park (Ga.) station was far below normal. As the vitality of the fish collected was low, there was high mortality in the holding shed and on some of the distribution trips. The Division of Wildlife of the State of Georgia distributed the larger portion of the fish produced at this unit, as well as those produced at the Warm Springs (Ga.) station. During the year the following four new buildings were constructed at Lake Park: Residence, two-car garage, holding shed, and a small office building. Roads were repaired, and two new bridges were constructed.

As the Louisville (Ky.) station was inundated in 1937, and practically all of the brood stock was lost, this hatchery's annual output is not, as yet, on a level with that for the years previous to the flood. The wild-brood stock collected from various sources is becoming acclimated and domesticated to pond conditions, and, with favorable weather conditions during the spawning season, the output of bass fry should have been greater. In addition to the propagation of smallmouth black bass, largemouth black bass, sunfish, crappie, and rock bass, this unit raised golden shiners and blackhead minnows for forage. A three-car garage and carpenter shop was constructed, and all buildings were repaired and painted. Two new ponds are being excavated. At the close of the year one pond was completed, except for the outlet kettle. The construction activities were carried on under the auspices of W. P. A. and P. W. A.

The Tennessee Valley Authority's hatchery at Norris, Tenn., which is operated by the Bureau, liberated its production of bass and bream in Norris Lake. From the 500,000 pike perch eggs furnished this unit from the Put in Bay (Ohio) station, 450,000 fry were hatched and planted in the lake.

From the Palestine (W. Va.) hatchery, which was operated in cooperation with the West Virginia Conservation Commission, 181,510 fingerling bass, bream, and crappie were distributed. This station was successful in securing a brood stock of channel catfish.

At the Orangeburg (S. C.) hatchery, and its nearby auxiliaries, the production of 1,009,185 fingerling pondfish exceeds that of any previous year. This output is a 94-percent increase over that of last season. Largemouth black bass and bluegill sunfish were the major species handled, while a limited production of redbreasted sunfish, red-eared sunfish, warmouth bass, catfish, crappie, and yellow perch was attained. The completion of a 900-foot section of the reinforced-concrete storm channel provides a canal the entire length of the pond system, thus eliminating hazards which greatly endangered the station ponds heretofore. A new one-story residence, consisting of six rooms and bath, was constructed. A storage shed and two garages were also constructed. The painting of all buildings was about 90 percent completed at the close of the year.

From 25 acres of water available for the production of fish at the Hoffman (N. C.) unit, 843,115 fish, of which all except 25,000 were fingerlings, were distributed. This output consisted of largemouth black bass, warmouth bass, sunfish, and crappie. In accordance with an agreement, several thousand of these fish were liberated in the ponds and lakes on the land utilization project in which this station is located. A site was cleared for the construction of 3 additional ponds, each of approximately 1 acre in area. One of the ponds was completed and considerable excavation work was done on the others. A combination holding and shipping shed, housing 4 concrete holding tanks, was constructed.

The output of fish from the Marion (Ala.) hatchery was the largest in the history of the station. The total output of largemouth black bass, bream, crappie, and rock bass was 3,228,390. Although some of the early bass eggs were lost on account of adverse weather conditions, the production of this species was in excess of 1,067,000 for the year. This station was unable to maintain a sufficient stock of crappie and rock bass and, consequently, the output of these species was inadequate to meet the demand. Twelve ponds, covering 16 acres, were added to the pond system. A well was drilled which produced 120 gallons of water per minute to furnish the necessary water for these ponds. A new holding shed is being constructed near this well in order to facilitate the handling of fish produced in the surrounding ponds. The levees on several of the old ponds were reinforced with dirt obtained from shallow areas. In addition to the above construction work, a number of repairs and improvements were made to buildings, roads, fences, drains, pond levees, etc.

Although the Cohutta (Ga.) station was under construction during the entire year, a limited production of smallmouth black bass, largemouth black bass, and Kentucky bass fry and small fingerlings was obtained for distribution during the spring. Six ponds were excavated during the period, which gives this station a total of 12 ponds. The office building, garage and workshop, holding house, residence, and pumphouse were completed. Grounds were cleared of underbrush and dead trees, and the areas around the buildings and pond embankments were sodded.

