32ND Annual Report

1961

DEPARTMENT OF FISHERIES

CANADA

Being the Ninety-fifth Annual Fisheries
Report of the Government of Canada

61925-4—1

ROGER DUHAMEL, F.R.S.C.
QUEEN'S PRINTER AND CONTROLLER OF STATIONERY
OTTAWA, 1963

Price: 50 cents Cat. No: Fs 1-1961

To His Excellency Major-General Georges P. Vanier, D.S.O., M.C., C.D.,
Governor General and Commander-in-Chief of Canada

May it Please Your Excellency:

I have the honour herewith, for the information of Your Excellency and the Parliament of Canada, to present the Annual Report of the Department of Fisheries for the year 1961, and the financial statements of the Department for the fiscal year 1961–1962

Respectfully submitted,

Minister of Fisheries.

61925-4—1½

To the Honourable J. Angus MacLean, M.P.,
Minister of Fisheries,
Ottawa, Canada.

Sir:

I submit herewith the Annual Report of the Department of Fisheries for the year 1961, and the financial statements of the Department for the fiscal year 1961–1962.

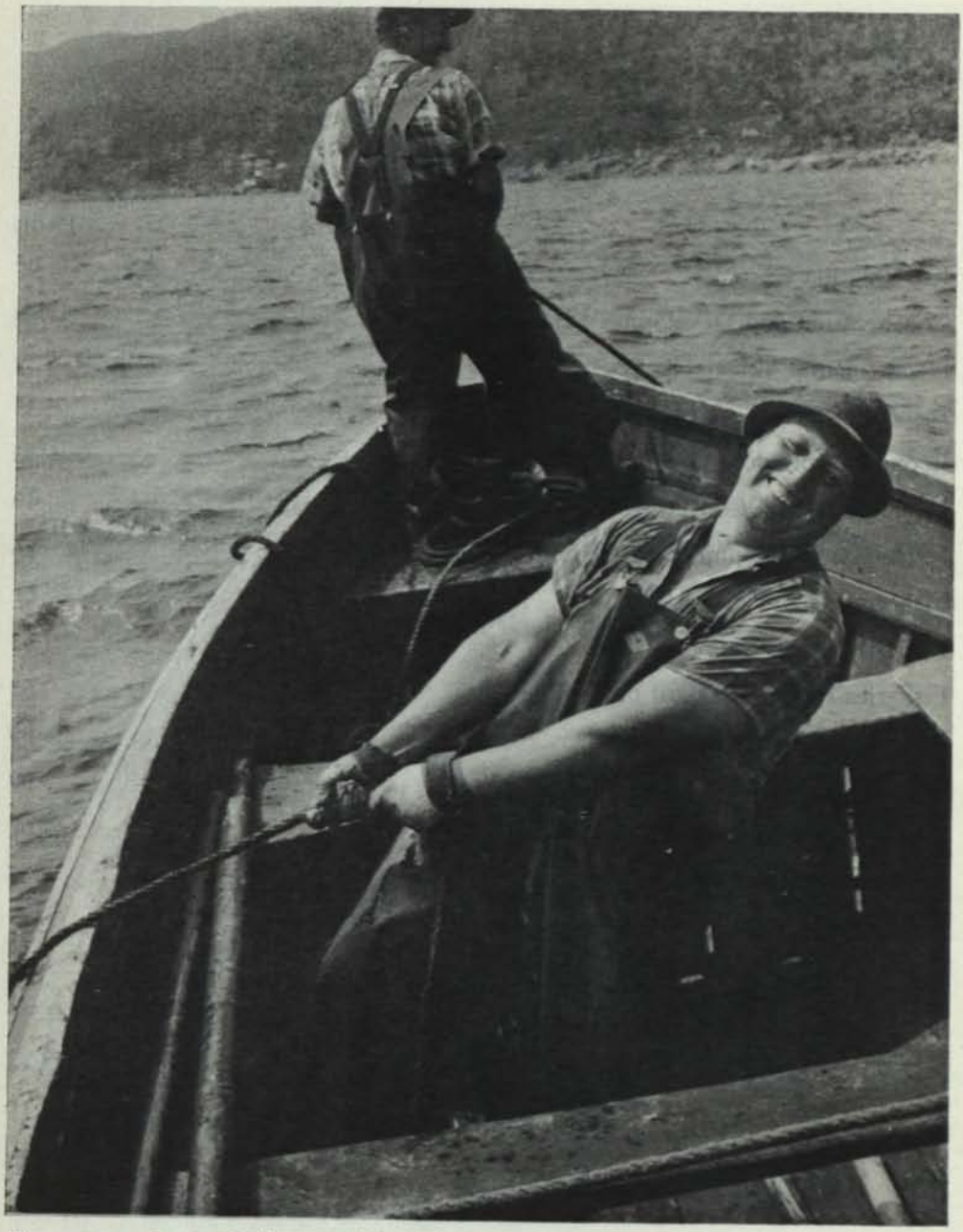
I have the honour to be, Sir,

Your obedient servant

Deputy Minister.

CONTENTS

APPENDICES



Strong arms and a stout back are requisites for a successful fisherman. This Newfoundlander qualifies on both counts, and obviously revels in his work.

INTRODUCTION

THROUGHOUT Canada's history her fishery resources have been an important source of income and today, with the harvests garnered from the Atlantic and Pacific and from some 260,000 square miles of freshwater areas, she is one of the world's leading eight producers of fishery products and among the first three exporting nations.

The Department of Fisheries is responsible for protecting and developing the country's primary fishery resources. It must guard and, where possible, increase the stocks and at the same time allow maximum exploitation to encourage the expansion of the fishing industry in the national economy. Standards of quality must be maintained for the good of consumers both at home and abroad, and a proper public understanding of the resource and the industry must be achieved.

The Canadian catch of all species of fish and shellfish by the country's 80,000 fishermen in 1961 was just under a million tons. The landed value was nearly $110 million, about eight per cent more than in 1960. The value at the processing level was approximately $200 million, of which total products worth slightly more than $143 million were exported, an increase of four per cent over the 1960 exports. Chilled, frozen and canned products accounted for the increase. British Columbia production was up about 25 per cent, chiefly because of higher salmon landings, although herring and halibut catches were also good. The Atlantic fisheries, which had had a record year in 1960, were down in value to a small extent, and the inland waters maintained and in some cases increased production levels.

The Department's work is directed from headquarters at Ottawa and from area offices at Vancouver, Winnipeg, Quebec, Halifax and St. John's, from which the field work is directed for the Pacific, Central, Quebec, Maritimes and Newfoundland Areas. The working force in the field is made up mainly of Protection and Inspection Officers and the fish culture staff of biologists, engineers and technicians. Their work is covered in the following chapters.

The Fisheries Prices Support Board and the Fishermen's Indemnity Plan are administered from Ottawa headquarters. The Prices Support Board is concerned with the problem of falling prices to fishermen, but in 1961 fishermen's incomes were generally higher than in 1960 with the exception of the northeast coast of Newfoundland, where the Board made recommendations for the benefit of inshore fishermen who suffered from a partial failure of the trap fishery. Fishermen generally, on both coasts, continued to take advantage of the low cost insurance provided by the Indemnity Plan.

One of the greatest problems facing the Atlantic coast fishing industry has developed in recent years with the tremendous pressure placed on the fishing resource by the expanded fishing fleets of other nations. The competition for the fish from the banks of the Northwest Atlantic, which are among the most

productive in the world, has made some sort of protection a vital necessity, as has the greatly increased fishing activity all along the Atlantic seaboard. The need for international action has become evident not only in the Northwest Atlantic but in other areas, and Canada is a member nation of seven international commissions, whose work on fisheries matters is summarized in a chapter of this report. The Commissions publish detailed annual reports of their activities.

The biological, technological and oceanographic work of the Fisheries Research Board of Canada is dealt with in another chapter. A more detailed account of the investigations carried out is published in a separate annual report issued by the Board, which functions under the authority of the Minister of Fisheries and is the scientific arm of the Department.

Bluefin tuna harpooned off Nova Scotia.

CONSERVATION AND DEVELOPMENT SERVICE

THE PROTECTION and maintenance of the fisheries resource, in the face of Canada's industrial growth, the ever-increasing efficiency of fishing methods, the pressure of a widely developing sports fishery and the resistance of a small but persistent number of people to regulations, call for a steady expansion of conservation efforts both at sea and on land.

In protection work, the fleet of 79 vessels listed in the next chapter was operated by the Service to maintain constant patrols of commercial fishing areas of both the Atlantic and Pacific Oceans and in certain inland areas. In offshore waters, the larger ships check the observance of both Canadian and international regulations while smaller, fast boats guard the fisheries of inland waters. The fleet is also subject at all times to call for service under Canada's over-all Search and Rescue Plan of Co-ordinated Assistance.

The effect on marine and aquatic life of water pollution continues to be a major problem in all areas, as does the multiple use of waters. These, added to the normal expansion of fish culture work, continue to strain the human and physical resources of the Service.

PROTECTION BRANCH

Maritimes Area

Weather conditions in 1961 were both good and bad for commercial and sport fishing. It was a year when the worst drift ice conditions of the past 30 years occurred in the Gulf and along the eastern coast of Nova Scotia. It was a year when inland water levels ranged from floods to extremely low conditions. It was a year of tragedy and a year of changes.

A prolonged cold period with frequent heavy snowstorms lasted through the first three months of the year and freezing temperatures occurred every day. Extremely high winds prevailed during this time and continued into April and May. The summer and early autumn months were fine and very dry, with the water levels becoming dangerously low. The last two months of the year were fine and mild with occasional heavy rains. Fog was present on the Atlantic Coast on 89 different days. All this of course had a marked influence on commercial and sport fishing. The commercial catch was somewhat lower than in 1960 and the angling results showed little change.

The decrease in the commercial catch was mainly in landings of herring, mackerel and groundfish. Lobster landings constituted about six per cent of the total volume, but accounted for over 39 per cent of the total landed value.

61925-4—2

The year 1961 brought an increased fishing effort for scallops, and some record catches were landed. When compared with 1960, the over-all landings of scallops showed an increase of 36 per cent in catch, and 52 per cent in landed value.

The 1961 sealing season opened in the Gulf on March 5 and on the northern front on March 10, both closing on May 5. The season was a poor one due to heavy ice conditions. Only 19,967 seals were taken, as against 111,600 during the season of 1960. With the introduction of new sealing regulations, each Canadian ship had to be licensed and registered in Canada. Nine vessels from the Maritimes Area participated in the hunt.

The market for Irish moss was exceptionally good, and the quantity harvested amounted to over 48 million pounds, with a landed value of approximately three quarters of a million dollars, which more than doubled last year's value. The big producing areas were in western Nova Scotia and Prince County, P.E.I.

The Protection Branch, in 1961, had a complement of 497 men, of whom 189 were full-time employees and 308 worked on a seasonal basis. It is the responsibility of the Branch to enforce the regulations made under the Northwest Atlantic Fisheries Convention Act, as recommended by the International Commission for the Northwest Atlantic Fisheries. These require that otter trawl nets used by trawlers and draggers be of a certain size mesh. In order to maintain these regulations, it is necessary that nets be measured periodically. Because the nets are heavy and awkward to handle, it takes at least two men to carry out a complete measurement of a unit, and since this job can only be undertaken at certain times, there is a considerable time factor involved. However, 186 vessels using otter trawls were checked, and 239 nets were surveyed and measured.

Over-all angling catches of sport fish were much the same as in the previous year. The only noteworthy change was in Atlantic salmon, 2992 more fish having been taken than in the previous season. Nova Scotian rivers accounted for over half the total increase, while the Miramichi system had an increase of 1305 fish, and the Restigouche system an increase of 127 fish. Inland water levels were high during the spring and fall months, but the summer months of July, August and September were hot and dry and water levels were extremely low. This was the second consecutive dry summer and it must be said that 1961 was another low-water year. The month of October brought heavy rains and fish had no difficulty in reaching the spawning grounds.

Despite the unfavourable conditions which existed, a cold late spring and a hot dry summer, the over-all catches of trout were on a par with last year, there being an estimated decrease of about five per cent. These conditions were similar in all three provinces. Striped bass anglers in Nova Scotia had a good year, but the catches in New Brunswick waters were considerably lower than the previous year. There was a considerable increase in salt water angling over the previous year. During the 1961 season, 60 boats were available to take out anglers and all the operators were certified masters. In Nova Scotian waters, 72 bluefin tuna were taken by rod and line—37 off Halifax, 23 off Cape St. Mary's, and 12 off Wedgeport.

In 1961, the Protection Branch in the Maritimes Area dealt with 506 prosecutions. Convictions were obtained in 482 cases. A total of $10,692 was collected in fines, and five persons went to jail. More than half of the prosecutions, 263, were the result of illegal lobster fishing, which accounted for $6443 of the fines and one of the jail sentences. The other four jail terms were for illegal clam fishing.

In addition to the prosecutions, Protection Officers and patrol boat crews made 2315 confiscations. The majority of these were directly concerned with illegal lobster fishing, which resulted in the liberation of 143,230 live lobsters and the destruction of 18,019 illegally set traps.

Twenty-eight Government-owned boats and five chartered boats were on regular patrol during the year. In the course of their duties they covered approximately 172,000 miles. Only 12 of these boats are employed on a year-round basis; the remainder are seasonal boats in the Gulf area. All boats gave good service and while some complaints were received that foreign vessels were working inside Canadian territorial waters, investigations revealed these reports were unfounded.

Two patrol boats, the *Alosa* and the *Illea*, were replaced during 1961. The *Maces Bay*, a 60-foot longliner type, built at Alberton, replaced the *Alosa* in August, and the *Cheval Point*, also built at Alberton, replaced the *Illea* in October.

More than 36,000 licenses and permits were issued during the year. Of these, 21,351 were lobster fishing licenses. Over 9000 were non-revenue permits and certificates, which included 4570 black salmon angling permits.

The estimated loss in fishing vessels, boats and gear during the year 1961 was approximately $775,000. Eight longliners, three large draggers and one large trawler accounted for about $557,000 of this loss, while lobster traps, weirs, nets and 10 lobster fishing boats represented the balance.

Thirty-nine people lost their lives while engaged in fishing during the year. Twenty-three were commercial fishermen and 16 were anglers. The worst tragedy occurred during March when three longliners out of Lockeport were lost, taking 17 men down with them.

During the year, many of the Protection Officers took advantage of low-water conditions to carry out stream improvement projects by clearing obstructions on the feeder and nursery streams.

The payment of bounty on harbour seals was continued in 1961 at the rate of $10.00 for an adult and $5.00 for a pup. In order to claim bounty, fishermen must forward the lower jaw to Halifax for examination. During the year, 694 seal jaws were examined and 653 were found to be eligible for bounty. The total bounty payments amounted to $4265.

Pacific Area

Regulation and management of the salmon fisheries is one of the major concerns of the Department in this area and, except for the management of the Fraser and Skeena sockeye and pinks, is the responsibility of the officers of the Protection Branch.

61925-4—2½

Landings of salmon in 1961 totalled 18,091,000 fish, somewhat below average but a sharp increase over the poor returns of 1960. On a coastwise basis the returns of sockeye were generally fair. With the exception of 1958 the catch in 1961 was the largest since 1954. The returns to District No. 2 were above average with a larger than expected run to the Skeena River. The Fraser River runs, although showing strength in early stages, weakened later and did not produce up to expectations. Escapements to all major producing areas, with the exception of the Rivers-Smith Inlets area were adequate. However, serious losses were experienced in some Fraser River watersheds because of high temperature conditions during the adult migration and spawning periods.

The pink salmon pack of 661,000 cases (8,304,800 fish) while an improvement over the cycle year 1959 was less than the average return for the odd year. While northern areas produced well, the catch in District No. 2 being the largest since 1952, the poor returns to the Johnstone Straits area and the near failure to the Fraser River system were responsible for the decline.

The Bella Coola sub-district for the second consecutive year produced a good pink run, the catch totalling 1,750,000 fish. The Skeena River and Butedale sub-districts also produced catches in excess of one million pinks each. The runs were also reflected in good escapements to these areas. The Atnarko River in the Bella Coola system had an escapement of approximately one million pinks. The Skeena River and the many rivers producing the catch in the Butedale area were also adequately seeded. The Nass Area was the only sub-district in the north with a high production potential that failed to reach the five-year average catch of pink salmon.

The return of chum salmon along the B.C. coast was again very disappointing. In District No. 2 the catch of 658,000 fish was only about one-half of the cycle years 1957 and 1958, while in District No. 3 the catch of 510,600 fish was the lowest on record, 61 per cent of the 1957 catch and only 30 per cent of that of 1958. Of some encouragement was the fact that the spawning escapement along the east coast of Queen Charlotte Island, for the second consecutive year, showed very definite improvement compared to escapements in the past number of years, which have been especially poor. Drastic conservation measures were taken in an endeavour to obtain escapements.

There was a good run of coho salmon with a total catch of 3,297,000 pieces, the largest return since 1951. District No. 2 and the west coast of Vancouver Island produced well, especially in the troll fishery. The only main producing area that did not equal or better cycle years was the blueback (small coho) fishery in the Gulf of Georgia.

Spring salmon returns were again light, less than the poor runs in 1960. The catch by trollers was in some areas down as much as 20 per cent from the five-year average. Notwithstanding the lighter runs of this species, fair escapements were obtained in the principal spawning grounds in District No. 2, i.e., Nass, Skeena, and Bella Coola. The escapement to District No. 3, however, was light, less than the brood year. Runs to the Fraser River spawning grounds also were light, less than the brood year.

Regulatory measures in the interests of conservation through shortened fishing weeks and partial or complete closure of fishing areas were again stringent in the chum fishery and the Fraser River pink fishery, the most restrictive ever imposed. Even in areas where runs of salmon were in good abundance, the trend was to reduce fishing time due to the ever increasing efficiency and mobility of the fleet.

Fishery Officers issued 21,898 commercial fishing licenses during the year as well as 2165 Indian fishing permits. In addition 954 angling permits were issued for sports fishing in tidal areas where such permits are required by regulations, i.e., Rivers Inlet, Phillips Arm and Muchalat Inlet.

During the year there were 273 prosecutions for violation of the various acts and regulations which it is the responsibility of the Department to administer. Revenue amounted to $12,199.89 from fines and $8676.26 from sales of confiscated articles and fish. Other duties of Fishery Officers include predator control, stream clearance work, and fry salvage. Two hundred and seventy-four hair seals and 62 sea lions were destroyed by Department personnel in 1961. One hundred twenty-two thousand and six hundred salmon fry were salvaged through efforts of Fishery Officers, chiefly along the lower east coast of Vancouver Island.

The number of departmental vessels on patrol duty in the Pacific Area was reduced to 37 by two unfortunate fires which virtually destroyed the *F.D. 201* and *Beldis*. Two 51-ft. wooden patrol vessels, the *Beaver Rock* and *Pillar Rock*, were launched during the year to replace the *Black Raven II* in the Campbell River sub-district and the *Sterna* in the Skeena River sub-district. Re-engining of the 85-ft. Headquarters vessel FPC *Kitimat* and the 60-ft. FPC *Stuart Post* from the Alert Bay sub-district was completed in 1961.

The policy of equipping Fishery Officers and patrol vessels with small, fast speedboats was continued in 1961. Department of Transport approval to replace conventional lifeboats with buoyance equipped speedboats and inflatable rubber rafts has greatly increased the efficiency of the service of patrol vessels in carrying out the many duties associated with the ever increasing sports fishery in tidal waters.

Efforts were also continued to increase the efficiency of the Department's coastwise radio-telephone network by replacing obsolete units and installing units in the important sub-district headquarters at Bella Coola, Rivers Inlet and Alert Bay.

The required maintenance and overhaul work on departmental vessels was carried out either under contract at private shipyards or at the Department's marine stations located at New Westminster and Prince Rupert. Major overhauls and engine rebuilding were undertaken on the FPC's *Sooke Post*, *Arrow Post* and *Babine Post*.

The number of motor vehicles operated by the Protection Branch increased from 28 to 31 by the purchase of automobiles for the use of the District Supervisor in Prince Rupert and the Fishery Officers on the Vancouver waterfront and at Whitehorse, Y.T. Replacement vehicles were also purchased for four sub-districts

in British Columbia. The number of office residences operated by the Department on the Pacific Coast now stands at 18 with completion of the modern unit for the Fishery Officer at Tahsis, B.C.

The two Fishery Officers assigned to the Yukon Territory were exceptionally active in 1961, preparing for the commencement of a freshwater commercial export fishery in 1962. The area covered by these men is a large one and they have been busy on surveys of the potential of lakes in the Territory, checking on the rapidly increasing sports fishery, pollution problems, etc. These officers issued 6597 licenses during the year, 6559 of them being angling licenses issued to sports fishermen.

Newfoundland Area

In a continuing educational program, discussions were held during 1961 with fishermen and lectures were given in schools, emphasizing the need for conservation measures.

It was found in the commercial salmon fishery that in several areas the regulation governing mesh size of nets was not being observed. However, fishermen generally adhered to the week-end tie-up regulation and there were few infractions.

Lobster fishermen, apparently convinced of the seriousness of taking spawn-bearing lobsters, co-operated fully on this score, but there were breaches of the regulations with respect to minimum size limits. In effect for the first time in Newfoundland, the system of licensing lobster fishermen met with general approval.

Regular inspection of deep-sea fishing gear in accordance with ICNAF Regulations was maintained by officers of the Protection Branch. The regulations specify a minimum mesh size for haddock and cod dragging operations.

There were 175 prosecutions for breaches of the Newfoundland Fishery Regulations. In the majority of cases the offences were of a minor nature, and fines ranged from $5 to $50. Several serious violations resulted in substantial fines.

Despite low water conditions, salmon anglers enjoyed a moderately successful season. The catch of 17,000 fish was approximately 1000 less than the total taken in the previous year. Average weight was 4.6 pounds, while the largest salmon recorded in the season's catch was 32 pounds (taken from the Lower Humber).

The forest fire situation curtailed the angling effort on the east coast. For a two-week period forest travel was prohibited on the Avalon and Burin Peninsulas. This was a contributing factor in the reduced catch.

Water levels were extremely low in practically all sections for the greater part of the season, with the result that salmon were obliged to remain in tidal waters for lengthy periods before migrating upstream to spawning areas.

Bounty payments amounting to approximately $7000 were made to hunters in Newfoundland and Labrador for bay seals killed.

A fleet of 12 patrol vessels was in service. The larger and more powerful craft were assigned to offshore patrol in areas where trawlers and draggers were operating, while the smaller units were engaged on protection and inspection work along the coasts. An addition to the fleet, the 65-foot *Garia Bay*, was commissioned in the early spring, and a 179-foot steel vessel, the *Cape Freels*, was scheduled to be launched early in the new year.

Central Area

The 1961 commercial fishing season in the Northwest Territories got under way with only two companies taking part in the operation. The companies employed 106 fishermen, who fished Great Slave Lake, and to a much lesser extent, Chedabucto, Keller, MacDonald, MacEwan and Tathlina Lakes, during the period January 1–March 31. Favourable weather conditions prevailed throughout the season and landings were slightly higher than for the same period the year before. Average returns to the companies compared favourably with those of 1960.

The summer season opened May 16 with both open water and ice fishing equipment being used simultaneously. In the open water stretches, fishermen aboard steel vessels were setting gill-nets, while snowmobiles, motor toboggans, dog teams, ice augers and other equipment used for ice fishing were operating in the same general area. However, by mid-June, only open water fishing was in progress. Four companies with 122 fishermen operated almost exclusively on Great Slave Lake. There was some endeavour to fish Kakisa, MacDonald and Thuban Lakes but the catches from these waters were small. The whitefish and lake trout landings from Great Slave were slightly less than the summer landings of 1960 and 1959.

A fishing operation in the MacKenzie Delta by the Indians and Eskimos of that area was undertaken during the summer, under the sponsorship of the Department of Northern Affairs and National Resources. The catch was for local consumption. This operation extended from Shingle Point on the west to Tuktoyaktuk on the east and Fort MacPherson on the south of the Delta area. Catches included 7000 pounds of herring, 2600 pounds of inconnu and several hundred pounds each of arctic char and whitefish. Twenty whales were also captured and utilized for oil and meat.

Several other fisheries were operated by Eskimo co-operatives across the arctic coast, in which mainly arctic char were taken. Much of this was for local consumption, but where the factors of domestic consumption and permitted production allowed, some quantities were exported.

On December 1, five companies, employing 158 fishermen, started winter operations on Great Slave Lake. Two of these companies also had 15 men on Keller Lake by December 1. However, by the end of the month, only 12,000 pounds of fish had been taken from the lake.

The commercial catch for the calendar year 1961 from Great Slave amounted to 5,585,981 lbs, made up as follows: whitefish 4,070,627 lbs; lake trout 1,039,608 lbs; inconnu 213,728 lbs; pike 229,915 lbs; pickerel 20,305 lbs and mullets 11,808 lbs.

An ever-increasing interest is being shown in sport fishing in the Northwest Territories. More than 1700 angling licenses were issued during 1961, as against 1400 in 1960.

Three new fishing lodges were opened during the year, bringing the total to seven in the Northwest Territories. Catches were reported as very good, especially for trout. It is reported that two additional fishing lodges are to be erected in the Great Slave Lake area.

Changes in regulations eliminated closed seasons and size limits on trout and grayling, extended the areas reserved for angling on Great Slave Lake and reserved 66 lakes in the Territories exclusively for angling and domestic fishing.

A film titled, "Sports Fishing in the Territories" was undertaken by the Department of Northern Affairs and National Resources. The Fisheries Officers at Hay River gave help and advice in the production of this film.

The Indians and Eskimos had a very successful domestic fishery in 1961. Good catches were reported from all domestic areas, which include Hay River, Fort McPherson, Providence, Yellowknife, Fort Rae, Fort Liard, Lac la Martre and Trout Rock.

There has been no change in personnel or patrol equipment. More use is being made of aircraft for patrol work each year because of the ever-increasing area which is being fished commercially.

During the year there were seven breaches of the Fisheries Act and Regulations. Two were committed by persons unknown. The other five persons were prosecuted and convicted. Fines totalling $38.00 were levied and 17 gill-nets, and three rods and reels with attachments, were confiscated.

The expansion program of the fisheries in the Northwest Territories became effective December 1. As yet, it is too soon to report on its success or otherwise. A great deal of interest, however, is being shown in the project, which before the end of the year had attracted at least one additional fishing company to the Territories.

FISH CULTURE BRANCH

(*See also Appendix 2*)

Maritimes Area

Hatchery and pond operations

The Fish Culture establishments operated in the Maritime provinces during 1961 consisted of the following: 13 hatcheries, four rearing ponds and three Atlantic salmon retaining ponds. In addition, collections of Atlantic salmon eggs were made on the Restigouche River and Margaree River, and landlocked salmon eggs were taken at Chamcook and Palfrey Lakes in New Brunswick. The spawning of speckled, brown and rainbow trout eggs from the hatchery brood stock was very successful.

The collection of eggs from all species for the year amounted to approximately 55,399,680. The total distribution of fish of all stages and species for the year amounted to 35,110,110, of which 597,000 were salmon yearlings.

Growth rate and survival of hatchery stock were, in most instances, about normal, although low water and high temperatures were encountered in many of the establishments. Of the 80,000 Atlantic salmon fingerlings overwintered in the spring-fed water supply at the Coldbrook Station, approximately 70 per cent had reached the smolt stage when liberated in the spring of 1961.

The pH of the water supply at Grand Lake Station reached such a low point during February and March that it was necessary to move all the stock to Coldbrook Station. In August all the stock on hand at the Grand Falls Station was killed from careless handling of pesticides by some farmers on the upper reaches of the stream supplying water to the hatchery.

Engineering Service

The engineering staff, consisting of two engineers and one technician, assisted during the construction season by a carpenter foreman hired on a seasonal basis, was occupied during 1961 with the extension and maintenance of buildings and works at Departmental fish culture stations and routine maintenance to other fish facilities.

The following were the major works undertaken by the engineering staff during the year:

A new hatchery building which was constructed at the Coldbrook Fish Culture Station. This was completed in time to receive eyed salmon eggs in January.

At the Margaree Fish Culture Station a reservoir was constructed to overcome sedimentation and icing problems and to afford a degree of temperature control for the hatchery water supply.

A salmon holding pond was started at Hales Brook, Restigouche County, New Brunswick. It was 95 per cent completed before freeze-up and the remaining work will be done in 1962.

A concrete water storage dam was built for the Antigonish fish culture station to replace the old wooden dam at South River Lake.

At the Walton Dam on the Big Salmon River, Saint John County, New Brunswick, the sluiceway was altered to provide a fish pass for ascending salmon.

Biological Service

A heavy program committed staff to priority salmon and pollution studies, and hatchery problems, involving mortality studies, tagging, new site location, etc., again leaving the large backlog of lake surveys untouched.

A large part of the staff and time was allocated to the continuation of the Saint John River project where the objective, although complicated by DDT pollution effects, is to study the impact on fisheries of hydro-power developments.