In spite of the fact that high winds prevailed at the Lyman (Miss.) station during the spring spawning season, this unit produced approximately 684,000 fingerling black bass and bream. The bass at this station grow very rapidly during the early part of the season, some attaining a length of 4 inches in 6 to 8 weeks. Owing to the various

sizes of bream taken from the ponds when they were drained, it is believed that this species spawned at least 9 months of the year in this locality. By enlarging the existing ponds, the water acreage was increased approximately 8½ acres. All levees were regraded and seeded with Bermuda grass, and willows were planted to prevent erosion around embankments except where there was danger of the roots clogging drainage lines.

Seventeen ponds covering 11.83 acres at the Marianna, (Fla.) unit were completed during the fall of 1938. On filling these ponds with water it was found that 6, due to seepage through the bottoms, would not hold sufficient water for the production of fish. Therefore, the output of 114,000 fry and 92,650 fingerling bass distributed from this station during the spring represents the production obtained from 5.93 acres of water. Difficulty was also encountered in obtaining sufficient brood stock from local sources for properly stocking the ponds that were utilized. As there was an unusually heavy culture of daphnia in the ponds used, the fish showed a remarkable growth. At the close of the year preparations were being made to apply a waterproofing treatment to the bottoms of all ponds. All buildings were completed and the surrounding grounds landscaped.

The Tupelo (Miss.) station, which has a pond area of only 16½ acres, produced more than 850,000 bass and bream, of which all except 198,000 were fingerlings. While the output of fingerling bass per acre was 42,500, the bream production was below 17,000. A six-room cottage was constructed. Approximately 8 inches of dirt was removed from four of the pond bottoms to eliminate the growth of water lilies, which have hindered the production and collection of young fish.

Inasmuch as several of the ponds at the Warm Springs (Ga.) station were not in operation, because of the fact that new supply and drainage lines were being laid and pond banks were being repaired and widened, the output of fish was slightly less than that of last year. Nevertheless, this unit produced approximately one-half million bass and bream for distribution. Catfish were received from the Lake Park unit and redistributed to applicants. In addition to the above construction activities, all buildings were repaired and painted.

Although unfavorable weather conditions prevailed and the water in the ponds was turbid during the spawning season, the Mammoth Spring (Ark.) unit attained a new record in the production of small-mouth black bass, with an output of 237,000 fry and 150,000 fingerlings. In addition to this species, largemouth black bass, rock bass, and bluegill sunfish were handled. A five-room cottage was constructed and repairs were made to all buildings, the barn being converted into a two-car garage. New concrete kettles were poured in three ponds and the levees and bottoms to all ponds were repaired and graded.

The city of St. Louis, Mo., with the assistance of the W. P. A. and P. W. A., built at the Forest Park station a new stone structure consisting of living quarters, office, garage, workshop, and holding shed. Ten new lakes were built and several of the old lakes and lagoons were deepened, cleaned, and reconditioned. New outlets were constructed and a better water supply system arranged to each lake and lagoon section. Due to these activities some of the lakes were not on a productive basis. Nevertheless, this unit produced approximately

400,000 fingerling fish for distribution. This station has proved a very valuable addition to the Bureau, inasmuch as it furnishes fish for the stocking of waters which heretofore had to be supplied from some remote point.

At the Tishomingo (Okla.) station approximately 14 acres of additional ponds were constructed. The following stone structures were built at this point: Four-room residence, three-stall garage, tool shed, and oil house. A holding shed is also under construction. Shortage of rainfall lowered Pennington Creek, the source of water supply, to where it was not flowing enough to maintain the proper level in the ponds. However, the 1939 output of fish was 716,980 fingerlings. Efforts to propagate channel catfish were a failure.

At the Natchitoches (La.) station W. P. A. and P. W. A. workers were engaged throughout the greater part of the year in the excavating of new ponds, laying of drainage and supply lines, building of a fence, gravelling of roads, repairing old pond bottoms and embankments, and constructing outlet kettles. Nevertheless, the output of fingerling largemouth black bass, warmouth bass, and sunfish was in excess of the previous year's record.