The Saint John upriver salmon run continued to decline, as shown by counts of fish passing over the fishways at both power dams. The salmon angling catch was half that of 1960 and the grilse run was extremely small. The commercial catches from the harbour and tidal river section were only slightly lower than the previous year but strong in comparison to upriver runs.

Entrance trials were continued at the Beechwood power house collection gallery, but results were inconclusive because of unknown availability of salmon. Photographic counts of fish in the skip hoist were unsatisfactory, so it is planned to install an underwater electronic fish counter with camera in 1962.

Tests with tagged smolts showed that less than one per cent entered the Beechwood headgate slots at the turbine intake during heavy spillage and 17 per cent during no spillage. Other tests indicated that holdup in the headgate enclosures rarely exceeded a week.

Nursery assessment of the main river below Beechwood was repeated in 1961. Population estimates for both years are well below those ascertained for other salmon rivers.

From the quantitative survey of the Tobique rearing area, it was estimated that from 3400 to 5400 salmon would be required to fully utilize the water. The 1961 spawning escapement was only 874 salmon.

In order to accelerate population recovery following losses from DDT spraying and hydro development, heavy plantings of salmon yearlings have been placed in the Saint John River. To date no benefits to the upriver runs have resulted from the increased plantings.

Three major projects were undertaken in Nova Scotia. Turbine mortality tests on alewives were conducted at Tusket River power plant. Mortality rate for adults ranged from 14.5 per cent to 18 per cent, depending on plant load. No delayed mortality could be observed for adults. Juvenile mortalities, including delayed mortality, averaged 50 per cent for tests carried out over a three month period.

Assessment of the efficiency of the two fish passes installed in the Annapolis Aboideau was continued in 1961. Although tagged returns to the upriver trap were low, most indications are that little delay is experienced by shad, bass, and salmon. The 1962 program will include capture and tagging of early run salmon and upriver recovery in improved trapping facilities.

A survey was made of East River, Sheet Harbour, to estimate its current productive capacity for salmon and to determine what problems will be involved in providing safe passage of both upstream and downstream migrants.

In the field of pollution assessment and control, the Maritimes Area Branch participated in the following:

New Brunswick

1. Fishkill assessment resulting from DDT forest spraying operations.
2. Base metal pollution, Miramichi River.
3. Pesticide pollution, Grand Falls Fish Culture Station.

Nova Scotia

1. Industrial waste pollution, Hillaton.
2. Sewage effluent, Bedford.

Observation on returns from several years of planting marked early run hatchery fish was continued at River Philip. The object of the experiment is to

ascertain whether or not the tendency of salmon to run into the river early is an inherited or environmental characteristic. A repeat experiment is underway at Big Salmon River, N.B.

The experimental merganser control was continued on the Miramichi watershed and the St. Mary's watershed by the Protection Branch. The St. Mary's project has been extended to a year-round patrol.

Seven lakes and one river were surveyed to determine their suitability to serve as possible water supply for an experimental fish hatchery.

At the request of the Minister for the Nova Scotia Water Act, a fairly comprehensive report on the Atlantic Salmon Fishery of Nova Scotia was produced and has since appeared in a Departmental publication.

No fish were caught or observed when a recheck of the Comeauville River system, poisoned with Toxaphene in 1960, was made. Assistance was given to the Nova Scotia Department of Lands and Forests in the poisoning of Silvery Lake.

Other operations included checking several fishways for operational problems, tagging of yearling salmon for experimental projects and minor obstruction surveys.

OYSTER CULTURE

The Department of Fisheries and the Fisheries Research Board of Canada continued co-operative investigations during 1961 to improve the position of the oyster industry in the Maritime Provinces.

The Department's efforts were under the supervision of the Area Director, Maritimes Area, and the Fisheries Research Board's under the supervision of the Director of the Board's St. Andrews, N.B. Biological Station.

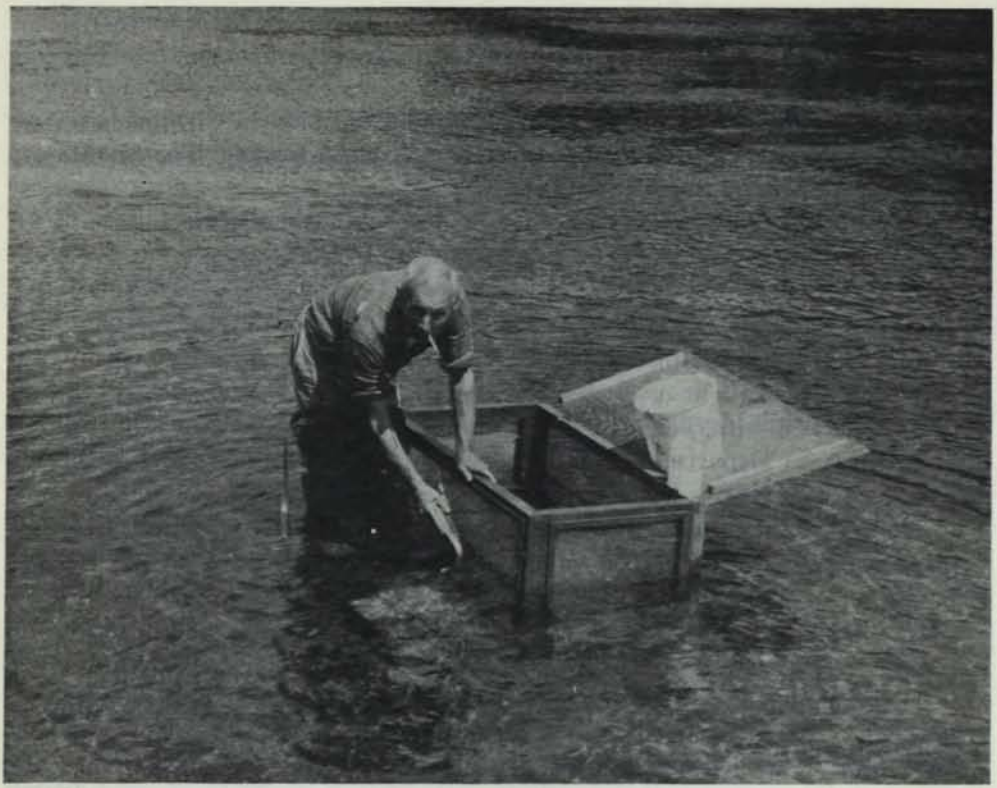
Mortalities in the New Brunswick and Nova Scotia Oyster Populations

The epidemic oyster disease which for the past several years has severely affected the oyster population of Nova Scotia and New Brunswick appears still to be confining itself to the area from Cape George in Nova Scotia on the south to Caraquet Bay in New Brunswick on the north, which in 1961 definitely included Miscou Harbour. The mortalities in Miscou Harbour, as of the fall of 1961, were of the order of 92 to 98 per cent.

A few small unaffected regions still remain within the above mentioned area, such as North Branch Wallace River, Pugwash River and the upper waters of Richibucto River.

From North Branch Wallace River and Pugwash River approximately 300 barrels of good grade oysters were taken. From upper waters of Richibucto River approximately 600 barrels of shucking oysters were taken.

The mortalities in the Bras d'Or Lakes continued to appear as in 1960 and are still not following the usual pattern of the epidemic disease. The area known as South Harbour showed mortalities of over 25 per cent in 1961, and they also have not been following the normal pattern of the epidemic disease. Neither can be claimed at this time to be epidemic oyster disease.



Water sampling station and cage for fish on Northwest Miramichi River, N. B., used in checking on base metal pollution from mines.

Rehabilitation of Disease Stricken Areas

During 1961 the transplants of disease-resistant breeding stocks to Fox Harbour and Miscou Harbour were not carried out as anticipated early in the season due to prohibitive weather and ice conditions.

The stocks transplanted in the years 1957 to 1960 all show good survival with the exception of plantings made at Malagash. In the latter location the early mortality which occurred (see 1960 report) appears to have levelled off. Also 500 barrels of breeding oysters stock-piled at Shippegan, N.B., for relaying to Miscou Harbour showed much higher than average mortalities. This could be caused by being too densely stock-piled.

During the fall of 1961 native spat from all the transplanted areas were examined with the following results:

Malagash Area

Survival much more encouraging than previous years.

Miramichi Area

Still remaining with very little or no mortality.

Shippegan-Caraquet Area

Producing good sets but showing signs of fairly high mortality.

It is of interest to note that 63 oyster picking permits were issued in the Neguac area and three permits issued in the Baie du Vin area. Between 20 and 30 barrels of seed oysters were reported picked from along the shores of Neguac Lagoon with no accurate report for the Baie du Vin Area.

Native spat and introduced spat held on trays in Kent County show practically no mortality.

Oyster Seed Stock and Seed Farming

Oyster farmers in general continued to look to the picking of "wild" oysters as the main source of seed for their oyster farms. They also procured a fairly large quantity of seed from contaminated areas which they relayed to their "pure" water leases. Again this year oyster farmers in different parts of the Maritimes put out collectors of various types such as tree branches, tin cans, shells and the conventional egg case fillers; results from these collectors varied from good catches to a nil return.

The Department of Fisheries placed 55,000 concrete coated egg case filler collectors in the water in 1961, this amount being smaller than it was in the previous year due to the lateness of the spring season and the unpredictable spawning.

Out of the 55,000 fillers 18,700 had to be dumped in the fall as they did not catch a set worth threshing. The remaining 36,300 fillers were put down on the bottom for the winter months. In the spring they will be taken up and again placed on floats for a few weeks to let the smaller oysters grow to a size that can be threshed.

Spatfall, in general, was light to moderate with the Shippegan, N.B. spatfall the heaviest seen there for many years, though not heavy by standards for some other areas.

A summary is given below:—

Location	Catch per filler	Catch per sq. in.
Ellerslie, Smelt Creek, P.E.I.	20	0.03
Ellerslie, Paughs Creek, P.E.I.	217	0.3
Shippegan, N.B.	95	0.1
Malagash, N.S.	75	0.1
Gillis Cove, Cape Breton	273	0.4
Crowdis Bridge, Cape Breton	8	0.01

Several random samples were made in the late fall to estimate the quantity of spat that would be available for the Department of Fisheries' seed farm after threshing the following spring. About 100 barrels of spat should be available for planting in the Conway Narrows rearing area.

The search still continued for a more suitable collector from the standpoint of economics and simplicity of handling, with few encouraging results. The plywood veneer that showed such good results in 1960 failed to do so this year. The reason very well could be the type of veneer used, which was hardwood to which the concrete mixture would not adhere as well as it did to the British Columbia fir veneer used in 1960.

Different types of plastic screening and nettings were also tried. These were used, both coated in concrete and in the untreated state. Results again in all cases were nil but it was interesting to note that all the types of plastics used showed practically no fouling, which may prove useful for their employment for other purposes.

Conway Narrows Seed Farm

A total of 139 barrels of seed oysters were fished off the seed farm in the fall of 1961, and sold to the lessees in the Maritime Provinces at $10.00 per barrel plus transportation, with 75 barrels going to lessees in P.E.I., 60 barrels to lessees in N.B., and 4 barrels to lessees in N.S.

Some difficulty was encountered in recovering the seed due to silting and the increased density of eel grass. The water was too shallow for the mechanical harvester to operate except at extreme high water, with the result that a large percentage had to be recovered by the much slower method of hand raking.

Oyster Leasing

Oyster leasing activity during the year 1961 continued at a high level. This activity is attributed mainly to the high market value of oysters.

As of December 31, 1961, a total of 1398 oyster leases were in effect in the three Maritime Provinces with a total of 3625.4 acres under lease.

The distribution of oyster leases in effect December 31, 1961, is as follows:

Location	No. of Leases	Acreage
Prince Edward Island—		
Malpeque Bay	286	1035.07
Other P.E.I. areas	497	1231.2
P.E.I. Total	783	2266.27
Nova Scotia—		
Bras d'Or Lakes	96	201.96
Other N.S. areas	71	158.9
N.S. Total	167	360.86
New Brunswick—		
Gloucester Co.	340	649.37
Northumberland Co.	92	311.1
Kent Co.	13	25.8
Westmorland Co.	3	12.0
N.B. Total	448	998.27

During the year 1961, 299 leases were cancelled for non-payment of rental, of which 169 have since been reinstated.

As of December 31, 1961, a total of 898 applications for oyster leases were awaiting examination and survey. Due to a limited survey staff it will be necessary for many of the applicants to wait a considerable length of time before their applications can be dealt with. During the year ending December 31, 1961, a total of 216 new areas were surveyed and 29 old leases were resurveyed.

The following is a breakdown in detail of oyster lease surveys and resurveys carried out during 1961:

Location	New areas surveyed	Old leases resurveyed
Prince Edward Island—		
Malpeque Bay	26	10
Conway Narrows	11	—
Pownal Bay	12	3
Hillsborough area	4	—
Foxley River	15	2
New London Bay	1	—
Pinnette River	1	—
Covehead area	4	—
Cascumpeque Bay area	4	—
Alexandria Bay	3	—
P.E.I. Total	81	15
New Brunswick—		
Gloucester	16	14
Kent	11	—
Northumberland	86	—
N.B. Total	113	14
Nova Scotia—		
Cape Breton area	10	—
Mainland area	12	—
N.S. Total	22	—
TOTAL FOR THE MARITIMES	216	29

The Canadian Atlantic Oyster Industry

The Canadian Atlantic Oyster Industry continued in 1961 to feel the effects of the oyster disease. Landings in New Brunswick increased from an all-time low of 31 barrels in 1960 to over 600 barrels in 1961, due to a fishery in the upper waters of the Richibucto River from which up to 600 barrels of shucking oysters were taken.

Nova Scotia production, slightly below 1960, dropped by approximately 100 barrels.

In Prince Edward Island the 1961 landings of 16,335 barrels represents an increase of 2377 barrels over 1960, which was partially due to the opening of a portion of the Department of Fisheries' reserve in Bideford River, where 1500 barrels were taken.

The value of the total Maritime landings of 20,410 barrels is estimated at $455,400.00, an increase in value of $52,160.00 over 1960.

Newfoundland Area

A program of investigation on the Exploits River, undertaken three years earlier, was continued in 1961 and it can now be said that the major survey work has been completed. The results of the various investigations will now be analyzed to determine the feasibility of implementing remedial measures.

The Bowater Corporation is engaged at present in diverting part of the headwaters of Indian River to the Grand Lake watershed as a source of additional supply for its Deer Lake powerhouse and also to facilitate movement of pulpwood to the Corner Brook mill from the upper Indian River watershed. Measures to ensure maintenance of fish stocks in this important salmon producing river have been continued. These provisions, involving expenditure by the Department and Bowaters, will make it possible for the existing salmon run to Indian River to maintain itself after the diversion is completed.

The major portion of the salmon run to Rattling Brook has now been transferred to Great Rattling Brook. The transfer, which began in 1956, was necessitated by hydro-development. In 1962 the major effort will be to determine numbers of juvenile fish migrating seaward, and in subsequent years a detailed check will be made to determine the adult return.

During 1961, pollution investigations were carried out in the Exploits River between Grand Falls and the estuary, at Tilt Cove, Little Bay, Red Indian Lake and Holyrood. Discussions continue between the Department and mining concerns at Wabush and Carol Lakes with reference to the wastes from iron ore developments in the Labrador area insofar as they affect the inland fishery.

Engineering construction work included necessary alterations to a fishway on the Upper Falls of Terra Nova River, the blasting of an obstruction on Isle aux Morts River, and construction of a foundation in a tributary of Great Rattling Brook to facilitate enumeration of salmon smolts in 1962.

The main effort of engineering survey teams was concentrated on major obstructions on the Humber River. Surveys included Big Falls, Taylor's Brook Falls, Main River Falls, and Adies Lake Dam. In addition, surveys were carried out on Bernard's Brook, a tributary of Conne River, Bay D'Espoir, and on Bay de L'Eau and Taylor's Bay brooks on the Burin Peninsula.

Generalized surveys to determine the species of fish present, probable productivity, and other useful information, were carried out on 10 lakes, including Gambo Pond, Red Indian Lake, Deer Lake, and George's Lake. A special examination was made of Butt's Pond to gain additional information on the life history of landlocked arctic char in this province. In the lake surveys the most common species found were speckled trout, landlocked salmon, landlocked arctic char,

smelts, and sticklebacks. Many waters, especially the larger ones, seem to contain good populations of landlocked salmon which are very little fished at present. It is apparent from the investigations that the Island contains an extensive, easily accessible, sport fishery resource that can probably support much more fishing pressure than it is presently getting. This is particularly true of larger waters.

Pacific Area

During 1961 the work of the Fish Culture Development Branch in the Pacific Area continued to expand, particularly in the field of salmon development. The number of pollution problems also continued to increase and considerable effort was applied to the study of these problems in order to prevent damage to the salmon runs. While no new hydroelectric projects were under construction during the year, a number of proposed projects were being studied. Studies of the Fraser River and Johnstone Strait chum salmon stocks were carried out during the year to provide data for management of the commercial fishery.

Early in 1961 the B. C. Power Commission announced proposals to develop hydroelectric power on two tributaries to Babine Lake, the Fulton River and 15-Mile Creek, and at Moricetown Falls on the Bulkley River. Since each of the projects would create a number of fisheries problems, it was suggested that they should be deferred for at least two years to allow time to study the problems. Extensive fisheries studies on each stream were implemented during the year.

Work in connection with Fraser River Board studies was continued during the year. These studies included extensive air and ground surveys to obtain information on the numbers, timing, and distribution of chinook and coho salmon runs to the North Thompson and Upper Fraser Systems. Two fishwheels were installed in the Fraser above Prince George to obtain information on the timing and distribution of chinook salmon above Prince George. Thermographs were installed at a number of sites in collaboration with the International Pacific Salmon Fisheries Commission to obtain temperature data. In order to obtain information on the downstream migrants, an inclined-plane trap was installed near the mouth of the Clearwater River, and a second trap was installed in the Fraser just above Prince George. In general, all the studies of the Board are progressing satisfactorily and it is expected that they will be completed in time to report to the provincial and federal Governments in September, 1963, as required under the terms of reference.

A continuing problem during the year was that created by the use of insecticides and pesticides. Benzene hexachloride spraying by helicopter was carried out on log booms at a number of sites to control Ambrosia beetles. The conditions and locations of spraying were approved by the Department. Inspection by scuba divers following the sprayings indicated no mortality to fish.

DDT spraying of 1400 acres for the control of saddle-backed loopers in the Kitimat area was also carried out. At a number of other sites spraying was undertaken to control damage by marine borers and for depression of deciduous growth. No significant mortality to salmon occurred as a result of any of the sprayings.

A number of proposals for the discharge of domestic sewage were examined and sanctioned. Tailings disposal facilities were provided by a number of mines at the request of the Department to prevent stream pollution, including Zeballos Iron Mine, Coast Copper Mine, Craigmont Copper Mine, and Bethlehem Copper Mine. Facilities were provided by several plating shops to reduce effluent toxicity.

An interim report on "Proposed Kraft Mills on the Fraser River near Prince George with Recommendations for the Treatment and Disposal of Wastes" was prepared in collaboration with the International Pacific Salmon Fisheries Commission and the Fish and Game Branch, British Columbia Department of Recreation and Conservation. The report discusses and makes recommendations concerning treatment facilities for the kraft mill wastes.

A number of stream intakes were investigated and adequate screening devices were devised to prevent the loss of juvenile salmon.

The tempo of fish culture programs at Robertson Creek, site of one of the Department's large, controlled flow spawning channels, increased during 1961 as the construction phase drew to a close. The spring of 1961 saw the successful emigration of pink salmon fry for the second consecutive year as a result of a transplant of 0.7 million eyed eggs in the fall of 1960. Experiments were instituted by early summer to study the environmental requirements of rearing

A fleet of salmon trollers tied up at the fishermen's wharf at Ucluelet, B.C.

underyearling coho salmon with specific reference to the effect of reduced flows from hydroelectric development on the rearing capacity of streams. This applied research is being conducted in a unique experimental facility where a variety of natural stream conditions can be simulated in a system of parallel channels for comparative-type experiments.

In late summer, a total of 119 pink salmon spawners returned to Robertson Creek and a further 33 to the adjacent Stamp River. These fish were the progeny of a 1.6 million eyed-egg transplant to the Creek in 1959. In addition, 222 chinook and 653 coho spawners were transplanted to sections of the spawning channel and their distribution, spawning site characteristics, etc., were studied.

A further transplant of 4.6 million eyed pink salmon eggs was placed in the channel during November. Survival to date compares favorably with previous years.

Successful tests were conducted in the Robertson Creek Experimental Test Flume during sockeye and coho smolt migrations from Great Central Lake in April and May. Results showed that the louver principle works, in diverting downstream migrants, with up to 96 per cent efficiency for sockeye smolts and 95 per cent for coho smolts, providing the fish bypass is adequate. The data clearly point up the importance of providing optimum bypass conditions in order to realize the full guiding potential of louvers.

The pink salmon eggs for the Robertson Creek transplant were obtained from Indian River at the head of Indian Arm of Burrard Inlet. A fence, complete with trapping and holding facilities, was constructed in connection with this program at Indian River during 1961.

Great Central Lake beach spawning studies were continued in 1961. Biological observations and sampling during spawning were limited to the Lindsey Creek and Forestry Camp Creek beach spawning areas. Regular periodic enumeration and behaviour observations were carried out by Department scuba divers from late September until early December on both the natural spawning beaches and the artificial spawning bed at Forestry Camp delta. Water samples and temperatures (measured by hand thermometer and thermisters) were taken at the gravel surface and subsurface levels at redd locations throughout the range of spawning depth (10 to 100 feet). The presence of groundwater at natural redd sites above the thermocline (about 40 feet) was indicated by temperature differentials of 4-14°F. between gravel surface and two to ten inches below surface (i.e. groundwater colder), and lower dissolved oxygen content of water samples, taken in redds by means of a groundwater sampling syringe, compared to overlying lakewater.

In August 1961 control of the stream source of groundwater percolation at the Forestry Camp Creek delta was effected by the completion of a 48-foot high concrete arch diversion dam on bedrock at the upstream end of the alluvial fan. All stream flows up to 165 cfs are intercepted at the dam and diverted to the lake via a 42-inch diameter pipeline 1800 feet long. These works eliminated the major source of groundwater percolation in the fan except from very heavy rains. Five deep holes drilled into the delta and provided with perforated casings

allow the measurement of water table fluctuations, subsurface temperatures and groundwater conductivity. A groundwater piezometer was modified to detect and measure subaqueous percolation on the delta front.

After closure of the diversion dam in August of 1961, water table levels in the delta lowered considerably, and percolation rates in natural spawning areas fell to a very low level. A considerable number of sockeye congregated at the artificial beach during October and November and between 50 and 100 fish were estimated to have spawned thereon. The bulk of observed spawning activity on the natural spawning area did not commence until after heavy rains in late November had resulted in an increase in natural percolation to pre-diversion levels.

At Jones Creek the pink salmon run in the spawning channel has increased from 400 fish in 1955 to 1456 in 1957, to 2604 in 1959 and to 5000 fish in 1961. Consistently high egg-to-fry survivals ranging between 38 and 63 per cent (four to six times that of natural streams) has made this rapid build-up possible. Maintenance costs for operating the channel have been relatively low. The spawning channel is looked upon as a good tool, not only to provide solutions to power problems, but to rebuild runs, where species and other factors are suitable.

At Rivers Inlet an assessment of the size, distribution and numbers of young sockeye in Owikeno Lake was made. In addition, a limnological program to describe the productivity and potential of the lake was made. A smaller smolt migration took place than that recorded in the spring of 1960. The 1961 smolts were also smaller than their counterparts in 1960. Townet catches in the lake during the summer and fall of 1961 indicated less than half the abundance of fry as compared with 1960. The uppermost basins had particularly low numbers of fry.

Preliminary surveys were carried out on Babine spawning streams in connection with a possible development program.

Work on the Big Qualicum Project is progressing satisfactorily and it would appear that completion date should be met unless some unforeseen problems are encountered. This controlled flow river system on the Big Qualicum River on Vancouver Island is the world's largest single Pacific salmon development project of its kind.

A contract for the construction of flow control works at the outlet of Horne Lake and for a 2½-mile flood channel to divert Hunt's Creek flood flows into the tidal section of Big Qualicum River was let to General Construction Co. Ltd. in May 1961. This contract calls for completion of the works by September 15, 1962, with flow control in the river available in August prior to the upstream migration of the salmon. The estimated cost for the project is $1,250,000, which includes property purchases, engineering design and investigation, and the actual construction.

The pre-development biological study was continued in 1961 with a view to assessing the stocks of salmon in their present environment and to designing temperature and discharge schedules for the operation of the control works. A total of 3.6 million chum salmon fry was estimated to have migrated seaward in

Hauling the net aboard an Atlantic trawler.

1961, which represented a survival from egg to fry of 5.2 per cent. In the previous year's study an 18.5 per cent survival from egg to fry was measured. The low survival recorded in 1961 was considered a direct result of the extreme freshets which occurred during the period of incubation. In 1959–60 the relatively stable water levels during the winter period resulted in the high survival rate.

The Upper and Middle Falls Fishways on the Indian River were completed prior to the salmon migration to the river system. The over-all expenditure by the Department on fishways at both the right and left banks of the Lower Falls, and the right bank of the Middle and Upper Falls was approximately $185,000.

These fishways now open up new spawning areas for the sockeye, coho and pink salmon in Canoona River and Canoona and Anchor Lakes. The estimated pink salmon population to this system in 1961 was approximately 80,000 fish with some 30,000 of these spawning above the Upper Falls Fishway which was previously inaccessible.

Work on the Nanika hatchery was continued in 1961. The egg-take was increased from 300,000 in 1960 to 5.2 million in 1961. The source of the eggs for the project again was 15-Mile Creek on Babine Lake.

In 1961 the Department undertook to survey all the major and minor streams in the Queen Charlotte Islands. These surveys were part of a long-range program to assess all the salmon bearing waters in the province. The purpose of the assessment is to determine the present carrying capacity of the accessible areas and to note ways and means in which improvement works may be applied in order to significantly increase salmon production. In the course of the assessment the history of the stocks of salmon is examined to determine the time and degree of changes in abundance and various information is tabulated in order to pinpoint the possible cause of changes in stock size. Biological data in the form of distribution, size and age of fish are collected on many watersheds in order to strengthen our knowledge of the salmon stocks. Finally, the watershed survey provides useful information for a stream catalogue which is the Department's inventory of the streams in B.C.

During 1961, the Fish Culture Development Branch again contributed to the international pink salmon study being conducted under direction of the Pink Salmon Co-ordinating Committee under terms of protocol drawn up between the United States and Canada. In 1961 a tagging enumeration program was conducted on the Cheakamus River; a combined weir count and tagging enumeration study was made at Indian River (Burrard Inlet); and a weir count was conducted on the Tsolum River.

In 1960 biologists of the Department initiated a study on the Fraser River chum salmon stocks. As a result of the 1960 program an over-all escapement of 253,000 chums was calculated, and considerable information was gained on the timing of individual stocks through the Area 29 fishery. The study also further established the existence of a major mainstem spawning population. The program was repeated in 1961, and the total escapement was calculated to be 170,000. Test-fishing was introduced in 1961 to further define the timing and abundance of the individual stocks through the fishery.

In addition to the development program, pollution work, and hydroelectric and industrial projects described in the foregoing, various studies more minor in nature were made. These include: an assessment of adult and young fish migrations of chum, pink, coho and spring salmon in the Cheakamus River; a trout planting program and fishway assessment in the Yukon Territory; a survey of the falls and watershed at Lowe Inlet; an evaluation of marine seismic exploration in the Gulf of Georgia and Point Roberts area; a biological survey of the Bulkley River system; a continual assessment of problems on the Puntledge, Quinsam, Okanagan and Capilano Rivers.

The practice of reviewing applications for water rights, placer-mining leases, foreshore leases, and streambed leases was continued during the year. In addition protective clauses were inserted in timber sale licenses and special use permits where applicable.

As in previous years technical assistance was provided to the local Fishery Officers in removing small obstructions from salmon streams.

Particular note should again be made of the excellent co-operation which the engineering and biological staff received from other technical groups and agencies. These included the Fisheries Research Board of Canada, the International Pacific Salmon Fisheries Commission, the Fish and Game Branch of the B.C. Department of Recreation and Conservation, and various agencies in the United States.

DEPARTMENTAL VESSELS

THE NEWEST addition to the Department's protection fleet, the *Cape Freels*, was under construction during 1961 at Halifax, for commissioning early in 1962. The *Cape Freels*, a 179-foot, 830-ton vessel, will patrol the offshore waters of the Newfoundland Area and is also equipped with refrigeration facilities to operate in the Newfoundland Bait Service when necessary, and can also be adapted for oceanographic and other scientific work.

The Protection Branch of the Department operates 79 patrol vessels. In addition to these the Department maintains a floating bait depot, the *Arctica*, and a floating fish inspection laboratory, the *Belle Bay*, in Newfoundland waters. Two smaller vessels, the *Ostrea* and the *Cyprina*, are operated in the Maritimes Area for oyster and other shellfish culture work.

The makeup of the fleet is as follows:

Protection Service

Name	Tonnage	Length	Crew
Maritimes Area--			
Acartia	7	37′	2
Cardita	15	45′	3
Cheval Point	12	39′	3
Cratena	56	65′	5
Crumella	65	65′	6
Cygnus	524	146.3′	29
Diala	16	42′	3
Fabia	12	32′	2
Gull Light	12	39.4′	2
Hyperia	11	40′	2
Lacuna	61	64.5′	5
Lamna	581	155.4′	32
Limanda	61	64.5′	5
Maces Bay	50	60′	5
Macoma	13	34′	3
Marcia	15	45′	3
Modiolus II	13	38.7′	2
Mya II	13	38.7′	2
Obelia	8	36′	2
Osmerus	25	40′	3
Paphia	15	45′	3
Prim Light	12	39.5′	3
Rossia	12	38′	2
Sabella	56	65′	5
Serpula	13	42′	2
Shediac Bay	50	65′	5
Tegula	15	45′	3
Yorke Point	—	26′	1

Name	Tonnage	Length	Crew
Newfoundland Area—			
Aurelia	29	48′	3
Badger Bay	48	57′	3
Boltenia	29	48′	3
Cinderella	28	56.5′	3
Crago	13	36′	1
Eastern Explorer	58	73.5′	8
Garia Bay	54	65′	5
Lomond	17	46.6′	2
Louise Ruth	20	41.8′	2
Nebalia	29	48′	3
Porella	20	48′	3
Sabinea	15	40′	2
Central Area—			
Mareca (Great Slave Lake)	15	32.7′	2
Marila (Great Slave Lake)	15	45′	2
Pacific Area—			
Agonus	19	37′	2
Arrow Post	44	54.6′	4
Atlin Post	45	61.5′	5
Atolla	16	37.3′	1
Babine Post	52	55.7′	4
Beaver Rock	26	51′	3
Bonila Rock II	23	47′	3
Brama	19	42′	1
Branta	10	36′	1
Chilco Post	48	63′	5
Ciona	14	34.5′	3
Clavella	38	52′	4
Comox Post	45	54.2′	4
Daphnia	13	34′	1
Diaphus	16	39.6′	1
Egret Plume II	25	46.5′	3
Falcon Rock	18	50′	3
F.D. 102	11	34.1′	1
F.D. 202	18	38.2′	2
Gavia	17	40.7′	2
Howay	198	115.7′	15
Kitimat	79	79.7′	9
Laurier	201	113′	15
North Rock	20	45′	1
Nicola Post	48	63′	5
Onerka II	25	46.5′	3
Pholis	16	37.3′	1
Pillar Rock	26	51′	3
Rissa	10	36′	1
Sarda	8	31.9′	1
Seal Rock	24	43.5′	2
Sooke Post	52	55.7′	4
Star Rock	18	39.9′	2
Statistic	10	30′	2
Stuart Post	44	54.6′	4
Temple Rock	16	45′	2
Takla Rock	6	26′	1

61925–4—3

Name	Tonnage	Length	Crew
Bait Service			
Newfoundland Area—			
Arctica	313	135.6′	15
Inspection Service			
Newfoundland Area—			
Belle Bay (laboratory vessel)	39	63.5′	4
Fish Culture Service			
Maritimes Area—			2
Ostrea	8	35′	(when required)
Cyprina	10	34.8′	2

INSPECTION SERVICE

FISH is one of the most perishable of foods, and until comparatively recent years fresh fishery products were unavailable to those who lived at any distance from the sea or from the fresh-water areas which produce fish in commercial quantities. With the improvement of transportation methods, refrigeration techniques and other methods of preserving quality, this situation has changed.

However, this improved circumstance calls for constant vigilance on the part of the agencies responsible for the quality of fish. One of these agencies is the Inspection Service of the Department of Fisheries, which maintains laboratories at major centres across Canada as well as several mobile laboratories in fishing areas and a fish inspection vessel, the *Belle Bay*, in Newfoundland waters. The bacteriologists and technicians who staff these laboratories work in conjunction with Inspection Officers who regularly check on the quality of fresh and frozen fish produced for export, as well as products imported from other countries for Canadian consumption. The staff of the Service also has certain responsibilities in connection with the production of products such as dried and salted fish, canned fish, and fish pickled in brine.

The laboratories of the Service are equipped not only for routine inspection of fish and fishery products but also to assist in solving the unusual technological problems which continually arise in any enterprise connected with food.

Since April, 1959, the Department has made systematic inspection available, on a voluntary basis, for fresh and frozen fishery products and the plants that process them, and firms which meet certain standards may be certified to mark their frozen products "Canada Inspected" and their fresh fish "Processed Under Government Supervision." The emblem in each case consists of the words enclosed in the outline of a maple leaf.

The standards were established following discussions between government and industry and were set by the Canadian Government Specifications Board. They are designed to cover plant construction, sanitation, equipment, handling and processing. As result of the CGSB specification there has been definite improvement in quality.

Details of the Inspection Service's work in 1961 follow.

Maritimes Area

During 1961, officers of the field service in the Maritimes Area inspected 65,583,247 lbs of salted, dried, smoked and pickled fish, and other products including fresh and frozen lobster meat. This was a decrease of 19,383,280 lbs from the previous year.

These inspections did not include those carried out under the Canadian Government Specifications Board specification which approved some 30,200,000

61925-4—3½

lbs of fishery products. This is an increase of some 12,000,000 lbs over the previous year. Most of the total CGSB production was in the fillet or processed form. Cod and haddock fillets and blocks accounted for over 61 per cent of the total CGSB inspections.

There were nine CGSB approved processing plants in operation in the Maritimes Area during 1961. Eight of these were certified to pack groundfish and one for scallops only.

The system of dockside grading which commenced in 1957 continued in 1961 when 83,581,000 lbs of fresh fish was inspected at the time of landing. This was an increase of approximately 10,000,000 lbs when compared with the figures for 1960. Of the total amount indicated for dockside grading for this year 82 per cent was approved for packing under CGSB standards; 17 per cent was judged edible but not eligible for sale under CGSB specifications, and one per cent was considered cull, which is not good enough to be sold for human consumption. Much improvement was noted in the landed quality of fresh fish graded at dockside in 1961 compared with 1960.

During the year 48,120,383 lbs of salted and dried fish were inspected. This was a decrease of some 10,000,000 lbs from the previous year. There were increases in the amounts of green salted cod and boneless cod. Decreases were noted in dry cod, pollock and hake. There were also decreases in the amounts of pickled, smoked and other types of fish inspected. Oysters and lobster meat, however, were up slightly.

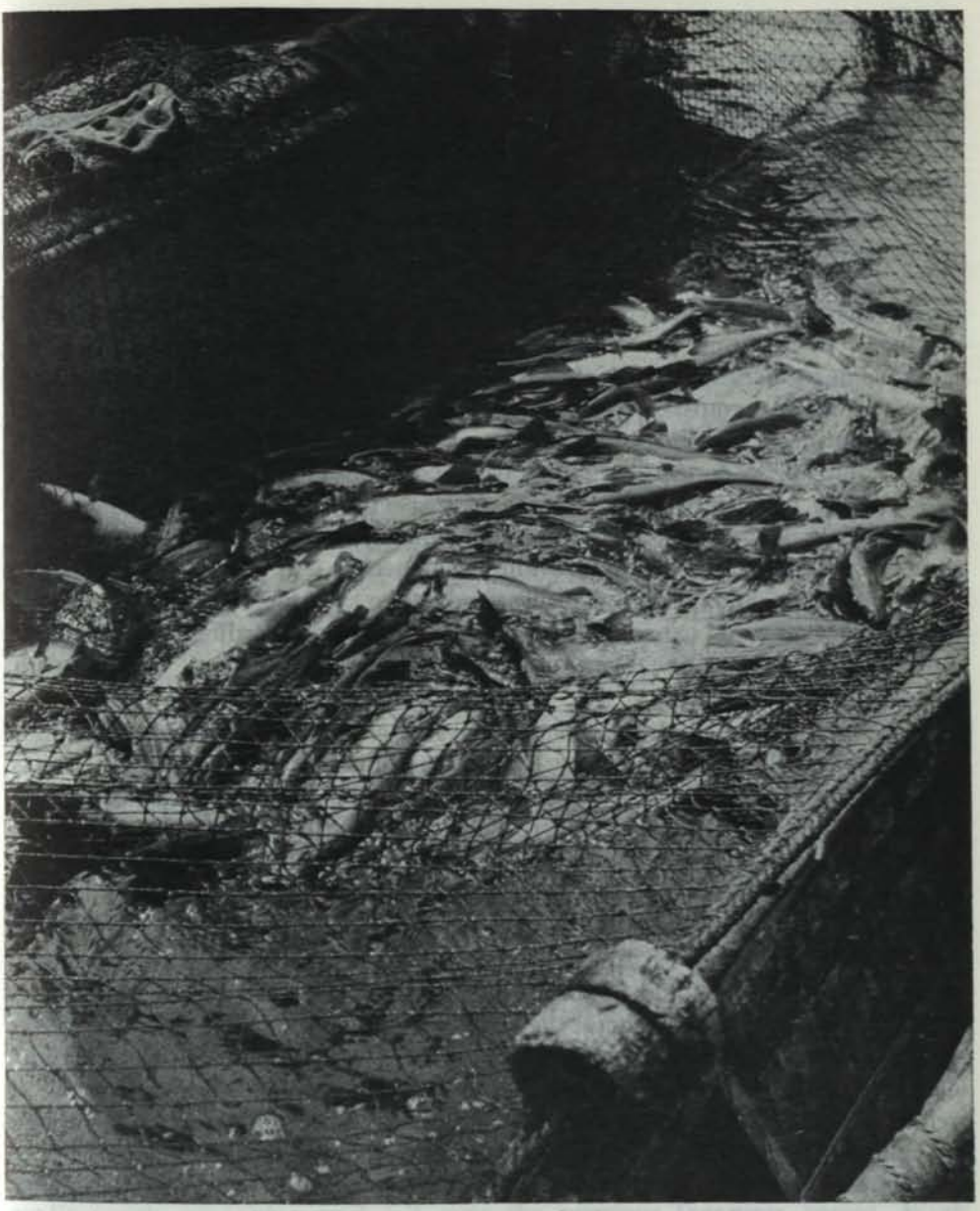
A total of 303,225 containers were inspected, mostly bloater boxes. This was a decrease of some 35,000 boxes from the year before. The quantities of various kinds of fish reinspected under the Fish Inspection Act during 1961 amounted to 3,844,000 lbs. This was an increase, which was accounted for by reinspections on salted cod, pollock, boneless cod and bloaters.

A total of 3,881,381 lbs of lobster meat were inspected, an increase over the previous year of some 180,000 lbs.

In 1961 the scallop regulations were amended to provide for the compulsory inspection of fresh scallops for export. Under amended regulations no person may shuck or handle scallops for export without prior approval of the Department.

During the year regulations under the Fish Inspection Act were amended to require a Certificate of Registration for a registered salt fish plant exporting salt fish. One hundred and ten Certificates were issued in 1961.

A total of 2779 lots of imported canned fish and shellfish were submitted for inspection to the Department's Fish Inspection Laboratories at Halifax, N.S. and St. Andrews, N.B., amounting to 593,100 cases. This represents an increase of 107,950 cases or about 22 per cent over last year. Sixty-two of the parcels inspected and part of 33 other lots were recommended for rejection. A total of 100 lots were reinspected and of these, 37 parcels were rejected. The parcels rejected were mainly for poor quality and the use of non-permitted colouring agents and preservatives. The importations of canned fish and shellfish for 1961 consisted mainly of tuna, sardines, shrimp and clams. Tuna and shrimp comprised nearly 60 per cent of the total.



"Drying up" a Newfoundland codtrap with the fish being brought to the surface for brailing into the boat.

The field force of the Inspection Service is responsible for carrying out the requirements of the Meat and Canned Foods Act, the Fish Inspection Act, and the regulations under these Acts. Among their duties are the inspection and grading of salted and dried cod, pollock, hake, haddock and cusk (including boneless fish prepared from these species); pickled herring, alewives, mackerel (split and fillets) and salmon; smoked herring (bloaters), boneless and mild

cured; oysters; frozen smelts; lobster meat (fresh and frozen); inspection of containers (barrels, pails and boxes); the inspection and grading of canneries, lobster meat plants, shellfish shucking plants and fish plants. In 1957 a voluntary system of inspection for fresh fish at dockside was introduced. Among the species of fish inspected were cod, haddock, redfish, grey sole, Canadian plaice, witch, catfish, pollock, hake and halibut. In 1960 scallops were included.

The inspectors are also required to check the weight of numerous fish products to prevent the marketing of "short weight" packs; to see that container markings and descriptions are according to requirements; to check labels and labelling requirements for canned fish, fresh and frozen fish, and shucked shellfish products; to maintain a constant check on sanitary conditions and operating methods in canneries, shellfish shucking plants and fish plants; to be responsible for withdrawals of routine samples of canned fish and samples of domestic canned fish for grading and inspection purposes and imported fish products, both canned and frozen, for inspection; to be responsible for the issuing of inspection and grading certificates on all types of inspected and graded fish products. They also make reports concerning the industry, conduct all necessary correspondence, and carry out general duties connected with office administration. They are responsible for giving accurate advice to the industry and to fishermen on fish processing and canning, and to give information regarding the regulations under the Acts. Educational work is carried out among fishermen, vessel owners, and plant employees.

The other arm of the Inspection Service consists of the Fish Inspection Laboratories. The main laboratory in the Maritimes Area is situated at Halifax and regional laboratories are at St. Andrews and Shediac, N.B., and Charlottetown, P.E.I. In addition to the regional laboratories a large mobile unit is operated on a yearly basis and two smaller mobile laboratories are operated on a seasonal basis. Temporary laboratory services were provided in the Magdalen Islands for sanitary and quality control in fish plants and canneries.

The officers of the Fish Inspection Service are responsible for the grading and inspection of domestic and imported canned fish; the determination of quality routine samples of fish products; the examination and quality analysis of salted, smoked, fresh, frozen and marinated fish products; the chemical and bacteriological analysis of fish plant water supplies; the bacteriological examination, as well as chemical and physical examination of fish plants and equipment; surveys of shellfish producing areas; the bacteriological examination of fresh and frozen lobster meat and the chemical and bacteriological analysis of groundfish fillets.

Important and large scale improvements and additions to existing fish producing plants and establishments were outstanding features of the fishing industry in the Maritimes Area in 1961.

During the year a successful course for fresh and frozen filleting plant foremen was conducted in Halifax, N.S. A total of 29 members of the trade attended this course. In addition to this, a fish canning course was held in Charlottetown with 35 members of industry in attendance.

Senior members of the Department's Inspection Service attended a number of meetings and conventions during 1961.

Pacific Area

During 1961, the Fish Inspection Laboratory at Vancouver inspected 3084 parcels of British Columbia canned salmon totalling the equivalent of 1,408,597-48-lb cases. This represented an increase of 1193 parcels and 774,833 cases over the previous year.

There were 39 inspections of canned herring during the year 1961, covering a total of 19,873 cases. Of this total, 16,775 were herring in tomato sauce and 3098 were herring in natural oil. All canned herring inspected was found to be Approved Quality. For the inspection of canned salmon and canned herring, the Department charges the canners a nominal fee of one-half cent per 48-lb case which resulted in collections of $7300.

There were 2074 inspections of imported canned fish and shellfish totalling approximately 6,000,000 lbs, or the equivalent of 125,800 cases of 48 lbs, made through ports of entry west of the Great Lakes. Included in this total were approximately 26,000 cases of canned salmon. Of the total importations, 41 lots consisting of 9500 cases were refused entry because of poor quality and 37 lots of approximately 56,000 cases were detained for label correction for compliance to the requirements of the Meat and Canned Foods Act.

Approximately 600 inspections of imported fresh, frozen and cured fish entered through ports in the Greater Vancouver area were carried out in 1961. These represent shipments totalling 5,629,000 pounds, of which all but 300,000 pounds were frozen. Of this total 41 lots were refused entry because of spoilage conditions.

During the year six lots totalling 1198 boxes or about 240 tons of dry salt herring were inspected for shipment to the Orient.

Nine plants processed fresh and frozen fish under CGSB Specification 32-GP-141(A) during 1961. These plants are located at Vancouver, Victoria, Butedale, Prince Rupert and Steveston.

The development of colour reference standards for the inspection of canned salmon was completed during 1961. Information concerning the fabrication of these standards has been made available to firms engaged in this type of manufacture with the hope that a commercial supply of these reference standards might become available to packers and brokers dealing in canned salmon. There is, however, no commercial supplier of these standards at present.

A method of rating canned salmon for grading into two classes within the present Approved Quality classification has been developed, using data relating quality with quantities produced over the previous four-year period. Work has been carried out on the development of colour reference standards for the grading of canned tuna into white meat, light meat and dark meat classes.

During 1961 the Bacteriological Section of the Fish Inspection Laboratory continued studies in regard to the standards of bacteriological methods for fishery inspection, in co-operation with the Department's other Inspection Laboratories. The bacteriologists also made many routine bacteriological tests as indices of sanitation and processing fish in all plants producing under CGSB specification.

The bacteriologists also tested samples from a great many imports of frozen fish and shellfish, including pre-cooked products, to determine their sanitary condition. In addition they made studies concerning the sterility of domestic and imported canned fish products and conducted tests for thermophilic bacteria in fresh and canned shellfish products.

Newfoundland Area

An important step taken in the inspection of salted fish during the year was the introduction of uniformity of grading between Newfoundland and the other Atlantic Provinces. This action, taken under the Fish Inspection Act, established similar grade standards for salted fish being exported from Canada.

In comparison with 1960 there was an increase in sales of light salted cod to Spain and Italy. Actually, supply does not meet demand. There were no serious market complaints with respect to quality.

There were substantial increases in quantities of Labrador cure inspected for Portugal, Jamaica and Puerto Rico. However, the amount of wet salted fish shipped to the Canadian mainland for further processing was down. A shipment of Labrador saltbulk to Italy received favourable market reaction.

Competition was quite keen and as a result some exporters accepted excessively damp fish. This necessitated extra drying by mechanical means in order to meet market requirements. In some localities, skin-heated fish was fairly common because of the hot, dry weather experienced.

Two new plants operated for the drying of salt fish during the year, and renovations were made to several existing plants. On the other hand two salted fish plants discontinued operations and one was destroyed by fire. In this latter instance the loss included fish stocks of approximately 2000 quintals.

A total of 2630 inspections were carried out on 430,850 quintals of salted fish, of which 168,357 quintals were light salted and 262,493 quintals were heavy salted. Compared with 1960 this represented a slight decrease in the light salted cure.

Four fresh fish processing plants operated under the Canadian Government Specifications Board requirements.

Sales of frozen filleted fish were made to the United Kingdom in greater volume than in previous years; and a lot of 50,000 pounds of round, gutted, head off, small haddock was frozen for the Jamaica market.

One new plant had trial runs in October and is expected to be in full production in the coming year. One firm added a meal plant to its facilities.

In an endeavour to promote the sale of frozen turbot in mainland centres, the Department arranged with the owners of filleting and freezing plants located in turbot producing areas of the East Coast to process and freeze filleted and dressed turbot. The outcome of this experiment will be watched with interest.

Pickled fish production increased somewhat, due primarily to the availability of mackerel. Inspections showed an increase of 6629 barrels over 1960. Inspected were 10,865 barrels of herring, 3179 barrels of turbot and 2475 barrels of mackerel.

The work of checking on the acceptability of products being marketed by fish processing firms was continued both by testing daily frozen samples received from the various plants at the laboratory and by on-the-spot sampling of end of line production through facilities of the Inspection Vessel *Belle Bay*. Particular emphasis was placed on the examination of plant water supplies.

In the chemical section analyses of by-products included the determination of the protein content of fish meals and Vitamin A content of fish oils. All imported salts used in the salt fish industry were analysed to ensure conformity with provincial requirements.

The laboratory also provided technical assistance to industry in the production of cod liver oil, cod liver solubles, and fish meal, as well as in canning, filleting and freezing operations.

Central Area

A record was set this year for the total amount of whitefish inspected prior to export. A total of 21,916,000 pounds were examined at the various stations and sub-stations in the Central Area and at Montreal. The bulk of this, amounting to some 15,340,000 pounds, was inspected in the three Prairie Provinces.

The voluntary inspection of other varieties of freshwater fish, made at the request of industry, amounted to a total of 5,605,976 pounds. Most of the quality checks were made in the Northwest Territories and the three Prairie Provinces. A small percentage was examined in Ontario.

A total of 439,499 cases of imported canned fish and shellfish were inspected during 1961. This is an increase of nearly 62,000 cases when compared with 1960. These shipments represent importations from 28 different countries. The bulk of the importations, however, were canned shrimp from the United States, anchovies from Sweden, sardines from Norway, sprats from Denmark, tuna, oysters and clams from Japan and herring in various sauces from Germany.

A total of 5,147,911 pounds of imported fresh frozen and processed fish were inspected for quality and labelling at various ports of entry by officers of the Central Area.

There were nine CGSB approved processing plants in operation in the Central Area during 1961. These are located in Saskatchewan, Manitoba and Ontario. Saskatchewan has seven CGSB plants and Ontario and Manitoba each have one. Approximately 2,280,000 pounds of fish processed at these plants during the year carried the Maple Leaf quality insignia.

The inspection laboratories at Toronto and Winnipeg continued with work in the development of the Department's program of plant and product inspection of fresh and frozen fish under CGSB specifications. The mobile laboratory working out of Winnipeg investigated various aspects of fish plant sanitation and production. The mobile unit's work extended from Ontario to the Northwest Territories, covering a route of some 11,000 miles.

Quebec Area

During 1961, officers of the field staff of the Quebec area inspected 24,852,000 lbs of fresh, frozen, salted, smoked and dried fish. This was a decrease of 3,838,979 lbs from the previous year. In addition to this, a total of 34,564 cases of domestic canned fish products and 29,408 gallons of oil were inspected. This was an increase of nearly 50 per cent in the total number of cases of domestic canned fish inspected compared with the previous year. The total number of gallons of oil decreased slightly in 1961.

Shipments of imported canned fish and shellfish entered through the port of Montreal amounted to 288,722 cases. This represented an increase of approximately 27,000 cases over the total for the preceding year.

During the year importations of fresh, frozen and packaged fish totalled 367,863 lbs, a decrease from the previous year. A total of 812,216 lbs of whitefish were inspected for export to markets in the U.S.

The program of quality control of fresh, frozen and salted fish plants and canneries is carried out by a centrally-located inspection laboratory at Quebec City and a mobile unit working out of that centre. The services of the mobile unit extended from Montreal to the Gaspé Coast.

Important improvements were made to a number of plants and establishments in the Quebec area during the year. One plant in the Quebec district adopted the CGSB specifications for its products.

During the year, senior officers attended departmental meetings in Ottawa. Several inspectors also attended courses on the processing and inspection of lobster meat in the Maritimes Area and the salting of fish at Valleyfield, Nfld.

ECONOMICS SERVICE

AS INDICATED in earlier numbers of this Annual Report, the activities of the Economics Service fall broadly into two groups, designated respectively as economic intelligence and economic research. In the first-mentioned group are included a) the development and maintenance of statistical services and other services of current information on the fishing industry and the fish trade, b) the provision of advice and guidance in the formulation of policy for the fisheries, the preparation of *ad hoc* documentation and the service of enquiries from the public in the field of fishery economics, and c) the undertaking of special investigations of a short-term nature.

Statistical services have been provided by the Department and its predecessors since Confederation. Over the intervening period, the series, relating principally to investment and employment, production (landings and processing), inventories and prices, have been revised progressively—and continue to be revised—in the direction of greater detail and, it is hoped, greater accuracy. In general, the development and revision of these series in undertaken jointly with the Dominion Bureau of Statistics; the Economics Service being responsible mainly for the collection of data and partly for compilation and the publication of reports and the Bureau being mainly responsible for the latter two functions. The Bureau also collects and publishes all statistics of the export and import of fishery products.

Statistics of fish landings are used chiefly by a) fishery administrative officers charged with responsibility for fishery management or conservation by means of seasonal closure and quota regulation, b) marine biologists studying the effect of fishing operations on the resources involved, and c) the business community concerned for which the progress of the catch of a particular species is a business indicator. Statistics of processing and inventories are of equal or greater interest to the last-named group, as well as to the DBS staff concerned with the national product and to officers of this Department, of Trade and Commerce and Finance and of the provincial administrations, who have to concern themselves with the economic outlook of the industry and trade from season to season. Statistics of investment and employment, because of their significance in relation to the role of fisheries in the economies of certain regions of Canada, are of major interest in government circles especially.

The requirements of the Department, D.B.S., the Department of Public Works, the Fisheries Research Board and the several international fishery commissions are co-ordinated through an Inter-departmental Committee on Fishery Statistics. Contact with provincial agencies is effected through special committees, such as the Federal-Provincial Atlantic Fisheries Committee, and with the fishing industry and fish trade through meetings arranged for the purpose with the trade associations or with officials of the firms involved.

61925–4—4½

The data collected are published on a monthly or annual basis by the D.B.S. The special reports released by this Service, and listed below, provide either greater detail, e.g. the B.C. monthly and annual catch statistics, or greater timeliness: the monthly reports appear within a week to a fortnight following the month to which they pertain and the weekly reports appear a few days after the end of the week covered. They thus serve different purposes and, to some extent, different publics, from those served by the D.B.S. publications.

The statistical reports and circulars, other than *ad hoc* material, prepared and distributed by the Economic Intelligence Branch at national headquarters in Ottawa are as follows:

WEEKLY—

1. *Prices Received by Fishermen:* at representative fishing ports (circulated within Department and to subscribers from the fishing industry).

MONTHLY—

2. *Summary of Fishery Statistics* (circulated within Department and in Dept. of Trade & Commerce).

3. *Statistics of Groundfish Fillet Production* (circulated within Dept. and in Dept. of Trade & Commerce—further circulation, to member associations and firms, from head office of Fisheries Council of Canada).

4. a) *Statistics of Iceland's Groundfish Fishery,* b) *Statistics of Norway's Winter and Spring Cod Fishery* (circulation as in preceding case).

5. *Statistics of Canadian Salt-Fish Production* (circulated to T. & C. trade commissioners abroad).

6. *Summary Statistics of Fish Landings (quantity and value), Inventories, Prices (port and wholesale) and Foreign Trade in Fishery Products in Canada* (published in Departmental journal, Trade News).

7. *Summary Statistics of Canada's Fisheries:* investment, employment, production and trade—quantities and values—by region for 20-year periods (published in private trade journal, *The Canadian Fisherman*—offprint copies circulated within Department and to other federal departments, provincial government agencies, international fishery commissions, firms and individuals in Canada and abroad).

ANNUAL—

8. *Statistics of the Canadian Fisheries:* quantity and value of landings, processed production, exports and imports, by species groups and major product forms (published in *FAO Yearbook of Fishery Statistics,* with circulation among governmental agencies, reference libraries and other subscribers in Canada and other countries).

In addition, the following statistical reports, circular letters, etc. are issued regularly by the Economics Service at the regional headquarters specified:

VANCOUVER, B.C.

WEEKLY—

1. *Salmon-Pack Bulletin:* statistics of canned-salmon production (circulated throughout season to mailing list in government and industry).

2. *Herring Production Bulletin:* statistics of fish-meal output, etc. (circulation as in preceding case).

3. *Fish Market Bulletin:* statistics on movements of fish through major coastal ports, prices, etc. (circulation as in preceding cases, with additional dissemination through press and radio broadcasts).

4. *Sportfishing Bulletin:* statistics of catch by anglers in tidal waters (circulated to club members and others).

MONTHLY—

5. *British Columbia Catch Statistics:* preliminary tabulation by species, statistical area and method of catch, i.e. gear (circulated within Department, to other administrative agencies and to industry).

6. *Oyster Production and Prices* (circulated to trade).

ANNUAL—

7. *British Columbia Catch Statistics:* revision of item 5. (with similar circulation—data also published in trade journal, *Western Fisheries*).

8. *Fishery Statistics of British Columbia:* tabulation of statistics of inventories of equipment, i.e. fishing craft and gear, and processing output (circulation as in preceding case).

9. *Sportsfishing Statistics:* revised version of item 4. (with similar but wider circulation).

10. *Statistics of Fishing Licences:* an analysis of employment, turnover, etc. in the primary fishing industry (circulated within Department, among fishermen's organizations and to others).

HALIFAX, N.S.

WEEKLY—

1. *Price Report:* statistics of dockside prices at major Maritime ports (disseminated, four times per week, through press and radio broadcasts).

MONTHLY—

2. *Landings and Landed Values of Commercial Fish Species:* by province (circulated within Department and to industry, also supplied to press).