In addition to distributing more than 1 million fingerling largemouth black bass, bluegill sunfish, Rio Grande perch, and channel catfish, the Uvalde (Tex.) station liberated approximately 400,000 bass fry in local waters. The 39 ponds, totalling 44 acres in area, were devoted to the propagation of game species of fish, and 12 ponds, about $\frac{1}{2}$ acre each in area, for the handling of forage minnows. As the water at this hatchery contains certain chemicals, the steel water-supply lines were corroded to the point where it was necessary to replace them. At the end of the year approximately 85 percent of the lines had been replaced with composition pipe. An addition to the implement building was constructed and the exteriors of all station buildings were painted.

The output of fry and fingerlings from the San Marcos (Tex.) unit approximated normal figures. Several old buildings were razed and a new combination garage, shop, and storage structure was built. A small building was also constructed for the purpose of storing paint, oil and grease, and other highly inflammable supplies. All old station buildings were repaired and painted. Considerable work was done on ponds, grounds, levees, and roads.

From the brood stock of 4 species of fish handled at the San Angelo (Tex.) Station, more than $\frac{1}{4}$ million fingerling fish were distributed. Extensive daphnia culture was carried on during the spring months to produce food for the fry, and golden shiners were introduced in the rearing ponds when the bass were about $1\frac{1}{2}$ inches long. A residence and double garage were constructed during the year. The pond system drainage line was completed. The exteriors of all buildings were painted, the grounds around the new buildings landscaped, and the station driveways were regraded.

At the Fort Worth (Tex.) station the output of sunfish and warmouth bass was in excess of that of last year, while there was a slight recession in the number of largemouth black bass, crappie, and catfish distributed. This station was enlarged by the acquisition of a site containing 31 acres, on which 10 ponds, covering approximately 14 acres, were excavated. All old pond embankments were repaired

and the bottoms of 2 were regraded. New concrete outlet kettles were built in all ponds. The following buildings were constructed: Four-room cottage, garage and store building, oil and paint house, blacksmith shop, and holding shed. In addition to these activities the station property was fenced in, all buildings were painted, the drainage system was enlarged, roads were graded, and grounds were landscaped.

The Welaka (Fla.) station, which was received by transfer from the Farm Security Administration the latter part of last year, was favored with W. P. A. and P. W. A. projects for prosecuting extensive construction work. Complete individual supply and drainage systems were installed in eight ponds at the Beecher unit. New kettles were constructed in eight new 2-acre ponds, and pond bottoms were graded to allow sufficient drainage for collection of fish. There was installed a new supply and drainage system for the series of 24 one-acre ponds. Repairs were made to old residences. A four-car garage was constructed, a laboratory building was erected, and two 6-room stucco cottages were partially finished. Nevertheless, this unit distributed approximately 100,000 fry and 300,000 fingerling black bass as well as a limited number of sunfish.

At the Fairport (Iowa) station considerable repair work to pond bottoms, embankments, kettles, and supply and drainage lines was accomplished. For reasons previously mentioned, salvage work in this field was not necessary this year. As this unit is fully equipped to handle rescue work, it cooperated with the State Conservation Department and sportsmen's organizations in eastern Iowa in the collecting of fish from stagnant inland waters and liberated them in suitable waters. Gratifying success was attained in the culture of yellow and channel catfish.

In the Indiana field, the Rochester station established an all-time record in the production of pondfishes. The total output of all species handled at Rochester and the Argos auxiliary was in excess of 2 million—an increase of more than 1 million over last year. Further experiments in the culture of spoonbill catfish in ponds were undertaken at this hatchery, but the results were nil. The dam at Lake Manitou, the station's water supply, was torn out and rebuilt. Sheet steel piling was driven along the toe of the dam to a depth of 18 feet to prevent seepage, and the floor, wing walls, and apron were reconstructed of reinforced concrete. A six-room residence and garage, both of brick, were constructed. A new bridge was built across the creek that traverses the station grounds.

UPPER MISSISSIPPI WILDLIFE AND FISH REFUGE

Up to this year the principal activities within the Upper Mississippi Wild Life and Fish Refuge have been the salvage of stranded fish in overflow areas. However, the virtual completion of the 9-foot channel has nullified this activity, as is shown by the fact that only 1,864,820 fish were rescued in comparison with the annual turnover of 40 or 50 million fish in previous years.