3. *Landings by Deep-Sea Fleet* (circulated principally to fish buyers in Maritimes and Newfoundland).

4. *Production of Selected Fishery Products:* statistics of processing, by major species and product forms (circulation as for item 2.).

5. *Report of Salted-Fish Holdings*: statistics of inventories of cured fish in Atlantic provinces (circulated mainly to trade in region).

ST. JOHN'S, NFLD.

WEEKLY—

1. *Price Report:* statistics of dockside prices at major Newfoundland ports (small public circulation, also disseminated through press and radio broadcasts).

MONTHY—

2. *Statistical Report:* statistics of landings and estimated values as landed, disposition of landings and processed production, by species and product form (circulated within Department and to industry, also supplied to press).

3. *Production and Stocks of Filleted and Dressed Groundfish:* statistics of processing and inventories, by species (circulated to industry in Newfoundland and Maritimes).

4. *Production of Salt Codfish:* statistics of processing, by coastal districts (circulated to trade, etc.)

ANNUAL—

5. *Salted-Cod Production:* revision of preceding item, giving details by port of origin (with more restricted circulation).

6. *Report of Lobster Landings:* statistics of catch, by coastal districts (circulated to trade etc.)

7. *Sealing Report:* statistics of capture and outturn of products (circulated to trade, etc.)

8. *Equipment and Employment:* statistics of fishing craft, gear and men engaged in primary operations (circulated within Department and to other agencies and individuals).

Apart from those released to the press and radio, the circulation of the bulletins and reports listed above varies from 25 to 1000. All are available free

of charge. Those circulated to small groups of subscribers have been produced in response to requests from special interests in the Canadian fishing industry and fish trade. In addition, a great many *ad hoc* compilations are prepared at the request of the departmental administration, members of parliament, businessmen, students and a wide variety of other correspondents in Canada and other countries. In 1961, for example, the Service's staff at Halifax and St. John's "processed" over 500 requests from the Department of Public Works for statistical data to assist in the assessment of harbour-improvement needs in the Atlantic region. In the same region, in connection with various industrial-development projects, some 30 or more special investigations were carried out and reported upon. To provide guidance for the management of the rapidly expanding marine sports fishery in Pacific coast waters, the staff at Vancouver made a number of special surveys of catch volume and disposition and of foreign participation in this activity—results, in part, to be released later.

The maintenance of efficient statistical services demands continuous refinement of concepts and methods and constant adaptation to new requirements. Some progress was made in both these directions in 1961. In collaboration with the D.B.S., mechanical tabulating (punch-card) equipment was installed at the Vancouver office. This permits tabulation of "purchase-slip" data in much greater detail than formerly, and the combination of these with other data, e.g. those on the ownership of fishing licenses, for analytical purposes. During the year the first of a series of conferences, designed to co-ordinate statistical services for the U.S. and Canadian Pacific fisheries, was held. In the Maritimes and Newfoundland Areas, courses of instruction were provided for protection and inspection officers who carry out much of the field work involved in the collection of fishery statistics. In the former Area, a simplified system for the reporting of processing and inventory data (monthly and annual) was developed, for application at the beginning of the following year. The service provided the industry on port-market prices also was extended and an analysis was made of lags in the reporting of landings data.

Many questions relating to the economy of the Canadian fisheries are not capable of informed consideration by policy makers without lengthy study or investigation. This is the responsibility of a separate branch of the Economics Service. The Research Branch is located mainly at national headquarters. In most projects of investigation, however, the services of the Area staffs are utilized when available. Certain phases of the work of the latter staffs, e.g. a periodic census of fishing enterprises, are basic to the research program.

Except in the case of occasional projects undertaken on an external request, the reports on the results of all studies and investigations are initially for the exclusive use of the Department. The Industrial Development Service and the Prices Support Board are the departmental agencies making the greatest use of these reports—less obvious, perhaps, may be the relationship of economics to the efficient administration of fishery management and inspection regulations. The publication of reports is based on the criteria a) that an interest in the results of a particular study or investigation exists on the part of the public, and b) that material of a confidential character, with respect to individuals or firms, is

excluded. Outside the Department, the principal users of the Service's reports are 1) other departments of the federal government, e.g. the Department of Finance and the Department of Trade and Commerce, 2) the provincial fishery administrations, 3) fishery trade associations and firms and individuals involved in the fishing industry in Canada, and 4) fishing and trade interests abroad and university and other reference libraries. Most reports are distributed without charge.

One study of a continuing nature was in progress during 1961. This was initiated in 1952 to obtain information on the effects of the departmental program of subsidization for fishing craft of certain types and sizes in the Atlantic provinces. Records of accounts of the assisted fishing enterprises are collected each season and analysed to determine the factors contributing to the success or failure of such enterprises operating in a variety of locations and conditions. New equipment and techniques are being introduced every year and the sample studied is adapted to these changes in the fleet. The 9th volume in a series of annual reports on this study, *Primary Industry Studies, No. 1*, was published during the year and a 10th volume was in the course of preparation.

The field work for another project, begun the previous year, was carried almost to completion in 1961. This is an investigation of the economy of the Canadian freshwater fisheries, with special reference to the fisheries of the Great Lakes—it is co-ordinated with a similar project in the United States. It is expected that a report will be available for publication in 1962.

Early in 1961, a report entitled *License Limitation: a Method of Economic Fisheries Management* was released by the Service. Based on researches during the preceding two years, it was prepared by a consultant employed for the purpose. It presents a theoretical and empirical statement of the case for restricting entry to a fishery as a means of preventing the dissipation of the net yield through an excess of capital and labour inputs. The economic, as well as the biological and administrative, aspects of the fishery-management problem were the subject of an FAO-sponsored conference in Ottawa in June, 1961, on "The Economic Effects of Fishery Regulation". This brought together a large group of representatives of the disciplines mentioned, from both academic and government circles and from a diverse range of countries. It is considered to have been the most productive gathering of its kind to have taken place thus far. The papers submitted and a transcript of discussions will be published later.

The most recent study undertaken by the Service is expected to yield significant results in the general field of fishery management also. This is a study of the lobster fishery in the Atlantic provinces. During the summer and fall of 1961, field records were collected from about 500 of the 10,000 fishermen involved. These are being analysed and the publication of findings is set for late 1962.

Projects undertaken for outside agencies in 1961 included 1) a paper, *The Demand Outlook for the Canadian Fisheries*, prepared for the "Resources for Tomorrow" Conference (Montreal, Oct. 23-28, 1961) and published by the

conference secretariat, and 2) an annotated compilation of the historical statistics of the Canadian fisheries, prepared as part of a wider project for the Canadian Political Science Association.

Besides the work outlined in the foregoing, the staff of the Economics Service are engaged in a variety of activities stemming more or less directly from the central functions of the organization. For reasons of space, reference may be made here to two or three examples only. During 1961, the Assistant Director assumed the chairmanship of a Departmental committee responsible for liaison with the External Aid Office and the arrangement of (fishery) training programs for Colombo Plan fellows and other students in Canada under technical aid schemes. The Chief, Economic Intelligence Branch, in addition to being chairman of the Interdepartmental Fish Trade Committee, concerned with matters affecting exports of fishery products, also represented the Department on an interdepartmental committee which developed regulations under the new Ship Construction Assistance legislation. The Chief Economist, Pacific Area, lectured in the short course for fishermen provided by the Extension Department of the University of British Columbia. The economist in charge of primary industry studies in the Research Branch performed a similar service for certain groups in the Maritimes Area. At the end of the year, the Director of the Service represented the Department on the Canadian delegation to the biennial conference of the Food and Agricultural Organization (Rome, Nov. 4-23, 1961).

INFORMATION AND CONSUMER SERVICE

TO BRING about a closer co-ordination of the Department's information and consumer activities, the Information and Educational Service was expanded to take in the Consumer Branch on August 1, 1961, and became the Information and Consumer Service.

Previously the Consumer Branch had been part of the Department's Inspection Service, and the merger brought all of the Department's public information activities into one group.

The Service carries out a continuing educational program to acquaint consumers, dietitians, home economists and home economics teachers with the proper methods of fish cookery. This program is designed to create a greater use of fish and fishery products in family feeding and in the menus of Canadian hospitals, schools, hotels, restaurants and other establishments catering to the public.

Other objectives of the Service are to bring to the attention of fishermen and the fishing industry findings of the fisheries scientists and those charged with management of the resource which may improve the efficiency of their operations; to bring about a better understanding of proper conservation and quality control practices, and to create a greater appreciation generally of the importance of the fisheries to the Canadian economy. To this end, the Information and Consumer Service through its Ottawa headquarters staff and information officers and home economists in the field utilize all the appropriate media to disseminate such information.

In the field, information officers are stationed in Vancouver, Halifax, and St. John's, Nfld., while departmental home economists are in Vancouver, Edmonton, Winnipeg, Toronto, Montreal and Halifax, with the main fisheries test kitchen at the Ottawa headquarters of the Department.

INFORMATION BRANCH

In recent years there has been a noticeable increase in the demand for information on the fishing enterprise from educational institutions, the industry itself and the general public. To provide up-to-date coverage of fisheries events of both national and regional significance, the Information Branch issues a steady flow of material in the form of informational sheets, pamphlets, booklets, films and filmstrips, as well as material especially prepared for newspapers, trade and other magazines and radio and television. The Branch received about 1500 individual requests for information and altogether sent out nearly 24,000 printed publications.

With the trend in the fishing industry to more technical and complex modes of operation, and to a greater diversification of fishing effort, it is vital that the industry be kept abreast of these events as they occur. One source for disseminating this information is the Department's monthly magazine, *Trade News*,

which is distributed on a request basis to the industry and to others interested in the fisheries. Through articles prepared by the information staff both at headquarters and in the field, and, on occasion, by departmental and Fisheries Research Board officers, the magazine provides a month-by-month account of activities in the fishing industry. It also delineates the Department's management policies and reports on the work being performed by fisheries scientists.

Of special interest last year was the August issue of *Trade News*, which devoted its entire space to summaries of background papers on fisheries topics prepared for the national "Resources for Tomorrow" Conference, held in Montreal in October. Prior to and during the conference itself, members of the Information Branch were assigned to the conference secretariat to assist in the editing of background papers and in press relations.

A second publication for which the Service is directly responsible is *The Canadian Fish Culturist.* Canadian scientists in the fish culture and related fields submit papers for inclusion in the publication which is circulated to persons and organizations concerned with fish culture practices.

The year 1961 marked the appearance of *Canadian Fisheries Reports*, which is published to provide for the circulation of specialized information on inspection, conservation, development, economics and related subjects. This publication is designed to fill the gap between purely scientific journals and more general publications. A mailing list of about 2000 was established for the first issue, and copies were distributed to departmental officials including fisheries officers, the fishing industry, federal and provincial departments of government, magazines and fishing publications.

An important phase of the work of the Information Branch is that which takes advantage of the possibilities of radio and television, which are particularly appropriate media for bringing the functions being performed by the Department's various services and agencies to the attention of fishermen, consumers and the general public.

The Service maintains a very close liaison with the Canadian Broadcasting Corporation; a manifestation of this is the fact that many tapes of interviews with departmental and Fisheries Research board officers provided by the Service are aired over the CBC's Fishermen's Broadcasts emanating from St. John's, Halifax, and Vancouver. In the Areas, Information Officers, as well as the Home Economists with the Consumer Branch, co-operate with the CBC officers responsible for programming. They arrange talks and interviews, and give talks themselves when the opportunity presents itself. In the year under review, the Information Branch taped 79 interviews for distribution to the CBC and independent radio stations. A series of radio reports on fisheries events in the Pacific, Maritimes, and Newfoundland Areas was inaugurated in 1961. Different tapes were produced for the various outlets of the Fishermen's Broadcasts.

Television is playing an increasingly important role in the Department's public information activities. In 1961, the Department's Home Economists, both at Ottawa and in the field, made frequent appearances on television, and to complement this the Information Branch prepared a slide package of various

Some of the posters displayed in fish processing plants.

fish dishes, as a public service feature for "Fish 'n' Seafood" Week, with commentary in both English and French. More than 50 television stations in all ten provinces and the Northwest Territories used the material, and many requests were received as a result for the special fish cookery booklet mentioned during the telecasts.

Greater television news coverage of the Department's programs has been noted in the areas. In addition, several stations have televised fisheries material of a feature nature.

In 1961, the Service continued its efforts to provide material on consumer education to newspapers, magazines and radio and television stations. Consumer copy was forwarded regularly to 67 daily newspapers, 134 weeklies, 104 radio stations, and 16 television stations which had expressed a desire to receive such information. Additional material was prepared and distributed during the Lenten Season and as previously mentioned "Fish 'n' Seafood" Week. Publications requesting them also receive illustrations to run with the copy provided. Two new fish recipe booklets were prepared by the Service in 1961. These were "New Fish Recipes" and "Let's Serve Freshwater Fish". A feature of the Department's endeavours in the educational field was the appearance of its latest educational booklet, "Teeming Waters". Like others in the series, it is highly regarded by educators as a teaching aid; these booklets are distributed free of charge to provincial educational agencies. For students, the Service publishes a special series of Fisheries Fact Sheets dealing with commercial and sports fish species as well as with catching and processing methods. Also in the publications field, the Branch assisted editorially and was responsible for the production of the book, "Design of Fishways and Other Fish Facilities", by C. H. Clay, Chief, Fish Culture Branch, Pacific Area. This book is sold by the Department of Public Printing and Stationery, which printed it, at $5.00 per copy.

As in previous years, the Branch continued to place great emphasis on the use of visual aids as an effective way of educating the public on fisheries matters. Many of the Department's films and filmstrips were screened by Information Officers and other departmental personnel to fishermen, students and service organizations. Full advantage was also taken of films and filmstrips in basic training programs conducted by the Department for new Fisheries Officers.

A new filmstrip, entitled "Let's Serve Freshwater Fish", was produced for the Department by the National Film Board in 1961. Art work was completed for three new posters emphasing the differences between young salmon and brook trout and pointing out to anglers and the Atlantic salmon commercial fishermen the need for conservation measures. A filmstrip on Atlantic salmon was also prepared as an integral part of this conservation program. The Department has received the support of the various Atlantic salmon associations, which are to co-operate by having the posters and filmstrip shown in the areas where they will be most effective. A series of three wallhangers covering commercial fishing methods used to catch main species of fish in the Atlantic, inland and Pacific waters is also in production.

The Branch is responsible for the production of all exhibits built for the Department. This includes those designed for consumer events as well as those for general fisheries displays. A new exhibit, "How to Recognize Quality Fish", was produced for the Department's consumer activities in 1961.

As in past years, the Branch was assigned public relations duties for international and national fisheries agencies meeting in Canada, for "Open House" ceremonies of the Fisheries Research Board stations, and for the annual meeting of the Board in Ottawa. In 1961, the headquarters staff carried out publicity and press relations functions for an FAO meeting held in Ottawa.

The work of the Area Information Officers complements and supplements that of the headquarters unit. However, because of their proximity to the fishing scene, the Area officers are involved in certain projects pertinent to their location. As an example, the Department's Newfoundland Area Information Officer is its representative on a committee organized by the provincial Department of Education to guide the 4-H clubs of Newfoundland in fish projects. During the year under review the Area Officer assisted the clubs in a lobster study by giving several radio talks on the fishery.

In 1961, the Information Branch in the Maritimes Area had its busiest year since it was established eight years earlier. The period was marked by increased public interest in the fisheries generally, and this trend was particularly evident among the school population, both pupils and teachers. This is attributed to the growing attention being paid to fisheries by governments—provincial and federal—and the resultant publicity being given to Canada's role in the international fisheries field, which has created a public awareness that the fishery resource is by no means inexhaustible. Representatives of the department are being called upon more and more to provide fisheries information to public and private bodies. The aforementioned publicity media, boards of trade journals, and house organs of private industry are becoming keenly interested in material dealing with fisheries.

Early in the year the Information Officer in the Maritimes embarked on a fairly extensive campaign of fisheries conservation education in the junior and senior high schools. In two Nova Scotia counties—Halifax and Kings—illustrated lectures were given in a dozen schools. This work is also to be carried out in Halifax. Lectures have been given in 18 schools. While much attention has been focused on schoolchildren, there has been a continuing program among fishermen. Last summer educational meetings were held with commercial fishermen in Kent and Westmorland counties in New Brunswick.

Each year this branch assists with the department's program at the Nova Scotia Fisheries Exhibition in Lunenburg, at the Lobster Carnival in Summerside, the exhibition in Yarmouth County, and the Lobster Carnival planned for Shediac.

Activities similar to those of the Chief of the Information Branch in the Maritimes Area are carried out by his counterparts in Newfoundland and British Columbia. In 1961, the Pacific Area Information Officer, in collaboration with

the Fish Culture Development Branch, arranged press tours of the Big Qualicum River and Jones Creek projects. Details of these projects are dealt with in the Conservation and Development Service section.

Largely through the co-operation of the Pacific Area Fishery Officers, increased numbers of British Columbians of all ages viewed departmental and other fisheries films. An active film program was maintained also in the Yukon Territory. Professional organizations in this area are reached directly through the co-operation of engineers and biologists of the Fish Culture Development Branch. In this manner, "special interest" groups are exposed to factual information on the fisheries in which they are interested.

CONSUMER BRANCH

The educational program of the Consumer Branch continued throughout the year with an increase in the number of demonstrations and in the use of television. Two staff changes were effected in the Ottawa Test Kitchen and the home economist at Edmonton was on sick leave for approximately four months with a resulting decrease in the amount of coverage for that area. The Halifax and Montreal home economists operated without kitchens. By 1962 these home economists will have these facilities available to them.

Demonstration of fish cookery to women's group in the Department's Ottawa test kitchen.

A total of 434 demonstrations were given during the year, an increase over the previous year. These demonstrations were given to women's groups of various kinds, home economics students at secondary and university levels, teachers, cooks of small hospitals, lumber camps and restaurants and armed services personnel in training. Radio talks and interviews totalled 45. The number of television appearances, 67, was almost double that for 1960. This is expecially gratifying because the response to these demonstrations has been excellent. Filmstrips were circulated through the home economics classes of secondary schools wherever possible. On suitable occasions, the home economists used filmstrips for other groups.

Recipes were tested in the Ottawa kitchen for use in newspapers, radio and television releases and in the preparation of cookbooks. The regional home economists occasionally tested recipes for fish which are only available in their own area. Food photographs were taken in the test kitchen for use with consumer releases. The program of testing for large quantity recipes was accelerated and recipes were distributed through the Department of Fisheries and through the Nutrition Division, National Health and Welfare. Special recipe booklets were prepared for exhibitions at which demonstrations were given and a new recipe booklet, *Fish for Year Round Salads*, was completed. Over 100,000 recipe booklets were distributed during the year. The Ottawa Test Kitchen was the scene of five special luncheons. Experimental work was started on the home freezing of fish to supply information for a booklet on freezing fish for homemakers. This was undertaken by regional home economists using fish indigenous to their respective areas.

Contacts with other home economists, dietitians, food service personnel, industry and the public was made and maintained at meetings and by participation in the following shows, exhibitions and conventions: Canadian Dietetic Association Convention; Canadian Restaurant Association Convention; Open House at Household Science Department of the University of Toronto; Nova Scotia Fisheries Exhibition; Fish in Nutrition Conference (F.A.O.) Washington, D.C.; Food Show, Ottawa; Canadian Association of Consumers Annual Meeting; Alberta Registered Dietitians Convention; Western Restaurant Suppliers Convention; Atlantic Regional Conference of the Canadian Restaurant Association, and Salon de l'Agriculture, Montreal.

INDUSTRIAL DEVELOPMENT SERVICE

THE Industrial Development Service has as its main objective the modernization and improvement of the Canadian fishing industry in all its diverse phases from catching to final distribution to the consumer. The Service is the application group of the Department and as such is interested in putting research finds to practical use as well as to apply the findings and experience of other countries to the Canadian scene. The Service encourages and co-operates with the fishing industry and provincial fishery authorities as well as with manufacturers, naval architects and engineering firms to further the logical and practical development of the fisheries.

The Service is composed of three Sections, Engineering, Vessel and Gear and Special Services. The program as carried out in 1961 is summarized in the following:

ENGINEERING

Refrigerated Road Transportation

Work on the improvement of refrigerated road trailers was continued in co-operation with the National Research Council and a trailer manufacturer. Studies were completed in the jacketing of a test vehicle and optimum air flow and duct dimensions were determined. Because of time limitations road temperature testing of a newly constructed trailer could not be undertaken. Preliminary test data indicated, however, that zero and sub zero temperatures can be maintained continuously in all parts of the load with no increase in refrigeration equipment and no significant lessening of load carrying capabilities. It is planned to complete this work in the near future with the expectation that trailers of this new design will be in operation for the transportation of frozen foods by the end of 1962.

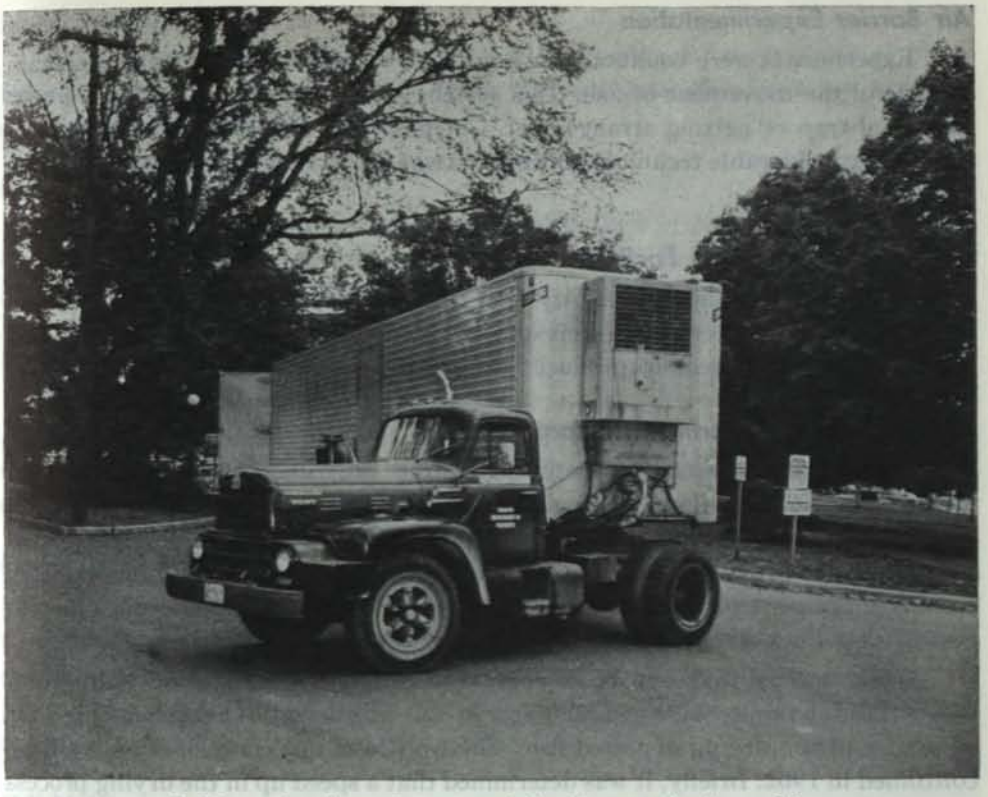
Salt Fish Dryers

Investigation of the operation of an experimental salt fish dryer installed at Catalina, Newfoundland, in 1957 was continued during the year. A report is to be published at the close of the five-year experimental period.

Layouts were made for the installation of several small salt fish dryers and start-up and operating assistance was provided.

Preliminary Layout and Design of Fish Plants

Preliminary design, layouts and cost estimates for fresh fish processing plants were prepared for both inland and coastal fisheries. Included were recommendations regarding processing equipment and freezing and refrigerated storage facilities.



Refrigerated trailer used to test methods of transporting frozen fish.

Development and Demonstration of Equipment and Techniques

Preliminary studies were undertaken on the handling of fish at sea and in trawler unloading, and design work was completed for some materials handling equipment aboard vessels.

Plans were formulated, in co-operation with the Fisheries Research Board, for the insulation and refrigeration of the holds of four vessels for the prosecution of the Pacific tuna fishery. The completed vessels are to commence fishing in 1962.

Specifications were developed for new pre-fabricated frozen bait holding units for the Newfoundland Bait Service as well as a new refrigerated truck for the transportation of frozen bait.

New Fishery Products

Research work by the Department of Agriculture has resulted in a new process whereby a fish-potato mix can be dried rapidly, stored for lengthy periods and can be reconstituted quickly by the addition of water without loss of flavour or quality. The Department of Fisheries, in co-operation with the Department of Agriculture, is developing plans for the establishment of a pilot plant operation to produce the mix on a semi-commercial scale.

Air Barrier Experimentation

Experiments were conducted in Lake Erie employing an air bubble curtain to control the movement of fish. This system was used to guide fish into a conventional trap or netting arrangement. Catching effectiveness was inconclusive; however, considerable technical information was gathered on the operation of such systems.

Community Processing Facilities for Fishermen

A number of small community operated facilities for the processing of fish were provided at selected locations in Newfoundland. This program has enabled fishermen in many areas to produce better quality fish under better conditions.

Fish Processing Experimental Plant

Familiarization courses were held at the experimental establishment in Valleyfield, Newfoundland, during the summer. The courses, which covered all aspects of salt fish processing from splitting to final packaging, were well attended by federal and provincial fisheries officials, as well as by members of the industry from management to plant foremen. New products and new techniques in processing, handling and packaging were demonstrated.

Work was carried out in co-operation with an investigating team from Memorial University of Newfoundland in the utilization of relatively high air velocities in the drying of salted fish. The work was not completed and will be continued in 1962. Briefly, it was determined that a speed up in the drying process is possible but with a resultant increase in operating costs. However, economies may be realized by using the higher air velocities during initial drying periods with lower air speeds for the final operations.

Experimentation was carried out in many facets of salt fish processing, i.e. dry, pickle and brine salting, holding and storage tests, high and low as well as conventional air velocity drying, new products and packaging.

VESSEL AND GEAR

The activities of the vessel and gear technologists were widely diversified during the past year as will be noted from the following summary.

Plastic Inshore Fishing Vessel

Work in co-operation with the Nova Scotia fisheries authorities was carried out in the development of a fibreglass reinforced plastic hull, 38 feet in length. This boat will be completed in 1962.

Steel Dragger—78 feet

Plans and specifications for a prototype multi-chine side dragger were developed in co-operation with the Quebec Department of Fisheries. The vessel was constructed by Quebec and became operational late in the year.

Stern Trawlers

The Department was associated with the provincial authorities of New Brunswick in the development of plans and specifications for stern trawlers suited to Canadian Atlantic conditions.

Herring Fishery

A herring fishing demonstration was undertaken in Newfoundland coastal waters in co-operation with the provincial authorities. Improved techniques and equipment, including a modified purse seine, power block, fish finding and light attraction systems, were utilized. Results were encouraging and emphasized the need for modern equipment in this fishery.

A vessel was also fitted out for stern trawling. However, the results were not as productive as with seining. It is thought that with some modification of the equipment used this method of fishing would be quite effective in the catching of herring.

Great Lakes Trawling

Experimental work in trawling for Great Lakes fishes was continued. Considerable success has been realized in the catching of smelt over an extended season and many operators are now stern trawling. Experimental trawling for perch has also shown promise, but the lower concentrations of this species tend to make for smaller drags than with smelt.

Gill Netting

In co-operation with the Atlantic Coast provinces, gill net instruction was again made available to fishermen in a number of areas. Results have been most promising and fishermen have been enabled to increase their catch with a relatively small investment.

Instruction and Demonstration

Talks and lectures were given at vocational training centers, and individual fishermen and groups were given practical instruction. This included demonstration of various types of gear used in a variety of fishing operations. Instruction was also provided in the practical use of several types of modern electronic fish finding equipment. Demonstrations took place both ashore and at sea.

Survey of Fishing Gear

A survey of fishing gear used in Canada was initiated. This project has been undertaken as part of a long term study of the effectiveness of fish catching equipment.

A variety of other projects dealing with practical aspects of fishing were undertaken or completed during the year, largely in co-operation with the provinces. Such activity ranged from small boat gill net operations to deep sea trawling; from the installation and demonstration of gill net haulers to large

stern trawls of bottom and mid-water types; from electronic fish finding equipment to lamp attraction systems, and trawl transducers by the use of which fish could be actually seen entering the trawls.

SPECIAL SERVICES

The Industrial Development Service, aside from matters of technological development, is also concerned in a wide range of related responsibilities including the administration of programs of financial assistance for fishing vessel construction, grants for the provision of frozen bait storage facilities and other matters pertaining to public works and marine aids to navigation as these relate to the fisheries.

In September of 1961 revised Regulations were gazetted amending the previous Dragger and Longliner Assistance Regulations. The new Regulations authorized by Order-in-Council P.C. 1961-1333 provide for an increase in the rate of subsidy from $165 per ton, gross tonnage, to up to $250 per ton on fishing vessels engaged in commercial fishing from ports in the Atlantic coast provinces. The program enables fishing vessels of approved type of a minimum length of 45 feet up to a maximum size of 100 tons to qualify for assistance. Grants in 1961/62 were made in respect of 39 vessels for assistance totalling $302,131.