A new phase of activity has, therefore, been undertaken by the construction of an extensive series of propagating ponds, many entirely artificial while others are seminatural. Several of these have

been in use for the past few seasons and have yielded excellent results. During the year additional pond acreage was under development at Genoa, Wis., and Guttenberg, Iowa. The former, which produced approximately two million bass fingerlings, now constitutes an extensive fish-cultural unit, while the latter, when completed, will be one of the largest hatchery developments in the country. A number of years will be required for full realization of this program, but the projects are being placed in productive operation as fast as individual ponds can be completed. The La Crosse (Wis.) Station, headquarters for these activities, has hatched and distributed 1,082,600 trout for direct planting in suitable waters and for transfer to Forest Service rearing ponds and cooperative nurseries maintained by sportsmen's clubs.

The Homer (Minn.) substation was largely engaged in the overhauling and repairing of equipment, boats, trucks, etc., utilized in that territory. The personnel also constructed seines, dip nets, egg cases, boats, outlet kettle forms, and other apparatus for use at the various hatcheries.

Fish rescued and restored to original waters, fiscal year 1939

<i>Species</i>	<i>Number</i>
Black bass.....	9, 700
Crappie.....	121, 300
Sunfish.....	210, 400
Catfish.....	1, 379, 000
Yellow perch.....	93, 600
Pike pickerel.....	2, 620
Buffalofish.....	31, 700
White bass.....	7, 500
Miscellaneous.....	9, 000
Total.....	1, 864, 820

NOTE.—The station at Guttenberg, Iowa, handled 1,352,020 of the above-enumerated fish and the station at Marquette, Iowa, handled 512,800.

AQUARIUM

The Bureau of Fisheries' aquarium, which is located in the basement under the main lobby in the Department of Commerce Building, has constantly increased in popularity among all classes of visitors. The fact that it is open to the public on Saturday afternoons and Sundays until 4 p. m. has enabled many who would not otherwise find it possible to view the displays during the weekends.

The number of specimens and species on display has varied somewhat during the year, but, as a general rule, approximately 1,500 individual specimens, representing about 50 varieties, are shown in the 47 tanks and 3 floor pools.

A consignment of spoonbill catfish (*Polyodon spathula*) collected from the Ohio River was received. However, the shipment arrived during the rainy season and the fish were unable to endure the chlorine in the water. Small activated carbon filters have been installed for the purpose of removing as much of the chlorine as possible in order to maintain the species that are susceptible to this chemical.

Further experiments were made with potassium permanganate in the treatment of fish affected by external parasites, especially with

regard to the application of such remedial measures to specimens held in outdoor pools.

The seasonal miniature hatchery, which is a special attraction to biology classes, was on display for the purpose of illustrating the methods utilized to incubate non-buoyant and semi-buoyant eggs.

In addition to holding fish in the reserve tanks for distribution to applicants in this locality, the aquarium was used in preparing and forwarding shipments of live fish and eggs to Puerto Rico and Colombia.

DISTRIBUTION OPERATIONS

As the majority of distribution-car trips are made from stations in the Mississippi River territory, this service was partly decentralized during the year by the assignment of an Assistant Superintendent of Distribution to the La Crosse (Wis.) station. This procedure will expedite distribution, inasmuch as it is often necessary to move fish in that area without delay. This condition was brought about by the fact that the ponds constructed in the Mississippi River refuge have been very productive, and proper holding facilities for large numbers of fish are not available.

The same number of fish can be carried by truck as by distribution car, to destinations within a radius of approximately 300 miles, at about one-fourth the cost. For this reason the Bureau is purchasing additional automotive equipment, as funds permit, and car No. 7, the oldest distribution car in Bureau service, was decommissioned and recommended for condemnation.

Many types of aerating equipment are in use at present by various Government and private agencies engaged in the distribution of fish by truck. The purpose of this equipment is the maintenance of the oxygen content and temperature of the water in the truck tanks at a level best suited to the fish during transportation. The Bureau's distribution trucks have been equipped with several different types of aerating apparatus in an effort to determine, from experience in actual use, which is best suited to this service. Upon conclusion of these trials the type of apparatus which has rendered the most satisfactory service will be adopted as standard.

Truck deliveries during the year aggregated 333,950 miles, exclusive of the distance traveled by National Park, National Forest, and State conservation department trucks engaged in the distribution of fish produced at Federal hatcheries. Neither does the above figure include travel by individuals and sportsmen's organizations who called at the hatcheries to receive their allotments of fish. The distribution cars engaged in the delivery of fish to applicants, and transfers of fish between hatcheries, made 77 trips during the year and carried an average of 260 pails per trip. The cars traveled 52,899 paid miles and 11,789 free miles. Detached messengers traveled 45,152 paid miles and 1,639 free miles in delivering fish to applicants. The Bureau was again favored with free transportation and reduced rates by a number of the railroads.

Summary, by States, of the distribution of fish, fiscal year 1939

State and species	Number	State and species	Number
Alabama:		Iowa--Continued.	
Black bass, largemouth.....	871,280	Rock bass.....	9,220
Black bass, smallmouth.....	27,600	Sunfish.....	184,840
Catfish.....	20	Kansas:	
Crappie.....	150	Black bass, largemouth.....	8,560
Rainbow trout.....	20,100	Crappie.....	850
Rock bass.....	1,770	Rainbow trout.....	5,000
Sunfish.....	1,836,320	Sunfish.....	14,700
Arizona: Black bass, largemouth.....	40,000	Kentucky:	
Arkansas:		Black bass, largemouth.....	63,330
Black bass, largemouth.....	138,075	Black bass, smallmouth.....	305,140
Black bass, smallmouth.....	110,000	Crappie.....	300
Crappie.....	6,125	Rock bass.....	12,100
Rainbow trout.....	1,100	Sunfish.....	8,445
Rock bass.....	8,000	Louisiana:	
Sunfish.....	55,250	Black bass, largemouth.....	273,840
Warmouth bass.....	1,500	Sunfish.....	415,850
California: Chinook salmon.....	18,088,500	Warmouth bass.....	33,615
Colorado:		Maine:	
Black bass, largemouth.....	29,900	Black bass, smallmouth.....	84,000
Blackspotted trout.....	1,064,780	Brook trout.....	558,585
Brook trout.....	2,053,995	Flounder.....	603,000,000
Catfish.....	4,600	Lake trout.....	67,800
Crappie.....	3,000	Lobster.....	2,900,450
Lake trout.....	21,700	Rainbow trout.....	4,800
Loch Leven trout.....	102,800	Maryland:	
Rainbow trout.....	1,151,850	Black bass, largemouth.....	43,750
Rock bass.....	615	Black bass, smallmouth.....	800
Sunfish.....	16,300	Brook trout.....	100
Connecticut:		Catfish.....	150
Black bass, smallmouth.....	398,000	Loch Leven trout.....	2,995
Brook trout.....	19,500	Rainbow trout.....	81,500
Rainbow trout.....	3,250	Sunfish.....	20,965
Florida:		Yellow perch.....	6,701,850
Black bass, largemouth.....	547,195	Massachusetts:	
Catfish.....	300	Black bass, smallmouth.....	147,000
Sunfish.....	19,960	Brook trout.....	336,090
Georgia:		Cod.....	132,605,190
Black bass, largemouth.....	337,185	Flounder.....	277,133,170
Black bass, smallmouth.....	3,640	Haddock.....	5,768,340
Brook trout.....	185,260	Lobster.....	1,148,500
Catfish.....	8,950	Mackerel.....	11,060,000
Crappie.....	1,010	Pollock.....	50,762,700
Kentucky bass.....	7,250	Rainbow trout.....	20,720
Rainbow trout.....	94,945	Michigan:	
Sunfish.....	519,630	Black bass, largemouth.....	271,670
Idaho:		Black bass, smallmouth.....	9,675
Blackspotted trout.....	669,050	Brook trout.....	827,720
Brook trout.....	167,045	Lake trout.....	692,250
Landlocked sockeye salmon.....	318,200	Loch Leven trout.....	1,200
Rainbow trout.....	1,698,410	Rainbow trout.....	115,770
Sockeye salmon.....	159,870	Sunfish.....	120,350
Steelhead trout.....	17,360	Whitefish.....	900,000
Illinois:		Minnesota:	
Black bass, largemouth.....	18,840	Black bass, largemouth.....	525,735
Black bass, smallmouth.....	52,000	Black bass, smallmouth.....	4,520
Brook trout.....	5,500	Brook trout.....	372,400
Catfish.....	7,350	Crappie.....	11,575
Crappie.....	2,910	Lake herring.....	3,000,000
Pike perch.....	1,500,000	Lake trout.....	185,500
Sunfish.....	29,505	Loch Leven trout.....	96,400
Indiana:		Pike perch.....	13,640,000
Black bass, largemouth.....	1,133,850	Rainbow trout.....	94,900
Black bass, smallmouth.....	38,070	Sunfish.....	24,050
Brook trout.....	105,200	Mississippi:	
Catfish.....	4,340	Black bass, largemouth.....	968,000
Crappie.....	6,750	Sunfish.....	860,925
Loch Leven trout.....	163,840	Missouri:	
Rainbow trout.....	99,415	Black bass, largemouth.....	771,940
Rock bass.....	34,725	Black bass, smallmouth.....	200,000
Sunfish.....	657,400	Catfish.....	10,450
Yellow perch.....	2,590	Crappie.....	47,100
Iowa:		Rainbow trout.....	50,000
Black bass, largemouth.....	53,905	Rock bass.....	7,500
Black bass, smallmouth.....	3,600	Sunfish.....	153,240
Buffalofish.....	800	Montana:	
Catfish.....	220,385	Black bass, largemouth.....	7,670
Crappie.....	26,630	Blackspotted trout.....	3,171,655
Loch Leven trout.....	10,100	Brook trout.....	248,010
Rainbow trout.....	23,675	Catfish.....	43,715