FISHERMEN'S INDEMNITY PLAN

ACCEPTANCE of the Fishermen's Indemnity Plan continued to expand through 1961. The Plan, which came into operation in 1953, offers fishermen owning and operating fishing vessels valued between $250 and $10,000, the opportunity to secure insurance against total or partial loss for a nominal premium of one per cent of the appraised value per annum. The Plan also provides a measure of low cost insurance to lobster fishermen on their lobster traps, an item which frequently suffers widespread damage from unexpected storms.

At the close of 1961 a total of 5978 fishing vessels were covered under this voluntary insurance plan. The Plan has been most widely availed of in British Columbia where 2549 policies were in effect at the end of the year. In Newfoundland vessels owned by 1102 fishermen were covered; in the Maritimes 1875 vessels and in Quebec 452 vessels. It is estimated that about one-third of the eligible fishermen have taken advantage of the Plan. Because of the wide dispersion of small fishing vessels in many hundreds of small fishing settlements, commercial marine insurance companies have found it impossible to offer insurance to such fishermen at rates within fishermen's capacity to pay.

Under the Plan fishermen pay a premium of one per cent of the appraised value and in the event of total loss of the vessel an indemnity of 60 per cent of the value is paid in the Atlantic provinces and 70 per cent in British Columbia

TABLE—FISHERMEN'S INDEMNITY PLAN

NET PREMIUMS COLLECTED AND INDEMNITIES PAID FROM INCEPTION OF PLAN (JULY 1953) TO DECEMBER 31, 1961

Province	Vessels		Lobster Traps	
	Net Premiums	Indemnity	Net Premiums	Indemnity
	$	$	$	$
Newfoundland	113,853	220,404	15,815	67,650
Nova Scotia	144,777	160,650	133,098	513,204
New Brunswick	44,886	37,230	628	1,070
Prince Edward Island	19,887	9,170	17,862	51,248
Maritimes	209,550	207,050	151,588	565,522
Quebec	31,682	61,111	11,773	24,276
Atlantic Coast	355,085	488,565	179,176	657,448
British Columbia	634,698	537,623	—	—
Total	989,783	1,026,188	179,176	657,448

where the loss experience has been less severe. In cases of partial loss, indemnity against the cost of repairing the vessel, in excess of 30 per cent of the appraised value, is paid on the Atlantic Coast and in excess of 15 per cent of the appraised value on the Pacific Coast. Since the Plan was introduced in July 1953 a total of 1030 claims have been adjusted with total indemnity payments of $1,026,188.

In the case of lobster trap coverage provided under the Plan, acceptance by fishermen has been limited largely to those areas where weather and other conditions lead to heavy losses of traps almost every year. Thus indemnity payments have been relatively high in relation to premium revenue. At the same time lobster fishermen in other areas have occasionally suffered quite severe losses but unfortunately, having failed to come under the Plan by paying the small premium, were not eligible to receive indemnity.

FISHERIES PRICES SUPPORT BOARD

IN BROAD TERMS both catches and prices for the principal species of fish improved throughout 1961, resulting in generally higher incomes to fishermen. The main exception was the inshore fishermen of the northeast coast of Newfoundland, where a partial failure of the main trap fishery resulted in lower catches and returns to such fishermen. Perhaps the outstanding feature of the year from the point of view of markets and prices was the reported increase in per capita consumption of fish products in the United States. Since that country represents the main market for Canadian fish products, any significant increase in the use of fish there makes possible increased production and stronger prices for Canadian production, particularly in the frozen fish group. The change in the foreign exchange rate of the Canadian dollar during the year also had the effect of improving the competitive position of the industry and resulted in higher returns in terms of Canadian dollars. This increase was reflected in higher prices to fishermen as the season progressed.

As indicated, the only area of serious difficulty from the point of view of fishermen's incomes was in Newfoundland. Action by the Prices Support Board was requested by the Newfoundland Federation of Fishermen. The problem was investigated and two courses of action were recommended to the Government. In the first instance, assistance was suggested and approved to experiment in the development of a market for frozen turbot. The traditional market for pickled turbot has been declining for some years and production had to be cut to meet market requirements. Some 8000 pounds of frozen fillets and headless dressed turbot were produced and delivered to Montreal for distribution in commercial channels. Although some resistance was encountered, the product was sold at prices sufficiently high to indicate the possibility of a limited commercial market.

The second course of action recommended and approved by the Government was a federal-provincial winter works program in fishing settlements most seriously affected by the catch decline. The federal Government contributed $300,000 towards this program, which was carried out in over 400 fishing settlements. The provincial authorities assumed local administration and the province contributed 25 per cent of the labour costs of the projects.

The staff of the Board continued to administer the Fisheries Salt Assistance Program and the headquarters activities of the Fishermen's Indemnity Plan. Under the Salt Assistance Program fishermen and other fish processors using salt for the curing of fish receive a rebate of 50 per cent on their laid down cost of salt. On the basis of 1961 production of these items, payments were made to 6286 fishermen totalling $347,348. Payments were also made to 330 processors amounting to $215,113. Total payments were $562,460.

The Board continued to co-operate with the Economics Service of the Department in the collection and analysis of costs of fishing operations in the Atlantic coast provinces.

Officers and members of the Board are: Chairman, I. S. McArthur, Ottawa; Members: W. R. Ritcey, Riverport, N.S.; C. E. Desourdy, Montreal, P.Q.; K. F. Harding, Prince Rupert, B.C.; H. I. Mifflin, Catalina, Nfld.; Francis Millerd, Vancouver, B.C.; Executive Director, H. C. L. Ransom, Ottawa.

THE FISHERIES RESEARCH BOARD OF CANADA

THE Fisheries Research Board of Canada is charged with responsibility for investigating the aquatic animals and plants from which Canada's large fish catch is drawn. The broad purpose of the Board's scientific investigations is to supply guide lines for the orderly harvest of this valuable renewable resource; to undertake researches leading to increasing the resource through the development of scientific management and cultural practices; and to add to the basic and practical knowledge concerning the organisms, their environment, and the uses to which they may be put, thus increasing their value to man.

Organized initially in 1898 as the Board of Management of the Marine Biological Station, it is one of the oldest government-sponsored research organizations in Canada, and it is the oldest research body in North America that has been continuously supervised by a selected honorary group of specialists.

Board membership in 1961, excluding the Chairman, Dr. J. L. Kask, numbered 15. Included in the membership are noted scientists from Canadian universities and research foundations, leading businessmen with an intimate knowledge of fishing and the fishing industry, and senior officers of the Department of Fisheries. The Chairman of the Board, who is also the Board's Chief Executive Officer, is a member of the Public Service of Canada. All other members hold honorary five-year appointments from the Minister of Fisheries. This broad representation ensures, as far as this can be done, that the Board and its research staff remain sensitive and responsive to the needs of the industry and the Department of Fisheries, and that its scientific programming and performance is maintained at a high professional level.

The Board as a whole meets in Ottawa with its station directors and unit chiefs in January of each year. At this time scientific programs as carried out at various locations across Canada are reviewed, and general Board policy is developed. Detailed program reviews are carried out by four regional advisory committees. These committees meet twice during the year, once at one or another of the Board's principal research stations and once at the time of the Annual Meeting. Their objective is program improvement; they make recommendations regarding priorities, and report on the quality of the researches being carried out.

The Board's administrative matters are handled by the Executive Committee. This Committee met three times during 1961 to consider personnel and financial matters and to initiate action on recommendations of advisory committees that have been approved by the Board and the Minister.

Research activities are completely decentralized. Day-to-day administration and supervision of Board operations is carried out by the Chairman and his headquarters associates at Ottawa.

The Board's scientific interests lie in three broad scientific fields: aquatic biology with emphasis on fishery biology; oceanography; and fishery technology.

61925-4—5

Although demands for research continued to outstrip capacity to perform, satisfactory progress was made in all branches under study during the year.

Co-operative oceanographic programs were again carried out with the Royal Canadian Navy, the Department of Transport, and the Department of Mines and Technical Surveys; and close liaison was maintained with the Institute of Oceanography at the University of British Columbia, the Great Lakes Institute of the University of Toronto and Institute of Oceanography at Dalhousie University. Co-operative research programs were also carried out with provincial governments, the International Pacific Salmon Fisheries Commission, and with several universities. A number of industrial development projects have been continued with the Department of Fisheries; and the National Research Council continues to administer and manage the Board-sponsored postgraduate scholarship competition.

A large fraction of the Board's biological and oceanographic effort is taken up by researches carried out for a number of international fishery and sea mammal commissions to which Canada is party. These include the International Commission for the Northwest Atlantic Fisheries, the International North Pacific Fisheries Commission, the Great Lakes Fishery Commission, the International Whaling Commission and the North Pacific Fur Seal Commission. Demands for research here, too, seem to be increasing rather than diminishing.

Although many new Board facilities (laboratories, vessels, workshops, and so on) have been added in recent years and are in the process of being added, still others are indicated.

During the year a condemned storage building at Halifax, N.S., was replaced with a new fireproof building which now houses extended laboratory and pilot-plant operations; an oyster investigation laboratory at Ellerslie, P.E.I., was completed and occupied, as was a new workshop at St. Andrews, N.B. Modifications and renovations were completed at the St. John's, Nfld., Biological Laboratory and the whole building was occupied by the Board's staff for the first time since its acquisition in 1950. The Cable Building at St. John's has been taken over by the Board and completely modified and renovated for laboratory and pilot-plant use by the Technological Unit at St. John's. At Nanaimo a gear-research building was completed and occupied and a technical-services building, which collects together all services and releases space at the water-front for scientific investigation, was also completed. The 177-foot research vessel *G. B. Reed*, for use on the Pacific Coast, is under construction at Yarrows Shipyards, Victoria, B.C., with November 1962 as the target date for completion.

It is anticipated that tenders will be called in May 1962 for a new 125-foot vessel for pelagic, groundfish and gear research out of St. Andrews, N.B. It is also anticipated that construction of a new laboratory will be started in 1962 in the Montreal area to house those engaged in arctic research and work on marine mammals in the Arctic and on the Canadian Atlantic Coast.

During the year, fire destroyed the Board's experimental fish hatchery at Kleanza Creek, B.C., a tributary of the Skeena River. Plans for rebuilding have not yet been finalized.

The Board's researches are carried out from four biological stations, an Arctic Unit, three technological stations, two technological units and two oceanographic groups.

BIOLOGICAL INVESTIGATIONS

The Board's principal biological stations are situated at St. John's, Nfld., St. Andrews, N.B., London, Ont., and Nanaimo, B.C., with an Arctic Unit in Montreal, Que. In the interest of operational efficiency these stations often maintain port observers and field stations in distant areas.

Atlantic fisheries—Newfoundland area

Total groundfish catches in Newfoundland were 13 per cent below 1960, as a result of a 20 per cent decline in the *cod fishery*. This turn was mostly a result of a poor inshore trap fishery. In 1961 caplin did not remain long in inshore waters, hence the cod did not remain either. The various kinds of line fishing for cod also reported reduced catches per unit of gear, partly due to early fishing-up of heavy concentrations by foreign trawlers. Although *haddock* stocks continue to decline because of scarcity of new recruits, the catch in 1961 was up by 60 per cent due to a very successful February and March fishery.

Redfish surveys in the Gulf of St. Lawrence confirmed their slow growth rate of 1.2 inches per year. On Flemish Cap and the northern Grand Bank autumn and winter concentrations of redfish were found in much deeper water than those of summer. A complex picture is exhibited of distributions of the different sizes of fish in relation to temperature and depth. *American plaice* stocks on the Grand Bank are now almost free of the undesirable "jellied" flesh that prevailed widely when they were first fished. Sharply increased trawl-fishing effort has been followed by decrease in fishing success except in the northern half of the Grand Bank.

Atlantic salmon returns to the Little Codroy River continue to indicate intensive exploitation of this stock (minimum of 64 per cent taken in 1961). One tagged grilse was caught in Greenland.

Lobster research was resumed in Newfoundland in 1961, when 1070 were tagged in Port au Port Bay. Of these, 33 per cent were taken commercially during the last three weeks of the lobster season.

Atlantic fisheries—southern area

The valuable and intensively utilized *lobster* stocks of the Maritime region are studies in order to improve management procedures. In one area tagged sublegal lobsters yielded sufficient known returns to show that they increased total yield when released for additional growth. Other areas are under study. In 1961 the annual check on survival of juvenile lobsters in Northumberland Strait showed few 4th-stage lobsters for the third year in succession.

Oyster investigations continued on the nature and control of several diseases and other pests that limit this industry. Hatching and feeding techniques for

61925–4—5½

larval oysters were improved, so that a functioning hatchery on a pilot-plant scale is now feasible. Increased study was given to effects of weather and water characteristics on oyster production. A hydraulic rake for harvesting *clams* was improved in 1961. It reduces waste by permitting survival of most of the undersized clams. *Scallop* landings continued their increase in 1961, as a result of more boats fishing on Georges Bank. Because utilization is heavy, trials with scallop drags of larger mesh have been made, but so far no saving of small scallops has resulted. Exploration in the southern Gulf of St. Lawrence discovered several usable scallop grounds there.

The individual weight of the *cod* in stocks inhabiting the Gulf of St. Lawrence has declined persistently in recent years, owing to cropping off the older fish by a more intensive fishery. Few cod in this region now live past seven years of age; the average gutted weight of those caught is only about $2\frac{1}{2}$ lb. Total quantity harvested from these stocks has not declined, but the smaller size will be a permanent feature of an intensive fishery, and it requires adjustments by industry. In recent years more effective use is being made of cod stocks owing to substantial reduction in discards at sea. This is partly because a lower cull size is now used, and partly because nets of $4\frac{1}{2}$-inch mesh capture fewer undersized fish.

Haddock catches were good in 1960-61, because the fish became concentrated into a limited area of favourable bottom temperatures. The strong 1952 year-class is now almost all gone, but this has not reduced landings because the 1956 and 1957 broods are above average. *Halibut* investigations are concerned with the effect of trawling on longline catches of large fish.

Studies of pelagic fishes were concentrated on *herring;* the Gulf of St. Lawrence stocks are beginning to recover in abundance after a widespread fungus disease a few years ago. The "*sardine*" *herring* of the Quoddy region have been found to come from autumn-hatched herring of Nova Scotia stocks. Exploration for large *pelagic fish* by longlining revelaed quantities of large sharks, including mackerel sharks which are in demand commercially.

Salmon stocks in New Brunswick continue to suffer from the forest spraying done a few years ago; their catches again decreased in 1961, while those elsewhere increased somewhat. Experimental applications of DDT to forests at reduced strength have given promising results. *Trout* studies included a comparison of brook trout and rainbow trout when they occur separately or in combination. In the latter situation rainbows tend to predominate.

Pollution studies were again concerned with effluent of a lead-zinc mine on the Northwest Miramichi. It was found that concentrations of these metals that are too small to kill salmon or trout would nevertheless cause abnormal downstream movements unfavourable to reproduction.

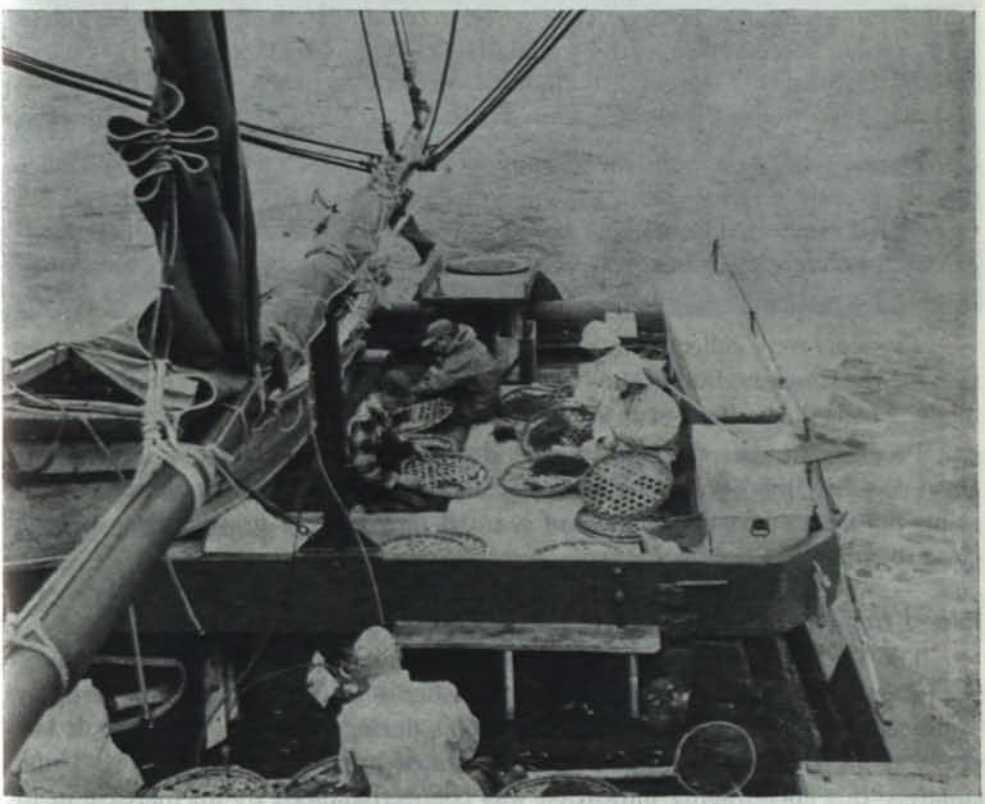
Pacific fisheries

The broad aspects of salmon distribution in the Pacific Ocean have been determined previously, but it is urgently necessary to know the exact high-seas distribution of Canadian salmon at different seasons. In 1961 a successful trial

was made of Japanese-style longlining to obtain salmon for tagging at sea. This provided 10 per cent return of sockeye tags, and more are expected in 1962.

Sampling of salmon catches for management purposes shows that the 1957 year-class of *sockeye salmon* was exceptionally numerous in all northern British Columbia areas. The 1957 year-class of *chum salmon* also was good, but the 1956 and 1958 broods have been much below average. *Pink salmon* in southern British Columbia and adjacent waters were studied intensively in 1959 and 1961 by the Board and co-operating agencies. Based on tagging of 32,000 fish and detailed spawning ground measurements, the total number of pink salmon in 1959, from Johnstone Strait southward, is estimated to have been 10.4 million fish. Of these, 74 per cent were captured by the fisheries, though utilization of individual stocks varied above and below this figure. In 1961, when fishing was severely restricted, the fisheries still took 49 per cent of the smaller total stock of 6.3 million.

Studies of survival of young salmon of the various species have continued. The behaviour and survival of young pink and chum salmon in coastal waters were followed by intensive work on the central British Columbia coast. Many were marked for identification later. Stream studies of young cohoes suggest that in small streams the presence of ponded areas is essential to good coho survival. Young sockeye studies continue at Babine Lake, where in 1961 the smolt production from a fairly large adult run was 20 per spawner, as compared with 55



Japanese-style longlining trials have been carried out by the Fisheries Research Board on chartered vessels to obtain Pacific salmon for tagging at sea.

per spawner from the previous year's similar run. In swimming out of Babine Lake, young sockeye depend partly on the sky as a means of orientation. The rate at which they swim down to the outlet is only a little less than their maximum possible sustained swimming speed.

Swimming performance of adult salmon was studied further in the experimental flume at Robertson Creek. In 1961 a speed of 35 miles per day was maintained for 10 days by 15 female sockeye, during which time they consumed energy at the rate of 15 cal/kg/day. Biochemical changes in maturing salmon, and chemical changes during stress, were assessed in their relation to obstacles to migration. Field studies showed that adult sockeye migrate by night as well as by day. When obstructions cause delay, the maximum passage is at dawn and at dusk.

Eight actual or potential sites of *pollution* were surveyed in 1961, with recommendations for design of facilities to avoid or eliminate the trouble. Tests of an insecticide "Phosphamidon" showed that it was only 1/250 as poisonous to young cohoes as DDT when used at the recommended concentration.

Herring investigations continued the assessment of spawn deposition as a means of estimating rate of utilization. Explorations for herring stocks at sea were made, and studies were undertaken on the number of young salmon caught in herring seines. *Groundfish* studies showed that most stocks are in a healthy state. Water temperature and other factors at time of spawning are being related to year-class success, to improve predictions of stock size. One stock, that of *rock soles* in the Strait of Georgia, is temporarily difficult to fish because of the unusual abundance of young fish.

Oyster beds near pulp mills are kept continuously under examination to detect possible progressive or cumulative effects of their wastes. Enough seed oysters were collected in British Columbia in 1961 to satisfy the local demand and even to provide some for export. Experiments with deepwater oyster culture have begun.

Fur seals were collected in accordance with the requirements of the Convention for the Conservation of the North Pacific Fur Seals, and reproductive studies made. Foods of *sea lions* were studied.

Progress in *gear development* included a substantial increase in midwater trawl speed by modification of the otter boards. Design of instruments for measuring the forces in various parts of a trawl net while in use has been brought close to completion.

Inland fisheries

The *sea lamprey* control experiments continued through 1961, according to the program evolved by the Great Lakes Fisheries Commission. Young lampreys (ammocoetes) were killed in 20 river systems during 1961. Counts of adult lampreys at barriers on Canadian streams declined by 25 per cent in 1961. Unfortunately this encouraging indication was counterbalanced by an increase in the lamprey stocks of United States streams by 80 per cent.

The *Lake Superior trout fishery* showed further decline. The *Great Slave Lake fishery* for trout and whitefish continued at about the same level of effort, success, and fish size. The year 1961 was the first year of the *population studies* at Heming Lake, designed to test theories of population dynamics and to assess methods of estimating biological statistics of fish stocks.

Fishing on Lake Nipissing, Ontario.

Arctic fisheries

Several Yukon lakes were recently opened to commercial fishing by the Department of Fisheries, and produced good quality though rather small fish. Lakes near Cambridge Bay and Wellington Bay, on Victoria Island, were found to contain *lake trout* and *arctic char* populations. Some of these are large enough to be fished commercially. In the Western Arctic, *sea herring* populations were found which spawn locally, and might be taken in good numbers by weirs.

Harp seal stocks remain in a precarious position because of overutilization. An aerial census of *grey seals* was made, which showed about 2000 animals in the Maritimes region. Similar surveys showed at least 2600 *walrus* in northern Hudson Bay. *White whales*, *ringed* and *bearded seals* were also studied, in relation to weather and oceanographic conditions.

OCEANOGRAPHIC INVESTIGATIONS

The Canadian Committee on Oceanography (CCO) co-ordinates the national efforts in oceanography by effecting the means and the methods for full co-operation between federal agencies, research groups, and specialized institutes. This contributes to steady and sound development. The deliberations of the Committee have developed a good basis for policy decisions in the national sphere, and have allowed, as well, for a logical approach to problems in the field of international oceanography. In all of these activities the Fisheries Research Board has always played a leading role.

Working Groups of CCO have been established on the east and west coasts and on the Great Lakes to develop such liaison and co-operation among the agencies concerned as are needed to best attain their respective objectives and the maximum utilization of facilities. In this promising atmosphere of co-operation involving various federal agencies and universities, the oceanographers of the Board further their studies of the seas on Canada's three coasts.

The oceanographic studies on the Atlantic coast are guided by fisheries requirements, and national and international responsibilities. Here three agencies of the Board contribute, the Biological Stations in St. Andrews, N.B., and St. John's, Nfld., and the Atlantic Oceanographic Group in Halifax, N.S. The research programs are closely integrated with those of the Division of Oceanographic Research of the Department of Mines and Technical Surveys, the Institute of Oceanography of Dalhousie University, and the Information Services of the Department of National Defence.

On the Pacific coast, co-operating under the West Coast Working Group of the CCO, the Pacific Oceanographic Group of the Board is concerned with the ocean phenomena of the North Pacific north of Latitude 40°N and east of Longitude 180°W. All possible resources of several federal agencies, as well as those of the Institute of Oceanography at the University of British Columbia, are co-ordinated.

In the Arctic, where the Department of Mines and Technical Surveys has accepted the responsibility for large scale surveys of arctic waters, the Arctic Unit of the Board is active in the field of biological oceanography, programs of which in some phases are closely allied with those of other federal agencies. In particular, co-ordination of programming between the Arctic Unit, the Division of Oceanographic Research of the Department of Mines and Technical Surveys, and the Atlantic Oceanographic Group has provided material for the ecological assessment of plankton species in terms of water masses from the Arctic Ocean southwards. The Pacific Oceanographic Group has participated in a project of the Pacific Naval Laboratory in the Prince Gustaf Adolph Sea.

In the international field, oceanographers of the Board play an important role. The Intergovernmental Oceanographic Commission, the Scientific Committee for Oceanic Research, the International Commission for Northwest Atlantic Fisheries, and the International North Pacific Fisheries Commission are organizations in which Canada participates in work that is international in scope.

TECHNOLOGICAL INVESTIGATIONS

The Board's technological investigations on Atlantic coast fish and fishery products are conducted at the Technological Stations in Halifax, N.S., and Grande-Rivière on the Gaspé Peninsula, Que., also at the Technological Unit in St. John's, Nfld. The Technological Unit in London, Ont., handles problems concerning freshwater fisheries products. Corresponding investigations on the Pacific coast are carried out at the Technological Station in Vancouver, B.C.

Atlantic Coast

Investigations at the Halifax Technological Station concerning the complex nature of marine oils have been greatly facilitated by recent developments in gas-liquid chromatography. This technique is being used to study the highly unsaturated fatty acids of fish oils which are known to alleviate conditions conducive to arteriosclerosis.

Some of the cod oils produced on the Atlantic coast of Canada are not marketable because of their high free fatty acid content. A chemical method for reducing the acid content has been developed and it has also been shown that air-blowing of these oils will render them more suitable for use as additives to lubricating oils and as drying oils in paints.

Tracer studies concerning the clearance of injected hormones labelled with radioactive carbon have shown that there is impaired hormone metabolism in sockeye salmon immediately before and after spawning, whereas no impairment was observed in spawned Atlantic salmon. This basic knowledge may lead to an explanation of why all Pacific salmon, in contrast to some Atlantic salmon, die after spawning. In a related study the concentration of two sex hormones in the blood has been correlated with the commencement of the river phase of the spawning migration of sockeye salmon.

The function of the corpuscles of Stannius, which in cod are associated with the kidney, has never been established, but it has been suggested that they may secrete steroid hormones. A search for hormones was not fruitful, but evidence was obtained that the corpuscles contain an interesting water-soluble form of cholesterol.

The feasibility of freezing gutted cod in the round, followed later by thawing and refreezing, is being investigated as a possible means of extending the operating season for plants handling inshore trap-caught cod in Newfoundland. Taste panel scores have shown that the frozen round fish keep well and that thawing in itself did not affect the quality. However, during subsequent storage the quality of the refrozen fillets deteriorated markedly and fish sticks prepared from the fillets had a low texture rating. These data were confirmed by examining the muscle proteins in an ultracentrifuge which showed that changes had occurred in the protein components.

Other studies on Newfoundland trap-caught cod have shown that they can be impounded for periods of 15 to 30 days without loss of gutted weight. When iced, these fish become soft more rapidly than Grand Bank cod and the

reason for this is not clearly understood. They do have a higher fat content, but the composition of the total fat was found to be similar to that of other cod examined.

As bacterial spoilage of low fat groundfish such as cod has been minimized, non-bacterial spoilage of fresh and frozen fish has become of increasing commercial importance. Studies have been initiated to investigate the part played by metal ions such as iron and copper in producing off-odours and off-flavours in groundfish.

Freezing experiments in Newfoundland have shown that the stowing density of pre-rigor, eviscerated, headed, frozen cod was about 50 pounds per cubic foot. When thawed by a method utilizing recirculated water the yield of fillets from these samples was 41 per cent. Cod frozen in saturated brine absorbed some salt but this apparently did not affect the frozen storage life of the fillets prepared therefrom.

The onset and duration of rigor mortis in fish is being studied in connection with the freezing of fish at sea and of trap-caught cod, as some of the changes associated with rigor mortis affect the storage life of the frozen product. About half of a large number of cod examined entered into rigor within five to ten hours after capture, even when chilled in ice, and remained in a state of rigor for about three days, that is, during the period when the fish would generally be put into the freezer. Protein studies have shown that when cod muscle goes into rigor at elevated temperatures there is substantial protein deterioration, but this does not occur at the temperature of ice. Post mortem biochemical changes have now been studied in both feeding and non-feeding cod held in captivity. Similar changes occurred in both, except that some were more rapid in the feeding fish.

The Halifax Station, Newfoundland Unit and the Gloucester Laboratory of the U.S. Fish and Wildlife Service are collaborating in an experiment to determine the effects on the refrozen fillets of thawing the original frozen fish by microwave and water thawing procedures. A joint project with the Information and Consumer Service of the Department of Fisheries, Ottawa, is also underway to evaluate various methods of cooking fish for taste panel assessment of quality.