PROPAGATION AND DISTRIBUTION OF FOOD FISHES, 1939 597

Summary, by States, of the distribution of fish, fiscal year 1939—Continued

State and species	Number	State and species	Number
Montana—Continued.		Oklahoma:	
Crappie.....	28,500	Black bass, largemouth.....	199,340
Golden trout.....	71,040	Crappie.....	25,930
Grayling.....	445,280	Rainbow trout.....	4,540
Loch Leven trout.....	298,400	Sunfish.....	567,950
Rainbow trout.....	1,142,170	Oregon:	
Sunfish.....	46,960	Brook trout.....	508,145
Nebraska:		Chinook salmon.....	1,946,280
Black bass, largemouth.....	10,600	Rainbow trout.....	215,000
Brook trout.....	146,150	Steelhead trout.....	63,060
Catfish.....	11,300	Pennsylvania:	
Crappie.....	25,775	Black bass, largemouth.....	50,415
Grayling.....	2,770	Brook trout.....	134,940
Rainbow trout.....	398,200	Catfish.....	7,750
Rock bass.....	4,500	Loch Leven trout.....	135,065
Sunfish.....	6,000	Rainbow trout.....	240,815
Nevada:		Sunfish.....	84,950
Black bass, largemouth.....	86,000	Rhode Island:	
Brook trout.....	52,000	Black bass, smallmouth.....	4,000
Rainbow trout.....	79,480	Brook trout.....	750
New Hampshire:		Flounder.....	121,455,000
Black bass, smallmouth.....	147,000	South Carolina:	
Brook trout.....	470,870	Black bass, largemouth.....	459,935
Catfish.....	200	Black bass, smallmouth.....	50
Lake trout.....	3,500	Brook trout.....	135,405
Loch Leven trout.....	2,500	Catfish.....	500
Rainbow trout.....	3,340	Crappie.....	20,975
New Jersey:		Loch Leven trout.....	2,000
Black bass, largemouth.....	10,280	Rainbow trout.....	144,125
Brook trout.....	10,000	Shad.....	1,534,000
Catfish.....	100	Sunfish.....	822,975
Flounder.....	11,774,000	Warmouth bass.....	32,800
Rainbow trout.....	27,400	Yellow perch.....	1,800
Sunfish.....	13,850	South Dakota:	
New Mexico:		Black bass, largemouth.....	25,610
Black bass, largemouth.....	883,010	Blackspotted trout.....	22,000
Black bass, smallmouth.....	12,000	Brook trout.....	102,185
Blackspotted trout.....	93,000	Catfish.....	43,750
Brook trout.....	37,900	Crappie.....	8,500
Catfish.....	17,420	Loch Leven trout.....	42,500
Crappie.....	33,630	Rainbow trout.....	600,655
Rainbow trout.....	480,000	Sunfish.....	24,000
Sunfish.....	568,800	Tennessee:	
New York:		Black bass, largemouth.....	837,750
Black bass, largemouth.....	10,600	Black bass, smallmouth.....	28,750
Black bass, smallmouth.....	243,685	Brook trout.....	190,630
Brook trout.....	735,125	Crappie.....	550
Flounder.....	172,578,000	Kentucky bass.....	3,100
Lake trout.....	756,970	Loch Leven trout.....	2,350
Loch Leven trout.....	118,915	Pike perch.....	450,000
Rainbow trout.....	127,000	Rainbow trout.....	536,380
Whitefish.....	20,000	Rock bass.....	8,975
North Carolina:		Sunfish.....	101,290
Black bass, largemouth.....	713,060	Texas:	
Brook trout.....	223,325	Black bass, largemouth.....	1,441,270
Crappie.....	37,670	Catfish.....	8,600
Loch Leven trout.....	40,145	Crappie.....	30,790
Rainbow trout.....	317,175	Rainbow trout.....	7,500
Rock bass.....	6,015,000	Rio Grande perch.....	175,760
Shad.....	1,797,950	Rock bass.....	5,100
Striped bass.....	251,890	Sunfish.....	897,515
Sunfish.....	16,000	Warmouth bass.....	8,100
Warmouth bass.....	4,300,000	Utah:	
White perch.....	998,140	Black bass, largemouth.....	4,295
Yellow perch.....		Blackspotted trout.....	657,160
North Dakota:		Brook trout.....	565,410
Black bass, largemouth.....	51,300	Chum salmon.....	94,080
Brook trout.....	750	Landlocked sockeye salmon.....	47,000
Catfish.....	2,750	Rainbow trout.....	573,665
Catfish.....	23,820	Silver salmon.....	78,955
Crappie.....	20,520	Sockeye salmon.....	188,080
Sunfish.....		Sunfish.....	800
Ohio:		Vermont:	
Black bass, largemouth.....	135,740	Black bass, largemouth.....	1,275
Brook trout.....	5,200	Brook trout.....	1,330,365
Catfish.....	9,200	Lake trout.....	12,000
Crappie.....	2,020	Landlocked salmon.....	5,990
Loch Leven trout.....	35,000	Rainbow trout.....	2,500
Pike perch.....	314,500,000	Virginia:	
Rainbow trout.....	38,850	Black bass, largemouth.....	91,380
Rock bass.....	20,950	Black bass, smallmouth.....	6,485
Sunfish.....	98,100		