Storage experiments have shown that the main problem with frozen cod is the change in texture which results from protein deterioration. Modern research techniques are being employed at the Halifax laboratory to study the various proteins of fish muscle in order to elucidate the intricate mechanisms involved in protein deterioration with a view to possible control. Isolated protein fractions are being purified, studied, characterized, their enzyme activities investigated, and the interactions of the various components determined under assimilated freezing conditions.

Experimental results have indicated that fat decomposition, resulting in the formation of free fatty acids, may have an effect on protein stability in frozen cod. It has been demonstrated experimentally that breakdown of certain of the fat constituents, called phospholipids, is responsible for the increase in free fatty acids resulting from frozen storage. An attempt to inhibit fatty acid

formation in cod flesh by the addition of a chelating agent (metal-binding chemical) was not successful. A procedure using ion-exchange chromatography is being developed for further studies on fish phospholipids.

Quantitative data on the main constituents of cod fillets indicate that the spawning cycle and the diet of the fish influence the composition of the flesh.

It has often been suggested that fat deterioration in fish muscle first starts in the more fatty layer of dark tissue immediately under the skin; however, results have shown that the fat extracted from the dark and white tissue of cod muscle have practically the same composition.

Biochemical changes in lobsters held in captivity are being investigated as a result of the increasing demand for live lobsters, and also in connection with a blood disease caused by bacteria called *Gaffkya homari.* Infection results in an increase in the acidity of the blood and death follows. Several of the constituents of lobster blood have been analyzed in detail and the properties of the micro-organism determined in order that means of predicting and preventing the disease may be devised.

World-wide interest has been shown in an improved process developed at the Halifax Station for producing a high quality fish protein concentrate, which could be used as a food supplement in aiding underdeveloped countries.

Studies were continued on the utilization of fishery by-products for manufacturing detergents, emulsifiers and glue. Research concerning the freeze-drying of fish is being initiated.

Histological techniques and the culture of marine fish tissue are being explored as tools for studying a number of biochemical processes occurring in fish.

In recent years the program of the Grande-Rivière Station has dealt mainly with the biochemical, bacteriological and engineering aspects of processing salted fish. The primary objective has been to establish a more rapid and reproducible method of preparing a light-salted fish having the desirable characteristics of the "Gaspé cure" cod.

Biochemical analyses of various types of salted cod have shown that the levels of such constituents as free amino acids, volatile acids and volatile bases, are characteristic for light- and heavy-salted fish. These so-called chemical indices have been used to determine experimentally the conditions which contribute to the special characteristics of Gaspé cure salt cod and have enabled the development of a process using brine salting, which is more rapid and controllable than the conventional dry-salting method, to obtain a product which is essentially the same as Gaspé cured fish. Furthermore, the results have shown that this product cannot be produced by desalting heavy-salted cod.

Several strains of bacteria have been isolated from light-salted fish and brines, and experimental results have demonstrated that these organisms play an important role in the formation of volatile bases which characterize light-salted fish. Optimum conditions of time, temperature and salt concentration have been

determined for brine curing and the effects of added preservatives have been studied. These investigations have made it possible to obtain the proper level of volatile bases with a shorter curing time.

Other bacteriological studies have involved the survival of coliform bacteria in light-salted fish brines and the occurrence of disease-causing bacteria in salted fish.

Engineering research has shown that the rate of drying of salted fish can be increased by using high air velocities, particularly in the early stages of drying.

The storage of semi-dried light-salted fish is a problem of concern to the industry and experiments have shown that control of the relative humidity in relation to the storage temperature is of primary importance.

Inland

In recent years the decline in high-priced freshwater fish has made it necessary for the industry to exploit the less desirable (coarse) species of fish and marketing problems have been encountered. The main concern of the London Technological Unit therefore has been to develop outlets for so-called coarse fish and to investigate other technological problems regarding freshwater fish.

Weiners have been prepared from a number of species of freshwater fish which are quite acceptable and considerable interest has been shown in the process. Some problems still require study; for example, weiners prepared from smelt have an undesirable gray appearance.

Bacteriological studies on fish weiners have revealed that the smoking and cooking operations destroy any bacteria present and if proper handling procedures are used, the shelf life of the weiners is about 15 days at ordinary refrigerator temperatures.

Smoked and breaded-cooked freshwater fish gave very good tasting and appearing canned products.

Some 400 cultures of freshwater fish bacteria are being characterized in an effort to classify the spoilage bacteria. Chlortetracycline (CTC) treatment of whitefish and yellow pickerel increased the shelf life by four or five days and contrary to unconfirmed reports, no detrimental side effects were observed.

Experiments aimed at establishing a test for freshness in freshwater fish showed that the level of volatile acids and bases did not increase until the fish became unacceptable and therefore could not be used as an index of freshness.

The proximate composition of 17 different species of freshwater fish has been recorded and will facilitate further work. The fat content, for example, influences the keeping quality of frozen fish and also must be considered in developing specialty products.

Thiaminase activity, the enzyme responsible for Chastek's paralysis in fur-bearing animals, was found in the organs of certain species of fish.

An experiment in collaboration with the Department of Fisheries is underway to determine the storage life of frozen whitefish.

During the year the London Unit designed a brine freezer and a reduction plant as a service to the Department of Northern Affairs and National Resources, which will be used in the Mackenzie Delta area.

Further experimental work was carried out on the smoke tunnel, the smelt grader, the use of liquid nitrogen as a coolant, and the cooling of fish on boats.

Pacific Coast

As a result of investigations at the Vancouver Technological Station, the use of refrigerated sea-water for transporting and storing fish has practically revolutionized the salmon fishery of British Columbia. Several vessels have now been converted and all have performed well.

A collaborative project with the Industrial Development Service of the Department of Fisheries has involved the installation of freezing equipment on seining boats, similar to that designed for use on halibut boats, in order to examine the possibility of establishing a Canadian tuna fishery.

Other engineering programs have concerned a pneumatic system for unloading salmon and a vacuum method of canning herring.

With the advent of freezing tuna and halibut at sea there is need for more basic information on some of the biochemical changes that occur in fish muscle immediately after death. Some of these changes are known to have an influence on the storage life of the frozen product. Mechanical means of measuring toughness in fish muscle are being explored in order to determine how treatment prior to death may affect the texture of frozen fish. Experimental results indicate that the brown lateral muscle of freshly killed fish reacts differently than does the white tissue.

Investigations using radioactive compounds have revealed the origin and structure of some of the sugars in fish flesh and have indicated that they are utilized to produce energy in much the same way as in mammalian tissues.

It has been established that the fats in lingcod and gray cod break down during frozen storage, but as yet there is no evidence of any change in the proteins as found in frozen Atlantic cod.

Biochemical investigations concerning texture changes and protein deterioration in frozen lingcod indicate that nucleotides are not involved. Other results suggest that protein deterioration in freshly killed fish does not occur until after rigor mortis has subsided.

Results of studies on migrating salmon have shown that body fat is rapidly depleted as a source of energy. Further work is being done to determine how and where this fat is utilized. Recent data have shown that the dark muscle tissue is very active in this regard.

The recent installation of fish-holding facilities at the Vancouver Station has made possible such studies as the homestream odour attractants for adult migrating sockeye salmon. Results have shown that these attractants are present

in homestream waters in very minute quantities and the difficult problem is to obtain enough concentrated material for chemical analysis. Evaporation cannot be used to concentrate the active ingredient(s) because it boils off with the water. This work has been hampered in another way in that the salmon used for testing purposes often die of infection. It has now been found that this can be prevented by bathing the fish in salt water and injecting them with an antibiotic.

Experiments with juvenile sockeye salmon have shown that they are attracted to food by smell. When their noses were plugged they were insensitive to the presence of food, but they responded when the plugs were removed.

It has been found experimentally that the vitamin A content of certain fish oils is responsible for their activity in lowering the cholesterol level in chickens. An abnormally high intake of vitamin A by laying hens resulted in a drop in egg production.

All the major steroid hormones of sockeye salmon blood have now been studied but very little is known about the pituitary hormones, which regulate the release of the sex hormones and thus govern the maturation and reproduction of Pacific salmon. A large number of salmon pituitary glands have been collected and a study of the hormones present has been initiated.

Results from a new project concerning the nucleic acid composition of Pacific salmon have complemented protein studies which have shown that the protein compositions of sockeye, pink and chum salmon were similar. However, they differed from those of coho and spring salmon which were sufficiently similar to Atlantic salmon, rainbow and steelhead trout to indicate a possible relationship.

Bacteriological studies have shown that in chlortetracycline-treated lingcod the bacteria count may indicate poor quality although other tests indicate that the fish are acceptable. In other words, chlortetracycline does not inhibit the growth of all species of bacteria.

Shrimp preservation studies have indicated that the presence of metal compounds in shrimp decreases the activity of certain antibiotics.

Work is continuing on a collaborative investigation with the International Pacific Salmon Fisheries Commission in connection with a salmon disease which causes a high mortality in the Horsefly River spawning area.

A new project has been started to identify the components responsible for the desirable flavours and odours of fish. Results have already indicated that salmon oil contains most of the constituents responsible for the flavour of salmon.

Among the miscellaneous investigations carried on at the Vancouver Station, it has been shown that polystyrene is a good insulator for use in the air shipment of fish. An enzyme has been prepared which may lead to control of browning in heated and fried fish products. Fish protein concentrate can be prepared by extracting herring meal with alcohol.

RESEARCH VESSELS

A fleet of 16 vessels of various sizes was maintained by the Board during 1961 for its investigations off both east and west coasts as well as on inland and arctic waters. Its makeup was as follows:

Name	Tonnage	Length	Crew
St. John's, Nfld.—			
A. T. Cameron	330	107.5′	25
Investigator II	52	78.4′	9
Marinus	35	58.5′	6
Parr	18	44.4′	2
St. Andrews, N.B.—			
Harengus	48	77.6′	9
Mallotus	13	53.8′	4
Pandalus II	20	46.3′	3
Clupea	11	30.2′	1
Montreal, P.Q. (Arctic Unit)—			
Calanus	5	47′	2
Salvelinus	13	35′	—
London, Ont.—			
Cottus (Great Lakes)	10	41.9′	2
Stenodus (Great Slave Lake)	10	42.8′	2
Nanaimo, B.C.—			
A. P. Knight	78	72.5′	6
Investigator I	36	54.3′	4
Alta	13	38.9′	2
Noctiluca	8	30.1′	1

INTERNATIONAL COMMISSIONS

THE LIVING resources of seas, lakes and rivers are of great magnitude and can be self-renewing, but they are by no means limitless and cannot be exploited recklessly without danger of their ultimate extinction. Their exploitation must be regulated on sound management principles. Often, however, these resources exist in the high seas or other areas beyond the jurisdiction of any single government, so that certain fisheries need some form of control based on international agreement. Canada has always been one of the first countries to recognize this need, and is a charter member of seven international commissions which co-ordinate scientific investigations and recommend management procedures to governments interested in areas of common concern.

Three of the conventions under which the commissions are established are bilateral agreements with the United States, dealing with Pacific sockeye and pink salmon of the Fraser River system, halibut of the North Pacific Ocean, and the fisheries of the Great Lakes. The other four are multilateral, and deal with the fisheries of the Northwest Atlantic Ocean, the fisheries of the North Pacific, fur seals, and whales. This chapter gives an account of the 1961 programs of the commissions.

THE INTERNATIONAL PACIFIC SALMON FISHERIES COMMISSION

The International Pacific Salmon Fisheries Commission was established as a result of the 1930 Convention between the United States and Canada. The initial purpose of the Commission of preserving, protecting and extending the sockeye salmon fisheries of the Fraser River was extended in 1957 to include pink salmon of the Fraser.

Detailed statistical, research and descriptive information is available in the Commission's own Annual Reports.

Although the 1961 sockeye run to the Fraser River produced the third highest total pack for the cycle year since 1917, the run was still a disappointment. The observed productivity in fresh water could have resulted in a run of several million more fish than actually returned if there had been average survival in the sea.

The management procedures for Fraser River sockeye, based on management at the racial level, have resulted in consistently high freshwater production of sockeye over the past decade. The spawning population in 1957, the brood year, was the largest and probably the most effective of the cycle year since at least 1917 and possibly since 1913.

The favourable production in fresh water was more than offset by an extremely poor marine survival rate. The returning adult sockeye run in 1961,

including the catch in non-Convention waters, was only 4,699,000 fish. The Canadian catch in Convention waters of 1,357,099 fish was 49.6 per cent of the total Convention waters catch.

Although the sockeye escapement was generally satisfactory in numbers, water temperature conditions were decidedly adverse during the upstream migration of the late July and August runs and similar adverse temperatures existed on many of the spawning grounds. These above-average water temperatures apparently stimulated a bacterial infection of the gills resulting in a heavy mortality on many of the spawning areas. The specially designed closures of the fishery during the latter part of the Horsefly run reduced a potential mortality of 100 per cent to the recorded 62 per cent of the total Horsefly escapement.

The experimental sockeye hatchery built on the Upper Pitt River in 1960 to offset the declining runs produced more fry from 1235 females than were produced from 11,664 females in the rest of the Pitt River system. This substantiates the Commission's previous observations that the Pitt River spawning grounds are unstable and the conclusion that the decline in the Pitt sockeye run is probably due to this fact. A total of 4,060,000 eggs were placed in the hatchery in the fall of 1961.

The Birkenhead River also has a declining sockeye run. However, on the basis of a fry enumeration program in the spring of 1961 it would appear that the spawning grounds of the Birkenhead River are quite efficient and that poor fry production may not be the cause of the decline in the Birkenhead run of sockeye. Observations on the success of incubations will be continued on this run for another three years, augmented by more detailed observations of the Indian fishery.

Some success has been realized in the program of transplanting eyed eggs to barren areas. However, in most cases the number of adult sockeye returning continues to be disappointingly small and complete failures in some transplants continue to occur. Sockeye were observed spawning at several places in the North Thompson River for the second consecutive year, indicating the possibility that some of the survivors from transplanted eggs may be straying from the planted stream. It is hoped that the larger "plants" now being used will result in better returns to the recipient streams.

Drastic regulatory action was taken in 1961 to start the rehabilitation of the Fraser River pink runs which obviously were in a dangerous condition. For some reason, yet to be understood, the fishing gear in 1959, the brood year, was unusually effective in all fishing areas except the Fraser area. Furthermore, spawning conditions for the early segment run were most unfavorable in 1959 because of the record high water flows and high velocities in the Thompson and Fraser Rivers at the time of spawning, forcing fish to spawn in shoreline areas which were later exposed by receding waters. The mortality of eggs deposited was so great that the very important early run to the Fraser River was almost exterminated.

The greatly increased restrictions on the 1961 fishery resulted in 76 per cent of the total run escaping to spawn as compared with only 17 per cent in the brood

year. The escapement, while actually no greater than the poor escapement in the brood year, enjoyed what appears to have been excellent spawning and incubation environment.

During 1961 the Commission carried out a co-ordinated pink salmon tagging program to provide additional information on the degree of spatial segregation of United States and Canadian pink salmon stocks during their passage through Juan de Fuca Strait. Several parts of the management and research program for pink salmon initiated in 1957 and including the 1959 tagging program were either completed or are approaching completion.

The artificial spawning channel adjacent to Seton Creek was completed in 1961, and 6711 fish, or 11 per cent of the total Seton Creek run, made use of the facility. Spawning efficiency was excellent and the number of fry emerging will be counted to determine the productive efficiency of the area.

A study was continued of the factors affecting passage of early sockeye runs through the Fraser River Canyon at high river levels and conditions affecting passage of sockeye and pink salmon through the Thompson River Canyon at low river levels. Preliminary designs were prepared for the facilities necessary to eliminate obstructions in the Fraser Canyon and to improve passage facilities in the Thompson River Canyon.

Canadian representatives on the Commission in 1961 were Senator Thomas Reid, A. J. Whitmore and W. R. Hourston, Pacific Area Director of Fisheries.

THE INTERNATIONAL PACIFIC HALIBUT COMMISSION

The International Pacific Halibut Commission is responsible for the regulation and management of the halibut fishery off the Pacific Coast of North America, including the Bering Sea. It was established in 1923 by a treaty between Canada and the United States that required an investigation of the fishery and recommendations for its rehabilitation. The Commission was continued with effective regulatory powers under treaties signed in 1930, 1937 and 1953.

The 1953 treaty requires the Commission to develop the stocks to levels which will permit the maximum sustained yield and to maintain the stocks at those levels. It authorizes the Commission to apply specific types of regulation and requires that its regulatory actions shall be based upon scientific investigations.

Management of the fishery has now been in operation for 30 years. As a result of the regulations, which have been enacted annually since 1932, the halibut stocks have trebled in size and the permitted annual catches are 60 per cent above those taken by an uncontrolled fishery immediately prior to regulation. The stocks and the fishery have been restored to highly productive and profitable levels.

The Commission consists of six members, three from each country. Canadian members in 1961 were: William M. Sprules, Ottawa, elected Chairman; Harold S. Helland, Prince Rupert, B.C., and Richard Nelson, Vancouver.

The Commission held its 37th Annual Meeting at Prince Rupert, British Columbia, from February 7 to 9 inclusive. This was the first of the annual meetings to be held on the Pacific Coast elsewhere than at Seattle, the seat of the Commission. Also, for the first time, meetings of the Commission with the Conference Board, which was established by the Commission in 1931 and consisted of representatives of the vessel owners and fishermen, were attended by representatives of the dealers. This obviated further need for the Industry Advisory Group, a nine-member group representing vessel owners, fishermen and dealers of Washington, British Columbia and Alaska, which was established in 1955 to develop liaison between the fleets and the dealers.

At the meeting with the industry, and at other sessions with its scientific staff, the Commission reviewed the condition of the fishery and the results of investigations in 1960. Proposals of the industry and of the staff regarding regulation in 1961 were discussed in the light of the scientific findings.

In executive sessions, the Commission approved a research program, dealt with fiscal and other internal matters and adopted regulations for the 1961 fishing season. These regulations became effective on March 30 upon approval by both the Governor General of Canada and the President of the United States.

The 1961 regulations continued without change four of the five regulatory areas of previous years, namely Area 1A, south of Heceta Head, Oregon; Area 1B, from Heceta Head to Willapa Bay, Washington; Area 2, from Willapa Bay to Cape Spencer, Alaska; Area 3A, from Cape Spencer to the Shumagin Islands, Alaska. Area 3B, which previously included all convention waters west of Area 3A including Bering Sea, was divided into two areas—Area 3B North, the waters of Bering Sea and those about the Aleutian Islands west of Cape Sagak on Unimak Island; and Area 3B South, the waters south of the Aleutian Islands and the Alaska Peninsula between Cape Sagak and Area 3A.

The regulations specify the opening and closing dates of fishing seasons in the various areas. The duration of the seasons are in the main dependent upon the length of time taken to fill catch quotas; when the quota is reached in a particular area, the season is declared closed. Details of the openings and closings, together with catch figures for all areas, are contained in a general report on the regulation of fishing and the investigations carried out, issued each year by the Commission.

Other significant changes included the elimination of the second seasons in Areas 1B and 2 and increases in the catch limits in Areas 2 and 3A from 26.5 and 30.0 million pounds to 28.0 and 33.0 million pounds respectively.

Total halibut production by the combined Canadian and United States fleets in 1961 was 69.6 million pounds, about 2.3 millions pounds lower than the all-time high of 71.9 million in 1960. The lower total was due largely to the elimination of the second season in Area 2 where stock reactions had indicated excessive fishing.

Sampling of the commercial landings was continued intensively at Seattle, Washington; at Prince Rupert, British Columbia; and at Petersburg, Alaska. Some sampling was also conducted at Vancouver, British Columbia. Materials

were obtained for study of changes in the composition, growth, mortality and recruitment of the halibut stocks upon important banks. Additional materials were collected at sea during the operation of three chartered vessels engaged in a trawl survey off central Alaska and by a trawler chartered for small-fish studies; also by assistants placed upon commercial vessels for that specific purpose.

Study of growth of halibut on the major grounds in all regulatory areas was continued, utilizing measurements of the widths of the annual growth zones in the otoliths to estimate the lengths of fish at each earlier age, as well as the usual age-length relationship. Data obtained from these investigations were used in studies of the dynamics of the Pacific halibut stocks.

Tagging operations in 1961 were confined to tagging on three trawl vessels chartered for a trawl survey being conducted in Areas 3A and 3B South by the Commission for the two Governments. A total of 4316 halibut, mostly below the legal size of 26 inches, were tagged. An additional 1414 individuals, mostly one- and two-year-olds, were tagged on a chartered trawler which was used for investigation of halibut below commercial size.

A total of 1106 tags were recovered in 1961 from all previous tagging experiments, compared to 879 in 1960. The increase resulted from the release of a large number of tags in Area 2 during 1960. Tags as usual showed up heavily in the year following tagging.

Halibut fishing boat in Hecate Strait, B.C.

Three tags that had been recovered in 1960 by the Japanese trawl fishery in the eastern Bering Sea were returned to the Commission during 1961. No tag recoveries were received during the year from the Russian trawl fishery in Bering Sea and south of the Alaska Peninsula.

At the request of the Governments, the Commission commenced in May 1961 a year-long investigation of the distribution and availability of halibut and of associated bottom-living species off the southern coast of Alaska between Unimak Pass and the eastern end of Kodiak Island. The object of the survey was to secure data which will provide a basis for estimating the effect that an intensive bottom-trawl fishery for bottom species would have upon the supply of adult and juvenile halibut and upon the Canadian and United States setline fishery for halibut.

Three trawlers—the *Arthur H*, *Morning Star* and *St. Michael*—with four-man crews were chartered and each was staffed with three biological aides. The vessels were equipped with otter trawls of the Pacific Coast type with a 94-foot groundrope and 4-inch and $3\frac{1}{2}$-inch mesh in the body and codend of the net respectively.

The 40,000 square miles of shelf area in the region of the survey were sampled by a grid of 910 stations. The program provided for three rounds of sampling during a one-year period—from May 1961 to July, from August to December 1961, and from January 1962 to April.

The catches included many species, of which some, such as ocean perch and turbot, would have commercial value. Halibut were taken in a high proportion of the hauls at all depths, but particularly inside the 100-fathom line. They consisted mainly of individuals below the legal size of five pounds.

It was conservatively concluded on the basis of the first two rounds of sampling that there is a large population of juvenile halibut on the shelf area between Unimak Pass and the eastern part of Kodiak Island. It was also evident that they would be susceptible to capture by any commercial trawl fishery as they were taken by the survey vessels in very large numbers along with other food or industrial fish.

Investigations of the life history and the abundance of halibut during their early years were continued to ascertain whether relationships can be demonstrated between the abundance of juveniles, prior spawning stocks, environmental conditions and future recruitment to the fishery.

The vessel *Victory Maid* was chartered for a 100-day period from mid-June to late September. Sampling with fine-meshed trawls was conducted on already-known concentrations of young halibut in Schelikof Bay near Sitka and off Kodiak Island. Grounds near Cape St. Elias, discovered during the 1960 operations, were again visited and produced relatively large numbers of fish from two to five years of age which sharply augmented the previously-scarce data for these ages. Three new local concentrations of juveniles were also discovered: one off Kodiak Island, one off the Trinity Islands, and another in Icy Strait.

Intensive exploratory fishing was again carried out off the British Columbia coast but most of the appropriate grounds again proved to be untrawlable.

Insignificant catches of fish from two to seven years of age were taken in a relatively large number of hauls. A lack of quantitatively usable results from seven years of exploratory work off British Columbia and the southern portion of southeastern Alaska indicate that further sampling in these regions is not justified except on an incidental basis.

A total of 9250 small halibut were caught ranging from two to twenty-five inches in length and from one to ten years of age. Of these, 4766 were less than one year of age, 3452 were one year old, 355 were two years old, 166 were three years old, and 511 were from four to ten years of age.

INTERNATIONAL NORTH PACIFIC FISHERIES COMMISSION

Canada, Japan and the United States have been co-operating in high seas fisheries research and conservation in the North Pacific Ocean since June 12, 1953, when the International Convention for the High Seas Fisheries of the North Pacific Ocean came into force. The International North Pacific Fisheries Commission, established by the Convention, is concerned with ensuring the maximum sustained productivity of the fisheries resources of the North Pacific. To this end, it promotes and co-ordinates the necessary scientific studies and recommends conservation measures to the member governments.

The Convention provides that any one or two of the members will abstain from fishing stocks of fish which are found to meet certain specified conditions. To qualify for abstention, it must be shown that a stock of fish reasonably satisfies three conditions: namely, the stock must be fully utilized, it must be under regulations designed to maintain or increase its maximum sustained productivity, and the stock must be the subject of a program of scientific investigation designed to discover whether it is being fully utilized and to determine the conditions necessary for maintaining its maximum sustained productivity.

At the time the Convention came into force, Japan agreed to abstain from fishing salmon of North American origin east of a temporary line located along or near the meridian of 175°W longitude. Japan also agreed to abstain from fishing for halibut in waters off the coasts of Canada and the United States. In addition, Japan agreed to refrain from fishing for herring of North American origin in waters off the coasts of Canada and the United States of America, east and south of the extremity of the Alaskan Peninsula.

At each of its annual meetings, beginning in 1958, the Commission has studied the stocks under abstention to determine if they continue to meet the qualifications given in the Convention. In the course of the years the Commission has determined that the stocks of herring off the coast of Alaska and off the coast of the United States south of the entrance to the Strait of Juan de Fuca no longer meet the abstention requirements of the Convention. The member governments have accepted the Commission's recommendations that these herring stocks be removed from abstention. As a result, beginning May 24, 1960, Japan was no longer required to abstain from fishing herring in international waters

off the Alaskan coast. Beginning on April 2, 1962, Japan will be no longer required to refrain from fishing herring in international waters off the coast of the states of Washington, Oregon and California.

Fishermen gathering in net after a "set".

No other changes have been made in the stocks under abstention. That is, Japan is still obligated to refrain from fishing for salmon of North American origin east of the temporary line drawn along the meridian of 175°W longitude. Japan is also required to continue to refrain from fishing for halibut of North American origin in the area described in the treaty. Japanese fishermen may not fish for herring of Canadian origin off the coast of British Columbia.

Canada also has an obligation under the abstention provisions of the Convention. Canadian fishermen may not fish in the eastern Bering Sea for salmon originating in the rivers of Alaska. The area of abstention is temporarily defined as east of a line running north and south along the meridian of 175°W longitude.

Although the Convention makes possible the addition of new stocks to the list of those under abstention, no member government has made such a proposal to date. The present situation is, therefore, that Japan is required to continue to abstain from fishing salmon and halibut in the eastern Bering Sea and the eastern North Pacific Ocean and from fishing herring off the coast of Canada. Canada is required to continue to abstain from fishing salmon of United States origin in the eastern Bering Sea.

The mid-ocean line, which marks the present eastern limit for salmon fishing by abstaining nations is provisional in nature. The Commission is instructed in the Protocol to the Convention to conduct scientific investigations to determine the final location(s) of the line. The Protocol stipluates that the Commission is first to determine if there are areas in which salmon originating in the rivers of North America intermingle with salmon originating in the rivers of Asia. If intermingling is found, the Commission is to conduct studies to determine a line or lines which best divide salmon of Asiatic origin from salmon of North American origin. The Commission is also to determine whether it can be shown beyond a reasonable doubt that this line or lines more equitably divide such salmon than the present provisional line.

The resulting research program into questions of the origins, abundance, distribution and intermingling of stocks of salmon on the high seas has been a major activity of the Commission for a number of years.

The organization, co-ordination and execution of the Commission's research program continued in 1961 as in past years. This program has been described in preceding Annual Reports of the Department of Fisheries. Again in 1961 the investigations revealed extensive intermingling of various populations of salmon from portions of the North American and Asian continents. The three most abundant species—sockeye, pink and chum salmon—from portions of North America west of Kodiak intermingle over broad areas in the North Pacific Ocean and the Bering Sea with the same species from portions of the Asian coast. Quantitatively, intermingling varies with the abundance of the various contributing stocks each year, and varies with the time of the year, the exact area involved, ecological conditions, and other factors.

Although its knowledge of the extent and nature of the intermingling of salmon from the two continents continues to grow, the Commission was again unable to apply the results of its researches to confirmation or relocation of the provisional dividing line for salmon fishing. In 1959, the Commission asked its member governments to provide an interpretation of the Protocol which would clearly define the principles by which the dividing line should be established. Up to the present time, the Commission has not received such an agreed interpretation from the Contracting Parties. Therefore, the Commission was unable, at its Eighth Annual Meeting, to take any further steps toward carrying out the assignment given in the Protocol with respect to relocating or confirming the dividing line.