Summary, by States, of the distribution of fish, fiscal year 1939—Continued

State and species	Number	State and species	Number
Virginia—Continued.		West Virginia—Continued.	
Brook trout.....	134,395	Crappie.....	17,600
Catfish.....	275	Lock Leven trout.....	23,760
Crappie.....	7,286	Rainbow trout.....	109,825
Pike Perch.....	400,000	Sunfish.....	151,860
Rainbow trout.....	475,915	Wisconsin:	
Rock bass.....	12,500	Black bass, largemouth.....	1,395,545
Shad.....	31,174,225	Black bass, smallmouth.....	18,000
Sunfish.....	112,640	Brook trout.....	460,100
Yellow perch.....	292,968,000	Catfish.....	3,700
Washington:		Crappie.....	47,250
Black bass, largemouth.....	3,125	Lock Leven trout.....	257,420
Blackspotted trout.....	664,765	Rainbow trout.....	280,800
Brook trout.....	661,250	Sunfish.....	38,850
Chinook salmon.....	28,247,230	Yellow perch.....	600
Chum salmon.....	7,876,275	Wyoming:	
Crappie.....	6,000	Black bass, largemouth.....	10,050
Rainbow trout.....	539,210	Blackspotted trout.....	7,151,600
Silver salmon.....	716,675	Brook trout.....	742,745
Sockeye salmon.....	1,557,555	Catfish.....	16,325
Steelhead trout.....	864,900	Crayfish.....	4,308,755
Sunfish.....	13,000	Lake trout.....	7,600
West Virginia:		Rainbow trout.....	577,050
Black bass, largemouth.....	39,105	Sunfish.....	4,150
Black bass, smallmouth.....	10,380	Yellow perch.....	10,000
Brook trout.....	28,480		