At the 1961 Annual Meeting, held in Tokyo in November, the Commission, for the first time, considered the effects of trawling for other species on the halibut stocks in the Convention area. Halibut in the eastern Bering Sea and

eastern North Pacific are under abstention by Japan. However, other bottom fish are not subject to abstention. A problem therefore arises, because halibut may be taken incidentally in the course of these trawl fisheries. Even though halibut thus caught are returned to the sea, there is a possibility of damage to the stocks. The problem was raised by the Canadian Section of the Commission and was placed on the agenda by unanimous agreement of all members of the Commission. In spite of extensive consideration of the problem, the Commission was unable to reach any agreement as to recommendations in this matter. Positions of the three national sections were disclosed in speeches by the leaders of each delegation at the final plenary session of the Eighth Annual Meeting. The Canadian Section originated the proposal that the Commission recommend that proper restraint be exercised on the fishing fleets to make certain that expansion or extension of trawl fishing operations south of the Aleutians is not permitted until the assessment now being made of the distribution of the halibut stocks is completed and the effect of trawl fishing operations on the stocks is known. The United States Section believed that Japanese trawlers should refrain from operating south and east of the Aleutian Islands until studies of the distribution of halibut in relation to the distribution of other bottom fish in these waters could be completed by the governments of Canada and the United States. The Japanese Section recognized the Japanese obligation to abstain from fishing for halibut in the waters in question and pledged continued observance of abstention requirements. However, the Japanese spokesman pointed out that most of the stocks of other bottom fish of the northern seas were still unexploited, that it was natural for Japan to exploit these resources and that she was under no obligatoin in the North Pacific Convention to give up the utilization of such stocks.

The Commission continued its study of the king crab stocks (*Paralithodes camtschatica*) of the eastern Bering Sea for the purpose of determining if joint conservation measures by Japan and the United States are required. The scientists studing king crab for the Commission reported that studies had not progressed to the point where recommendations might be made for conservation measures in the existing fisheries. Note was again taken that the fishery for king crab in the eastern Bering Sea was expanding rapidly and that vessels from the U.S.S.R., as well as Japan, were engaged in the fishery. No statistics from the king crab fisheries of the U.S.S.R. were available.

The Commission continues to accelerate its activities in publication of reports of the results of its research programs. Research bulletins are published, at irregular intervals, in both English and Japanese. Working parties of scientists from the three countries are now engaged in preparation of ten chapters of a joint report on the origin, abundance, distribution and intermingling of salmon from the two continents on the high seas.

The Eighth Annual Meeting of the Commission was held in Tokyo, Japan, from November 6 to 11, 1961. Preliminary sessions of various committees and sub-committees concerned with the Commission's work began two weeks prior to the first plenary session. The total number of accredited participants for the meeting was 131, including 13 representatives from Canada, 58 from Japan, 37

from the United States, eight observers representing other international fisheries organizations and three permanent and 17 temporary members of the Secretariat. Observers included representatives of the several international fisheries commissions active in the North Pacific Ocean and respresentatives of the U.S.S.R. The meeting was held under the Chairmanship of Commissioner Iwao Fujita of Japan.

Canada was represented by Commissioners George R. Clark, John M. Buchanan, James C. Cameron and Roger T. Hager. The following officers were elected by the Commission for 1962: Chairman, Edward W. Allen of the United States; Vice-Chairman, George R. Clark of Canada; Secretary, Iwao Fujita of Japan.

INTERNATIONAL COMMISSION FOR THE NORTHWEST ATLANTIC FISHERIES

The Commission was established in 1951, the result of a Convention signed in Washington, D.C., in 1949, and its main purpose is "to make possible the maintenance of a maximum sustained catch" from the fisheries of the Northwest Atlantic Ocean.

The following 13 countries, all of which maintain important fisheries in the Convention Area, make up the membership of the Commission: Canada, Denmark, France, West Germany, Iceland, Italy, Norway, Poland, Portugal, Spain, the Union of Soviet Socialist Republics, the United Kingdom and the United States.

The newest member of ICNAF is Poland, which signed the Convention in November 1961. The Federal Republic of Germany and the U.S.S.R. also became members in recent years, Germany in 1957 and the U.S.S.R. in 1958. The other 10 countries have been members of the Commission since its inception.

The Canadian Commissioners are George R. Clark, Deputy Minister of Fisheries, Ottawa, who was elected Chairman of the Commission at the 1961 Annual Meeting for the period July 1, 1961 to June 30, 1963; J. H. MacKichan, Halifax, N.S., and H. R. V. Earle, St. John's, Newfoundland.

The only fishing vessels from countries not members of the Commission which maintain an important fishery in the Northwest Atlantic are trawlers from the Baltic city of Rostock, in East Germany. Small fisheries have been tried periodically by Belgium, Brazil and Cuba. The Commission is collecting data on the trawl fishery from Rostock, and is trying to obtain relevant information on the minor fisheries by other countries.

The Convention area is divided into five subareas, and panels have been established within the Commission for each of these. The subareas are designated as follows: 1, West Greenland; 2, off Labrador; 3, north, east and south of Newfoundland; 4, Gulf of St. Lawrence and Nova Scotian seas; 5, east of New England.

The Commission has established five panels, one for each of the five subareas. Memberships in these panels are assigned by the Commission on the basis of

maintenance of a substantial fishery by the individual countries in the subarea concerned. These memberships, as revised at the 1961 Annual Meeting held in Washington during June, are as follows:

Panel	1	2	3	4	5	Total
Canada	—	+	+	+	+	4
Denmark	+	—	—	—	—	1
France	+	+	+	+	—	4
Germany	+	+	—	—	—	2
Iceland	+	—	—	—	—	1
Italy	—	—	+	+	—	2
Norway	+	—	—	—	—	1
Poland	—	—	—	—	—	—
Portugal	+	+	+	+	—	4
Spain	+	+	+	+	—	4
USSR	+	+	+	—	—	3
UK	+	+	+	—	—	3
USA	—	—	+	+	+	3
TOTAL	9	7	8	6	2	32

Panel memberships for the newest member of ICNAF, Poland, will be established at the 1962 Annual Meeting. Polish vessels are fishing mainly in the northern part of the Convention Area, Subareas 1, 2 and 3 (from Greenland to Newfoundland).

A meeting of a group of scientists working on Assessment of Fisheries for ICNAF was held in March at Lowestoft, England. This group was appointed in 1959 to study the sizes of the stocks of commercial fish in the Convention Area and the extent and nature of the fisheries utilizing these stocks, with the aim of ascertaining whether, and to what extent, international regulations were required for ensuring the continued maintenance of these fisheries and the greatest results from them. A complete report by the group was considered by the Commission at its 1961 Annual Meeting, and proposals for increased international trawl regulations resulted.

A second group of scientists met in March at Aberdeen, Scotland, to consider Environmental Research. This group was appointed in 1960 to consider and plan researches of an environmental character (hydrography, plankton, fish eggs and fish larvae). The considerations of the group during the March meeting were concerned in the main with the planning of a comprehensive environmental survey of the northern part of the Convention area, the region between Greenland, Baffin Island and Labrador; the survey will also include the region between Greenland and Iceland (outside the Convention Area), which is strongly connected with the West Greenlandic region in many ways: water currents, transport of plankton and fish eggs and larvae, migrations of fish, etc. The survey will be made possible by the co-operation of research vessels from a number of member countries, during the spring and early summer in 1963, the season of the year when fish eggs and larvae are most abundant. The work and the routes of the

research vessels will be co-ordinated so as to cover the essential parts of the region. Care will be taken to ensure that the methods and gears used by the various vessels are co-ordinated so as to make all data collected directly comparable. It is expected that the survey will greatly enlarge and improve the knowledge of the conditions governing the life of the commercial fish species (particularly cod and redfish) living in these regions, including the exchange of fish (transport of eggs and larvae, migrations of larger fish) between the East Greenland, the West Greenland and the Labrador areas. The fishery in Subareas 1 and 2 (West Greenland-Labrador) account for about one-third of the cod and redfish fisheries in the Convention Area.

The Eleventh Annual Meeting of the Commission was convened in Washington June 5–10, 1961, and was preceded by a six-day meeting of the Standing Committee on Research and Statistics in Woods Hole, Mass.

About 80 commissioners and experts participated in the meetings, which also were attended by observers from other international organizations, and from certain non-member countries interested in the fisheries in the Convention Area. The Commission's Vice-Chairman, G. R. Clark, conducted the Meeting.

The Commission accepted an invitation by the USSR Government to hold the 1962 Annual Meeting in Moscow the following June.

The report by the Environmental Group, including the plans for the Environmental Survey and the holding of the Environmental Symposium in 1963, was adopted.

During the meeting the Commission considered the question of the harp and hood seal stocks in the Convention Area. These stocks are now utilized by at least four of the member countries, and it was the consensus that it would be advisable for the Commission to deal with the problems connected with possible conservation requirements for these seal stocks. A resolution was adopted, in which the Depositary Government was requested to ask the member governments to consider an amendment to the present Convention providing (1) that the harp and hood seals be brought under the provisions of the Convention and (2) that a separate Panel be established for the purpose of dealing with the conservation requirements of the harp and hood seal populations.

The report of the Assessment Group was considered by the separate panels and, in conformity with the decisions by the panels, the Commission adopted the proposal (1) that a minimum trawl mesh size of $4\frac{1}{2}$ inches or 114 mm be introduced in Subareas 1, 2 and 3 for groundfish (except redfish in the southwestern part of Subarea 3), and (2) that a minimum mesh size of also $4\frac{1}{2}$ inches or 114 mm be introduced in Subarea 4 for cod, haddock, flounders and American plaice. The proposals include rules for the measurement of meshes and for the use of savings gear, and further provide for exemptions in order to avoid impairment of other fisheries.

At the present time a $4\frac{1}{2}$ inch minimum mesh is in force for cod and haddock in Subareas 4 and 5 and a 4 inch minimum mesh size for the same species in Subarea 3. Thus the new proposals will in their entirety mean the introduction of the same minimum mesh—$4\frac{1}{2}''$, for the whole of the Convention Area.

GREAT LAKES FISHERY COMMISSION

The Great Lakes Fishery Commission was established by the Convention on Great Lakes fisheries between Canada and the United States, in 1955. Its major responsibilities are to formulate and recommend to the Governments of Canada and the United States measures which will permit maximum sustained production of fish of common concern in the Great Lakes; and to formulate and implement a program to eradicate or minimize sea lamprey populations in the Great Lakes. Members of the Commission for Canada during the year were: Dr. A. L. Pritchard, Ottawa, Vice-Chairman; Dr. J. R. Dymond, Toronto; and Dr. A. O. Blackhurst, Port Dover.

Control of the sea lamprey has been the principal concern of the Commission since 1956. Sea lampreys have virtually annihilated lake trout in Lake Huron and Lake Michigan and have greatly reduced their numbers in Lake Superior. Commercial production of trout in the upper Great Lakes has dropped from about 16 million pounds annually to less than 500,000 pounds in 1960.

The sea lamprey control program is supported by both countries. The United States contributes 69 per cent and Canada 31 per cent of the cost. The proportions are based on the historic economic interest of the two countries in the lake trout fisheries of the Great Lakes. The program has been carried out under Commission contracts with the Fisheries Research Board of Canada and the U.S. Bureau of Commercial Fisheries since 1956.

During 1961 the lamprey control program consisted of four main operations: (1) maintenance of electrical barriers to follow changes in abundance of adult lamprey; (2) surveys to determine the occurrence and distribution of sea lamprey larvae (ammocoetes) in streams: (3) bioassays in representative streams to determine the concentrations of lampricide required at different seasons of the year; and (4) the actual chemical treatments which are immediately preceded by bioassays to determine the precise concentration to be used.

Electrical barriers were discontinued as control devices in 1961 as abnormal rainfall and severe flooding in the spring of 1960 resulted in the escapement of spawning lamprey in many streams. The barriers are now used on a reduced scale in Lake Superior to provide an index of the abundance of spawning adults which will indicate the general effectiveness of the chemical treatment program. Although the effectiveness of the program will not be known until a count of the spawning adults is made at the electrical barriers in 1962, two years after the completion of treatments, there was evidence of a reduction in lamprey predation on lake trout in 1961. Agencies studying the lake trout fishery in Lake Superior observed a decrease in the incidence of lamprey wounds on trout during the fall that ranged from 40 to 95 per cent in different areas.

Emphasis has been placed on the completion of chemical treatments on Lake Superior tributaries and their evaluation. In addition to three streams in which lamprey larvae were recently discovered, seven streams in the United States and three in Canada were treated a second time to destroy sea lamprey

ammocoetes that escaped initial treatments and newly established individuals. Preliminary surveys and some chemical treatments were carried out in tributaries of Lakes Michigan and Huron during the year.

Seasonal changes in the effectiveness of the lampricide (TFM) have complicated chemical treatment operations, and studies of the nature and reason for these changes were continued in 1961. Other research included studies of the relative effectiveness of TFM on different sizes and species of ammocoetes and the ultimate effects of sublethal exposure. Sea lamprey ammocoetes have been found living in the lake bottom at the mouths of some streams from which they have drifted. These populations are to a large extent beyond the range of lethal larvicide concentrations in the stream outflow and have therefore survived treatments. Frequent re-treatments of the contributing streams before ammocoetes drift into the lake will give some measure of control in these situations. However, investigations were continued in 1961 to determine the location of these populations and develop methods for destroying them.

Since the ultimate objective of the lamprey control program is to restore the highly valued lake trout to its former level of abundance, the Commission has also given considerable attention to the development of a lake trout rehabilitation program.

The commercial catch of lake trout in Lake Superior has continued to decline at an alarming rate and in 1961 was about 75 per cent of that in 1960 and less than one-tenth of that in 1950. Information on the relative abundance of young fish presented to the Commission in 1961 supported earlier evidence that natural reproduction in Lake Superior had been negligible in recent years and that the lake trout population was rapidly approaching complete dependence on planted hatchery fish. The proportion of hatchery fish in the Canadian catch increased ten times over 1960 and provided the great majority of the 2- and 3-year-old fish captured by the industry. In the United States more than 50 per cent of lake trout taken under 17 inches were hatchery fish.

About 5.5 million lake trout eggs were collected by state, federal and provincial agencies in 1961, nearly 80 per cent from brood fish in hatcheries. Slightly over 1.2 million yearling trout were planted in Lake Superior by these agencies in 1961, bringing the total since 1958 to nearly four million fish. Recoveries from plantings in 1958 and 1959, still not completely vulnerable to the fishery, showed a high survival. Experimental shoreline plants made in 1960 have so far shown the same survival as conventional boat plants.

Early in 1961 the Commission suggested that methods for establishing a catch limitation for lake trout in Lake Superior be considered by the regulatory agencies, but that implementation be postponed until success of sea lamprey control operations was evident. In view of the increasing dependence of the lake trout population on planted trout and the markedly lower incidence of lamprey wounds during the year, the Commission concluded at its interim meeting in November that a reduction in fishing effort would be desirable in Lake Superior to protect spawning stocks. It therefore recommended that the 1962 production

of lake trout be restricted to the amount needed for biological studies. The regulatory agencies were to adopt appropriate procedures for accomplishing this objective.

In 1959 and 1960 the Commission submitted general recommendations for research on the Great Lakes to the Governments of Canada and the United States. In 1961 it requested the preparation of research programs for each of the lakes, which would permit more detailed consideration of research needs than had been possible previously. State and provincial agencies responsible for the fisheries and federal departments carrying out biological and technological investigations were asked to assist.

NORTH PACIFIC FUR SEAL COMMISSION

Valuable information on the migratory patterns and range of feeding habits of North Pacific fur seals was obtained during 1961 by scientists of the four countries signatory to the 1957 Interim Convention on the Conservation of the North Pacific Fur Seals—Canada, the United States, Japan and the Union of Soviet Socialist Republics.

In accordance with plans developed by the North Pacific Fur Seal Commission, which was established under the Convention, scientific agencies of all participating countries carried out research at sea. Research and management on the breeding grounds in the Bering Sea and the Sea of Okhotsk are conducted by the United States on the Pribilof Islands, and by the Soviet Union on the Commander Islands and Robben Island. The scientific investigations are concerned with the dynamics of the fur seal populations, distribution and migration at sea, feeding habits and harvesting methods.

The results of the operations of all contracting countries were reviewed by the Commission at its Fifth Annual Meeting, held in Ottawa. At this meeting the members gave approval to a continuation of the wide-ranging research program and to a controlled harvest of fur seals in 1962 comparable to the 1961 take. This decision reflected the success of the Commission in its main task, which is to develop and maintain the stocks of fur seals of the North Pacific at levels designed to produce the highest sustainable yield, with due regard for their relation to the productivity of other living marine resources of the area.

The Canadian Commissioner in 1961 was George R. Clark, Deputy Minister of Fisheries of Canada (Alternate Commissioner, Dr. W. M. Sprules, Special Assistant to Mr. Clark).

Under the terms of the Convention pelagic sealing (killing of seals at sea) is forbidden except for certain specific numbers that may be taken pelagically by scientists of the member countries for research programs and by aborigines using primitive weapons. All harvesting is done on the breeding grounds under the control of the Soviet Government on Robben Island in the Sea of Okhotsk and the Commander Islands in the Western Bering Sea, and under control of the United States on the Pribilof Islands in the Eastern Bering Sea. During 1961 the commercial land take by the U.S.S.R. was 10,882 seals and by the U.S., 95,974.

The Convention contains a provision whereby Canada and Japan each receive 15 per cent of the sealskins taken by the U.S. commercial operations on the breeding grounds and, subject to certain stipulations, a similar percentage of the U.S.S.R.'s commercial take on the breeding grounds. Canada's share of North Pacific fur seal skins sold during the fiscal year 1961–62 produced a net revenue of $319,463.

An extensive tagging program was conducted on the breeding grounds as part of the scientific studies; Soviet scientists tagged 10,472 seal pups on Robben Island and 11,069 on the Commander Islands, and United States scientists tagged 50,000 pups and 740 yearling and two-year-old seals on the Pribilof Islands. Recovery of tags from recaptured young seals indicates a certain intermingling of the herds with some U.S.A. tagged seals appearing on Robben and the Commander Islands and some Soviet tagged seals appearing on the Pribilofs.

For some years past there has been evidence of overcrowding on the main Pribilof Island breeding grounds and as a corrective measure, with the Commission's approval, the United States has included in its commercial take specified numbers of surplus female seals. It was noted that in spite of this female kill, together with the loss occurring through natural causes, the number of females is estimated to be larger than the level calculated to be necessary for optimum production.

The Commission noted the high degree of co-operation that exists between the scientists of the four countries.

United States Commissioner Ralph C. Baker was elected Chairman of the Commission, to serve through the Sixth Annual Meeting, and Canadian Commissioner George R. Clark was elected Vice-Chairman. The next Annual Meeting was arranged to be held in Washington, D.C., November 26, 1962, to be preceded by a meeting of the Standing Scientific Committee.

INTERNATIONAL WHALING COMMISSION

The conservation of the whale stocks of the world has become an increasingly pressing problem, and in recent years has been the responsibility of the International Whaling Commission, which is constituted under the International Whaling Convention signed in Washington in December 1946.

The Commission held its Thirteenth Annual Meeting in London, England, in June 1961. Representatives of Contracting Governments were present from Argentina, Australia, Canada, Denmark, France, Iceland, Japan, Mexico, New Zealand, Norway, South Africa, Sweden, the Union of Soviet Socialist Republics, the United States and the United Kingdom. Also attending were observers from the Food and Agriculture Organization of the United Nations, Chile, Italy, the Netherlands, Portugal and a Special Committee of Three Scientists who have been advising the Commission in a special scientific investigation to assist in the achievement of the Commission's aims.

The meeting was under the chairmanship of G. R. Clark, Deputy Minister of Fisheries of Canada, who had been appointed the previous year for a three-year term.

The duty of the Commission is to recommend catch quotas, closed seasons, minimum size limits, and methods of catching whales to the member governments. One of its main responsibilities is the establishment of a total quota for Antarctic pelagic whaling.

Two of the world's leading whaling nations, Norway and the Netherlands, had withdrawn from the Convention in 1959 because of a previous failure, outside the Convention, of the Antarctic whaling nations to reach agreement on a division of the quota established by the Commission. Since the Twelfth Annual Meeting, however, Norway had rejoined the Convention and at the opening of the Thirteenth Meeting the Chairman was commended for his active part, outside the Commission, in bringing near agreement on a catch-quota system among the Antarctic pelagic whaling countries.

The five countries engaged in Antarctic whaling—Japan, the Netherlands, Norway, the U.S.S.R. and the U.K.—had held a series of meetings for the purpose of reaching agreement on a formula for division of the total quota. Considerable progress had been reported and it was thought likely that the Netherlands would rejoin the Convention.

The Antarctic catch limit had been suspended at the Twelfth Annual Meeting for the following two seasons but, of the four countries—Japan, Norway, the United Kingdom and the U.S.S.R.—Japan and the U.S.S.R. had objected to the suspension and were therefore working under the 15,000 blue whale unit limit, while Norway and the United Kingdom in the Convention, and the Netherlands outside it, were not operating under these restrictions. (One blue whale unit is one blue whale or two fin whales or two and one-half humpback whales or six sei whales.)

In spite of this situation the countries concerned had responded to the request made at the previous Commission meeting that they should limit the size of their national catch quota to levels no greater than each had imposed for the 1959–60 season.

During the 1960–61 season there were 21 Antarctic whaling expeditions (eight Norwegian, seven Japanese, three Soviet, two British and one Dutch), which caught a total of 16,427 blue whale units. Antarctic land stations at South Georgia caught 830 blue whale units in 1960–61.

Technical discussions between representatives of the British and Norwegian industries in the spring of 1961 resulted in a report which indicated that improvement in the design and technique of explosive harpooning had reduced the time taken to kill whales and very often ensured instant death. This indicated that the existing methods of taking whales were not necessarily inhumane, but the Commission decided to keep the matter under review, and some of the member Governments were continuing to support experiments on alternative methods of killing whales.

In connection with the Antarctic pelagic whaling operations, the Commission and the countries directly concerned re-affirmed the view that an international inspection system should be introduced and implemented as quickly as possible.

61925-4—7

The Commission was informed that the detailed program of scientific investigation using the latest scientific methods for the study of animal populations, and the task of finding out how to obtain an increase in the sustainable yield of Antarctic whales, which had been referred to the special Committee of three scientists who specialized in population dynamics, had been merged at a special meeting in the spring of 1961. As a result it was stated that sound population assessments, capable of estimating the sustainable yields, might be expected if the large mass of statistical data could be ordered and processed in the proper way. This would involve an extensive task in joint tabulation, the transfer of the data to punch cards at some central point, probably Seattle, and an extensive computing program. The Commission agreed in principle with this project.

SPECIAL COMMITTEES

FEDERAL-PROVINCIAL COMMITTEE FOR ONTARIO FISHERIES

RESEARCH programs and management practices affecting fisheries within the province of Ontario are of mutual interest to the Department of Fisheries of Canada and the Ontario Department of Lands and Forests, and are reviewed annually by the Federal-Provincial Committee for Ontario Fisheries. The Department of Lands and Forests is the agency responsible for the administration of the fisheries of the province.

Federal officials on the Committee are Deputy Minister of Fisheries George R. Clark and the Special Assistant to the Deputy Minister, Dr. W. M. Sprules, Chairman and Secretary of the Committee, respectively; Dr. A. L. Pritchard, Director of the Department's Conservation and Development Service, and Dr. J. L. Kask, Chairman of the Fisheries Research Board of Canada. Ontario members of the Committee are F. A. MacDougall, Deputy Minister of the Department of Lands and Forests; Dr. C. H. D. Clarke, Chief of the Division of Fish and Wildlife; R. N. Johnston, Chief of the Research Branch, and Dr. F. E. J. Fry of the Department of Biology, University of Toronto.

Under the Committee's terms of reference each of the contracting governments has clearly defined responsibilities. For the federal Government these are: lamprey research and control in Lake Superior, and lamprey investigations in the other Great Lakes as required; general fisheries research on Lake Superior; economic studies on all the Great Lakes after consultation with the Ontario Department of Lands and Forests; and technical studies, including gear research and demonstration, also after consultation with the Department of Lands and Forests. The provincial Government has responsibility for: general fisheries research on Lakes Huron, Erie and Ontario: collection of routine statistics of the commercial and sport fish catches on each of the Great Lakes; and hydrographic surveys of a broad general nature on each of the Great Lakes concerned.

Research programs on Lakes Ontario, Erie, St. Clair, Huron and Superior are designed and directed by a "lake co-ordinator" appointed for each lake. The co-ordinators report on the investigations conducted by the two governments as well as, in a general way, on researches carried out by other agencies. Their reports to the annual meeting of the Committee, held in June, showed that a wide range of studies on various species had been conducted during the past year.

Investigations of Lake Ontario species covered whitefish, lake trout, yellow pickerel, American eel, white perch and several others. Studies on sea lamprey predation, as indicated by the scars left on attacked whitefish, have shown a general downward trend in scar incidence during the seven years of the survey. The Lake Erie report noted that smelt and perch continued to be extremely abundant, but that blue pickerel were almost non-existent. Biological information

61925-4—7½

was supplied on these and other species with particular relation to their catchability by commercial fishermen. Studies of trawls in action, by means of an echo sounder, strongly suggested that smelt, when overtaken by the trawl, appear to swim upward as far as the thermocline, which is the sharp temperature gradient separating warm upper water layers and colder lower water layers. Escapement appeared to be much less when the top of the trawl cut into the thermocline. In the latter part of the season, when surface waters warmed up, temperature conditions confined and concentrated the smelt closer to the bottom and made them more vulnerable to capture by trawl.

The Committee was particularly concerned by an oxygen depletion which occurs in Lake Erie during the summer months and, in addition to providing for special studies in this regard, decided also to have the problem taken up with appropriate agencies concerned with water resources.

The Lake Huron report discussed studies on planted lake trout in South Bay and a native population of this species in Georgian Bay. In both cases the depredations of sea lamprey were considered responsible for declines in abundance. Other investigations dealt with hybrid trout, whitefish, alewives, smelt, and various other species. Commercial as well as sport fishing also came in for study under a wide range of research projects which included analysis of temperature and hydrographic conditions in various parts of the lake.

Details of the war of science against the sea lamprey, the predator which has caused havoc to certain fish populations, especially the once-abundant laketrout, are contained in the report of the work of the Great Lakes Fishery Commission.

FEDERAL-PROVINCIAL ATLANTIC FISHERIES COMMITTEE

The Federal-Provincial Atlantic Fisheries Committee was formed in 1958 to organize and decide upon ways and means of assisting the orderly and progressive development of the fisheries of the Atlantic region.

Chairman of the committee is George R. Clark, Deputy Minister, Department of Fisheries of Canada, and other members are of the Deputy Minister of Fisheries or equivalent level from the provinces of Quebec, Nova Scotia, New Brunswick, Prince Edward Island and Newfoundland.

Terms of reference of the Committee are briefly as follows: to receive and consider proposals and recommendations regarding fisheries matters of joint and common interest; to make recommendations to be placed before the various governments for the implementation of programmes and projects; to encourage the exchange of information on matters of common interest pertaining to the fisheries of the Atlantic Province and to assure co-operation in the integration and co-ordination of activities on fisheries matters of common interest.

Problems of common interest to the federal Department of Fisheries and the departments of the provincial governments concerned with fisheries in the Atlantic region were considered at the third annual meeting, held in May 1961, of the Federal-Provincial Atlantic Fisheries Committee.

At the meeting good progress was reported in efforts to create a greater diversification of the fishing enterprises of the Atlantic coast by the introduction of different types of fishing gear and vessels, a co-operative undertaking of the provinces and the federal Government.

The Committee has three sections, dealing with Salmon and Trout, Oysters, and Industrial Development.

A review of the proposed Atlantic Salmon Regulations was presented at the meeting for consideration, and a number of proposals which had been recommended for approval by the Salmon and Trout Section were accepted by the parent committee. It was found, however, that it did not seem possible to adopt uniform regulations for all provinces on salmon fishing seasons and weekend and mid-season closures.

The Committee was informed that DDT spraying of budworm infested areas of New Brunswick in 1961 would make use of half-strength concentrations, which would be far less harmful to fish than the more concentrated formula used in previous years. There was evidence that New Brunswick's Miramichi River salmon population might be making a recovery from the effects of extensive DDT sprayings from 1954 to 1957. Studies of juvenile and adult salmon problems are to be continued on the Saint John River, New Brunswick, in an effort to devise solutions to existing problems and to gather basic information necessary to deal with difficulties arising from possible future industrial development on this river system.

The Oyster Section's report said that the program launched by the federal Department in 1957 to transplant 10,000 barrels of disease-resistant Prince Edward Island oysters to depleted beds in Nova Scotia and New Brunswick had been completed in 1960. Survival of all transplanted stock was in the normal range.

THE FISHING INDUSTRY, 1961

THE STATISTICAL data on value of production in the primary fishing industry in 1961 are summarized in the table below. The total, estimated at just under $110 million, was approximately eight per cent higher than in 1960. Statistics of the value of production at the secondary (processing) level are incomplete as this is being written. A total of about $200 million, however, for the value of production at point of first sale, may be accepted. Of this total, $143.3 millions' worth of products were exported—an increase of four per cent over the figure for 1960. The increase is attributable mainly to higher sales of chilled and frozen fish products. Canned-fish sales abroad were higher as well.

VALUE OF FISH LANDINGS,[1] BY REGIONS AND PRINCIPAL SPECIES

Region and Species	Landings 1961	Change from 1960
	$ million	$ million
PACIFIC COAST—		
Salmon (all spp.)	24.8	+6.4
Halibut	6.9	+1.5
Herring	4.6	+2.4
Other Species	1.7	−1.3
Sub-total	38.0	+9.0
INLAND LAKES—		
All Species	12.5[2]	−0.3
ATLANTIC COAST—		
Lobster	17.9	−0.1
Cod	15.4	−1.1
Other Groundfish	12.8	+0.5
Herring	3.0	−0.7
Other Species	9.7	+0.4
Sub-total	58.8	−1.0
TOTAL	109.3	+7.7

[1]Preliminary data, subject to revision.

[2]Estimate based on incomplete information.

The Pacific Area

The value of production in the fisheries of British Columbia in 1961 was more than one-fourth higher than in 1960. The salmon fishery, in which the landings were 60 per cent greater in volume, contributed the major proportion of this increase—substantial contributions were made by the herring and halibut

fisheries also. The 1961 salmon fishery hardly could be worse than that of the previous year but, in fact, it exceeded expectations, especially in the northern districts, and there was a considerable diversion from other fishing operations as the prospect of a good salmon fishery developed through the season. Salmon landings in July were the largest on record for that month. Port prices for salmon were reported to be close to the level prevailing in 1960, with the exception of troll-caught coho, the price of which appears to have been somewhat lower than in the preceding year.

The landings of pink and coho salmon were particularly satisfactory and those of sockeye salmon also were substantially higher than at the previous point on the "cycle" (1957). The chum salmon fishery, on the other hand, was again a failure. The canned-salmon pack totaled 1.4 million cases, the species composition being as follows:

Species	*Per cent*
Pink	47.0
Sockeye	28.4
Coho	17.2
Chum	6.8
Other	0.6
	100.0

Information on current sales and inventories of canned salmon is not available; holdings of frozen salmon in cold storage, however, were 30 per cent lower on Dec. 31, 1961, than a year earlier.

The 1961 halibut season was relatively late in opening—some 10 days later than in 1960—and landings for the season were almost 15 per cent below those of the preceding year. At the same time, halibut prices reached what is believed to be a record level. In contrast with conditions in 1960, when shipments of chilled halibut were chiefly in demand (and supplies of the frozen product had to be stored for an extended period), there was a steady movement of frozen fish to the market in 1961—year-end stocks were 20 per cent below those of a year before. A trend toward the production of flitches, evident for the past several years, increased sharply during this season.

Statistics for the herring fishery reflect the sharp curtailment of operations in 1960—the fishery was closed down during the first part of that year. Winter operations in 1961 were successful and unusually good catches were maintained throughout the summer months. When the winter season got under way again—on Nov. 22nd, following a tie-up of a month's duration—production mounted rapidly; by the end of the year landings (for the season) were nearly 75 per cent above those of a year earlier. The price obtained by fishermen under the agreement between the UFAWU with the Fisheries Association was substantially higher than that of the previous season but 20 per cent below the price negotiated in 1959 and prevailing for a short period prior to the slump in the fish-meal market at the end of that year.

The Inland Area

Assessment of the situation in the freshwater fisheries is made difficult by a dearth of current statistics on landing, apart from those at Great Slave Lake and in the province of Ontario. In this province, increased landings (in comparison with the previous year) are reported in 1961 for all important species except yellow pickerel, the landings of which were about the same as in 1960, and grey trout, the landings of which again declined. The major advances, however, were made in the fisheries for yellow perch and smelt in Lake Erie; the 1961 landings in the former fishery were 125 per cent higher and in the latter 350 per cent higher than in 1960. Landings of whitefish, cisco and white bass were also substantially higher—a record whitefish catch is reported from Lake Ontario and there were successful fisheries for these species in certain areas of Lake Huron (Georgian Bay) and eastern Lake Superior. Failures are also reported, e.g. the summer fishery for whitefish in parts of western Lake Superior, where a succession of poor seasons is causing a withdrawal of men and equipment from the industry.

Elsewhere in general, excepting Lake Winnipeg, recent production levels seem to have been pretty well sustained in 1961. In mid-summer, forest fires interfered with operations on the lakes of northern Saskatchewan and northwestern Ontario. A depressed market for pickerel and whitefish was reported from time to time during the season, with some effect on prices and fishing operations. The results of the summer and fall fisheries on Lake Winnipeg appear to have been discouraging.

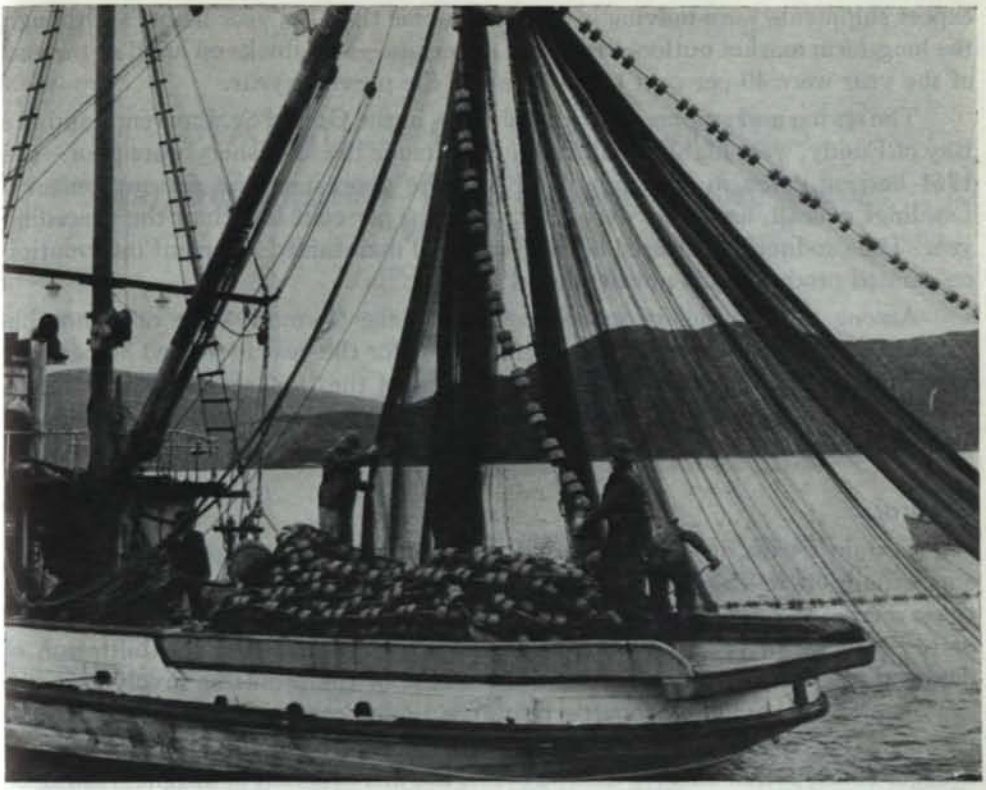
Cold-storage stocks of frozen lake fish in the dressed form were about the same at the end of 1961 as a year earlier but stocks of frozen lake-fish fillets were considerably (65 per cent) higher, the change being attributable to larger holdings of whitefish fillets—holdings of pickerel fillets were much lower than the year before.

The Atlantic Area

The value of fishery production in the Atlantic provinces in 1961 was slightly less than that of the preceding year, which, however, represented an all-time peak. The drop resulted principally from a shortfall in the cod and herring fisheries in the summer and autumn—in these cases, in contrast with the lobster fishery, a rise in prices was insufficient to compensate closely for the decline in landings.

In the late spring, the lobster and other small-boat fisheries were delayed from two to four weeks by an ice blockade in the Gulf of St. Lawrence and on the east coast of Newfoundland. Thereafter the lobster fishery generally was successful, with landings for the year being only seven per cent below those of the record-breaking season of 1960. Higher prices largely offset the decline in landings. The reduction in supply affected output mainly in the canned form; sales of shell lobster and of lobster meat were maintained at close to the 1960 level.

Cod landings dropped about 14 per cent in 1961, as compared with 1960, but landings of other groundfish rose slightly. The drop in cod landings resulted from a failure of the summer trap-fishery along the east coast of Newfoundland and the



Purse-seining for herring in Bonne Bay, Nfld.

Straits. Otherwise, the small-boat fishery generally was more successful in 1961 than for several years. The deep-sea fishery, prosecuted with large draggers or trawlers, is reported to have been consistently good but the results obtained by medium-sized craft (draggers, danish-seiners and longliners) appear to have been uneven; good at certain times and in certain places, poor at other times and places. Increases of as much as 25 per cent in dockside prices were recorded but the average increase in prices was about 10 per cent.

The output of processed groundfish in the major fresh and frozen forms (fillets, blocks and portions) in 1961 was about 17 per cent greater than in 1960. At just under 185 million lb., this is the highest level of production yet achieved. Exports during the season, evidently facilitated by the adjustment in foreign-exchange rates, were also well ahead of those of the previous year and year-end stocks in cold storage were about eight per cent below the figure for Dec. 31, 1960.

Increased utilization of codfish for filleting, combined with a relatively poor inshore fishery, resulted in a sharp decline in the production of cured groundfish in 1961. In Newfoundland, which normally produces about 85 per cent of the total, the production of salt codfish was somewhat less than 450,000 qtx. (hard-dried wt. equivalent). This represents a drop of one-third from 1960. Production of the light-salted cure was the lowest in the long history of the trade in that commodity. On the other hand, prices were reported to be higher than ever before,

export shipments were moving in greater volume than the year before—although the long-term market outlook remained uncertain—and stocks on hand at the end of the year were 40 per cent below those of the previous year.

The spring and summer herring fisheries, in the Gulf of St. Lawrence and the Bay of Fundy, were highly productive. Results for the fall fishery were poor—the 1961 herring catch in Newfoundland was the poorest of the present century. Landings overall, however, were only about 10 per cent less than the preceding year. The production of cured herring was well maintained—current information on canned production is not available.

Among the fisheries of secondary importance (formerly) the most notable gains were made in the scallop fishery: landings for the year increased 36 per cent in volume and 55 per cent in value over those of the 1960 season. The value of primary production in the scallop fishery now ranks with that of the regional herring fishery.

General

Certain trends are now emerging that presage a new stage of development and expansion in the fishing industry of Canada. Among these trends are a) those related to resource management, e.g. the growing interest in the application of research in all phases of the fisheries, particularly in the rehabilitation of depleted stocks, and the widespread discussion of the problems involved in the exploitation of common-property resources under conditions of free entry; b) those related to productive capacity and efficiency, e.g. the rising tempo of dragger construction on the Atlantic coast, the introduction of dragnet fishing on the Great Lakes and the equipping of vessels for distant-water tuna fishing on the Pacific coast; and c) those related to improvement in marketing, e.g. the current advances in processing and packaging, including the extension of these to freshwater fishery products, the growth of interest in new market outlets, as evidenced by sales of frozen groundfish fillets, lobster and Pacific salmon (including air shipments) to Europe—more recently the trial shipment of freshwater fish to European and of cured codfish to Asian markets—and the modernization of plant facilities in support of developments of this kind.

STATISTICS OF THE FISHERIES

FISH AND SHELLFISH—LANDINGS AND LANDED VALUES, 1960 AND 1961

(Principal Species)

	Landings		Landed Values	
	1960[1]	1961[2]	1960[1]	1961[2]
	'000 lb.		$ '000	
Pacific Coast				
Salmon	75,153	118,179	18,401	24,841
Halibut	33,867	32,932	5,399	6,867
Herring	187,675	447,234	2,178	4,577
Crabs	5,068	4,444	515	455
Ling Cod	4,516	4,211	402	394
Oysters	5,879	6,285	339	366
Soles and Flounders	7,960	6,259	419	362
Shrimps and Prawns	1,678	1,060	299	171
Grey Cod	5,244	3,300	260	163
Atlantic Coast				
Lobsters	51,517	47,752	18,031	17,925
Cod	604,621	517,905	16,537	15,434
Haddock	95,126	118,772	3,685	4,645
Small flatfishes	121,434	109,096	3,780	3,410
Scallops	7,716	10,506	2,021	3,076
Herring	246,329	209,009	3,682	3,035
Halibut	6,618	6,042	1,712	1,651
Redfish	46,859	55,684	1,172	1,459
Salmon	3,577	3,444	1,461	1,403
Swordfish	3,890	3,192	1,342	1,235
Pollock	57,604	49,634	1,262	1,066
Mackerel	13,138	14,856	724	776

[1]Revised.
[2]Preliminary

61925-4—8½

FISH AND SHELLFISH—LANDINGS AND VALUES BY PROVINCES AND AREAS, 1960 AND 1961

	Landings		Landed Values	
	1960[1]	1961[2]	1960[1]	1961[2]
	'000 lb.		$ '000	
Sea fisheries—TOTAL	1,684,348	1,856,761	88,745	96,841
Atlantic Coast—TOTAL	1,342,602	1,225,807	59,763	58,804
Nova Scotia	430,310	456,955	26,094	27,947
Newfoundland	546,051	484,711	15,856	14,789
New Brunswick	228,121	143,831	9,206	7,606
Prince Edward Island	43,283	36,521	4,640	4,484
Quebec	95,837	103,789	3,967	3,978
Pacific Coast—TOTAL	341,746	630,954	28,982	38,037
Freshwater fisheries—TOTAL	123,024	120,000[3]	12,767	12,500[3]
Ontario	47,600	48,700	4,983	5,000
Manitoba	31,944	31,000	3,867	3,800
Saskatchewan	14,530	14,000	1,367	1,300
Alberta	15,852	14,000	1,159	1,100
Northwest Territories	5,543	5,800	702	700
Quebec	3,014	3,000	537	500
New Brunswick	4,541	3,500	152	100
GRAND TOTAL	1,807,372	1,976,761	101,512	109,341

[1]Revised.
[2]Preliminary.
[3]Estimated.

FISH AND SHELLFISH—EXPORTS BY TYPES OF PRODUCTS, 1960-1961

	Quantity		Value	
	1960	1961	1960	1961
	('000 lb.)		($ '000)	
Fresh and Frozen Fish, whole or dressed	167,406	146,169	34,940	35,526
Fresh and Frozen Fillets	140,053	151,476	33,893	37,002
Smoked fish	6,916	6,400	1,305	1,300
Pickled Fish	17,950	18,408	2,363	2,313
Salted and Dried fish	107,766	99,118	18,458	17,065
Canned fish	30,348	33,397	15,144	17,454
Molluscs and Crustaceans (fresh and canned)	32,932	37,205	23,268	24,851
Fish oils ('000 gallons)	3,310	8,488	2,053	614
Miscellaneous	—	—	6,679	7,222
TOTAL	—	—	138,130	143,347

NUMBER OF FISHERMEN IN CANADA, BY AREAS, 1959 AND 1960

	1959	1960
SEA FISHERIES	61,756	60,505
British Columbia	15,456	15,159
Maritimes and Quebec	27,870	27,055
Newfoundland	18,430	18,291
FRESHWATER FISHERIES	18,307	17,666
TOTAL	80,063	78,171

VALUE OF FISHING CRAFT AND GEAR IN CANADA, BY AREAS, 1959 AND 1960

	1959	1960
	$ '000	
SEA FISHERIES	108,479	116,967
British Columbia	52,839	56,240
Maritimes and Quebec	39,643	43,578
Newfoundland	15,997	17,149
FRESHWATER FISHERIES	12,722	12,315
TOTAL	121,201	129,282

APPENDIX 1

FINANCIAL STATEMENTS 1961-62

COMPARATIVE SUMMARY OF EXPENDITURES

Appropriation	1961-62	1960-61	Increase or Decrease —
	$	$	$
Miscellaneous Gratuities	.....	1,775.00	−1,775.00
Minister's Salary and Motor Car Allowance.	17,000.00	17,000.00	
Departmental Administration	453,508.64	420,532.33	32,976.31
Information and Educational Service	216,412.62	188,659.33	27,753.29
Economics Service	309,389.93	304,950.66	4,439.27
Industrial Development Service	690,126.43	660,759.35	29,367.08
Fishing Bounty	159,998.00	159,945.45	52.55
Field Services Administration	860,258.36	888,790.36	−28,532.00
Conservation and Development Service—			
Operation and Maintenance	6,158,057.41	5,764,718.45	393,338.96
Buildings, Works, Land and Equipment	2,235,425.54	1,071,020.24	1,164,405.30
Inspection and Consumer Service	2,277,243.53	1,891,643.74	385,599.79
Fishermen's Indemnity Plan—			
Administration	240,111.90	225,555.70	14,556.20
SPECIAL			
Canadian share of Expenses of the Commissions	1,070,956.59	840,135.46	230,821.13
Acquisition of Land for the International Pacific Salmon Fisheries Commission	106,261.48	2,356.00	103,905.48
Exchequer Court	.....	7,111.46	−7,111.46
Newfoundland Bait Service	449,568.96	444,406.19	5,162.77
Educational Work Among Fishermen	106,482.32	89,805.69	16,676.63
Fisheries Prices Support Act—			
Administration	60,705.52	54,117.40	6,588.12
Assistance to Producers of Salted Fish	562,460.81	755,104.97	−192,644.16
Assistance in Construction of Vessels of the Dragger or Long Liner Type	302,130.95	345,887.85	−43,756.90
Assistance in Construction of Bait Freezing and Storage Facilities	3,675.00	42,992.00	−39,317.00
Destruction of Dogfish and Other Predators.	147,714.99	118,908.94	28,806.05
Contribution towards a special Newfoundland Works Program for Fishing Settlements that Experienced Income Reduction Resulting from Decreased Catches	266,632.23	.....	266,632.23
Recoup Lobster Trap Indemnity Account— as at March 31, 1962	99,000.00	114,480.00	−15,480.00
Refunds of Amounts Credited to Revenue in Previous Year	.....	900.00	−900.00
Contribution Towards The Cost of a Special Meeting of the Food and Agriculture Organization of the United Nations Regarding Distribution and Use of Fish Meal	.....	2,500.00	−2,500.00
FISHERIES RESEARCH BOARD			
Headquarters Administration	198,904.33	188,191.57	10,712.76
Operation and Maintenance	4,577,821.55	4,092,184.72	485,636.83
Land, Buildings and Equipment	1,528,034.70	501,248.49	1,026,786.21
TOTALS	23,097,881.79	19,195,681.35	3,902,200.44

COMPARATIVE SUMMARY OF REVENUES

	1961-62	1960-61	Increase or Decrease—
	$	$	$
Return on Investments—			
Pelagic Sealing (Profit on sales of skins)	319,463.92	284,097.24	35,345.48
Interest on Sale to Bonavista Cold Storage Co. Ltd	1,000.00	.....	1,000.00
Miscellaneous	.....	21.20	.....
	320,463.92	284,118.44	36,345.48
Privileges, Licenses and Permits	116,700.37	111,150.35	5,550.02
Proceeds from Sales	116,849.59	147,484.78	−30,635.19
Service and Service Fees	38,814.58	50,282.64	−11,468.06
Refund of Previous Years' Expenditure	22,357.55	34,896.65	−12,539.10
Miscellaneous	53,591.20	45,728.57	7,862.63
TOTALS	668,777.21	673,661.43	−4,884.22

PROTECTION AND INSPECTION SERVICES
DISTRIBUTION OF EXPENDITURES BY PROVINCES AND ESTABLISHMENTS
NEWFOUNDLAND AREA

Particulars	Permanent Salaries	Temporary Assistance	Other Expenditure	Total
	$	$	$	$
Protection and Inspection—				
Inspection Officers	261,412.65	5,747.95	41,184.54	308,345.14
Protection Officers	68,320.80	.....	25,869.21	94,190.01
Wardens	66,748.45	16,421.75	28,179.75	111,349.95
Guardians	.....	96,294.30	10,528.85	106,823.15
Departmental Boats—				
Garia Bay	3,679.73	2,331.48	10,048.73	16,059.94
Badger Bay	6,454.92	1,800.15	11,088.65	19,343.72
Pecten	.....	.....	3,392.67	3,392.67
Sabinea	.....	.....	253.67	253.67
Cinderella	9,072.97	.....	6,584.47	15,657.44
Louise Ruth	1,500.81	2,457.94	3,677.76	7,636.51
Lomond	2,539.92	2,013.00	3,496.64	8,049.56
Eastern Explorer	18,963.32	6,469.09	14,294.55	39,726.96
Point May	615.00	.....	123.00	738.00
Porella	6,858.05	2,628.00	8,201.25	17,687.30
Nebalia	7,940.58	205.00	4,275.09	12,420.67
Aurelia	7,053.42	2,628.00	5,583.46	15,264.88
Boltenia	7,073.39	1,503.13	9,355.44	17,931.96
Cape Freels	.....	.....	129.60	129.60
Belle Bay (Floating Laboratory)	5,138.96	3,628.00	10,804.50	19,571.46
Fish Inspection Laboratory	51,163.32	666.90	10,060.99	61,891.21
Fisheries Area Office	20,040.00	.....	305.34	20,345.34
Miscellaneous	.....	.....	24,381.84	24,381.84
	544,576.29	144,794.69	231,820.00	921,190.98

MARITIMES AREA

—	Officers		Wardens			Guardians		Miscellaneous			Total
	Permanent Salaries	Other Expenditure	Permanent Salaries	Temporary Assistance	Other Expenditure	Temporary Assistance	Other Expenditure	Permanent Salaries	Temporary Assistance	Other Expenditure	
	$	$	$	$	$	$	$	$	$	$	$
NOVA SCOTIA—											
Inspection Branch—District No. 1	124,696.91	16,615.90								4,617.12	145,929.93
District No. 2	84,081.34	20,692.51								2,594.56	107,368.41
Protection Branch—District No. 1	57,315.18	14,497.04	19,063.97	9,710.00	8,238.41	7,406.81	153.44			2,703.07	119,087.92
District No. 2	117,010.73	25,491.31	32,291.88	7,884.33	11,025.70	18,198.72	233.72			4,206.62	216,343.01
District No. 3	42,494.43	9,877.69	24,579.37	15,478.65	8,701.38	15,749.46	394.10			5,673.64	122,948.72
District No. 4	59,740.96	14,437.20	8,470.38	1,638.50	3,712.71	11,637.80	242.68			2,663.08	102,543.31
Fish Inspection Laboratory—Halifax								102,744.86	2,252.07	43,514.89	148,511.82
New Fish Inspection Laboratory—Halifax										334,873.96	334,873.96
Miscellaneous—Protection								7,617.50		2,296.43	9,913.93
Inspection											
PRINCE EDWARD ISLAND—											
Inspection Branch—District No. 4B	54,909.74	10,045.50									64,955.24
Protection Branch—District No. 9	59,814.59	18,990.47	16,336.79	1,661.70	3,735.59	1,383.20	476.24				102,398.58
Fish Inspection Laboratory—Charlottetown								10,132.84	3,045.80	9,627.06	22,805.70
Miscellaneous—Protection										7,541.98	7,541.98
Inspection										1,931.79	1,931.79
NEW BRUNSWICK—											
Inspection Branch—District No. 3	33,710.72	6,063.47								1,552.06	41,326.25
District No. 4A	46,531.44	21,682.62								4,272.36	72,486.42
Protection Branch—District No. 5	23,327.49	7,401.43	15,412.34	1,090.00	2,558.19	5,893.64	80.04			2,576.47	58,339.60
District No. 6	42,279.45	10,423.77	32,723.71	8,291.11	7,089.20	21,755.34	1,130.15			4,293.43	127,986.16
District No. 7	73,470.81	19,289.59	38,573.17	18,777.40	7,999.82	12,460.31	492.37			7,537.02	178,600.49
District No. 8	37,317.94	11,747.80	14,365.96	5,498.36	5,619.70	4,947.82	70.20			4,251.94	83,819.72
Fish Inspection Laboratory—Shediac								14,224.93	3,893.63	9,999.86	28,118.42
Fish Inspection Laboratory—St. Andrews								31,321.92	1,221.41	3,611.29	36,154.62
Miscellaneous—Protection										2,111.50	2,111.50
EAST—											
Inspection—Maritimes Area Office								7,435.60	12,720.55		20,156.15
Protection—Maritimes Area Office								18,331.91		38,391.38	56,723.29
Home Economics Service								5,760.00		2,401.17	8,161.17
Miscellaneous—Protection										11,736.94	11,736.94
Inspection										6,713.32	6,713.32
	856,701.73	207,256.30	201,817.57	70,030.05	58,680.70	99,433.10	3,272.94	197,569.56	23,133.46	521,692.94	2,239,588.35

MARITIMES—PATROL

Particulars	Permanent Salaries	Temporary Assistance	Other Expenditure	Total
	$	$	$	$
NOVA SCOTIA—				
Cratena	11,892.96	5,796.48	15,647.17	33,336.61
Marcia	8,277.23	2,922.49	8,245.13	19,444.85
Limanda	16,893.60	28.27	12,646.87	29,568.74
Lacuna	5,970.96	8,569.96	13,482.77	28,023.69
Sabella	12,072.93	8,949.33	13,784.89	34,807.15
Mya II	5,605.27	1,498.23	3,904.43	11,007.93
Modiolus II	8,253.96	2,436.97	5,622.20	16,313.13
Serpula	7,823.81	3,342.01	4,811.32	15,977.14
Scatari Light	.....	7,526.64	5,217.18	12,743.82
Sable Light	4,254.96	4,067.78	4,173.27	12,496.01
Chartered Boats	.....	1,854.12	1,004.72	2,858.84
PRINCE EDWARD ISLAND—				
Obelia	2,924.25	2,787.66	3,955.32	9,667.23
Kildare Point	2,850.33	2,615.63	3,847.47	9,313.43
Yorke Point	2,669.54	.....	1,424.41	4,093.95
Fabia	3,453.24	2,194.07	3,788.94	9,436.25
Acartia	6,016.08	.....	2,798.37	8,814.45
Prim Light	8,901.70	.....	3,957.09	12,858.79
Chartered Boats	4,863.56	9,957.10	10,593.53	25,414.19
NEW BRUNSWICK—				
Rossia	2,895.31	3,080.64	3,150.00	9,125.95
Ilea	4,780.43	.....	2,000.40	6,780.83
Tegula	3,773.15	3,695.69	5,567.84	13,036.68
Alosa	5,188.72	4,434.43	3,560.63	13,183.78
Osmerus	2,991.91	.....	598.39	3,590.30
Shediac Bay	8,916.61	2,994.44	9,161.62	21,072.67
Cheval Point	1,230.29	.....	1,224.19	2,454.48
Cardita	8,264.49	.....	4,619.78	12,884.27
Paphia	8,196.94	.....	4,961.45	13,158.39
Maces Bay	8,787.02	1,399.29	8,476.60	18,662.91
Cumella	10,882.85	8,852.04	17,944.79	37,679.68
Hyperia	5,960.07	.....	3,879.19	9,839.26
Gull Light	8,253.96	2,244.66	5,365.72	15,864.34
Neguac Light	.....	8,273.13	4,383.00	12,656.13
EAST—				
Cygnus	43,396.57	63,977.97	73,258.34	180,632.88
TOTALS	236,242.70	163,499.03	267,057.02	666,798.75

QUEBEC AREA

—	Officers			General			Total
	Permanent Salaries	Other Expenditure	Temporary Assistance	Permanent Salaries	Temporary Salaries	Other Expenditure	
	$	$	$	$	$	$	$
Quebec—							
Home Economics Service	.....	.....	.....	.....	.....	1,700.48	1,700.48
District No. 1	57,666.91	15,325.56	.....	.....	.....	208.63	73,201.10
Chartered Boats	.....	.....	.....	.....	.....	4,650.00	4,650.00
District No. 2	60,794.52	13,136.29	.....	257.50	.....	1.00	74,189.31
District No. 3	25,582.17	10,142.30	.....	.....	.....	68.88	35,793.35
Grindstone—Office—Residence	.....	.....	.....	.....	.....	1,585.62	1,585.62
Fish Inspection Laboratory—Quebec	.....	.....	.....	15,285.85	542.50	18,825.55	34,653.90
General—Protection	.....	.....	.....	.....	.....	1,190.58	1,190.58
Inspection	.....	.....	.....	.....	.....	4,135.61	4,135.61
	144,043.60	38,604.15	.....	15,543.35	542.50	32,366.35	231,099.95

1961-62 CENTRAL AREA

	Officers		Guardians		Miscellaneous			Total
	Permanent Salaries	Other Expenditure	Temporary Assistance	Other Expenditure	Permanent Salaries	Temporary Assistance	Other Expenditure	
	$	$	$	$	$	$	$	$
Ontario	75,861.75	4,755.56				463.92	12,231.34	93,312.57
Fish Inspection Laboratory—Toronto					8,119.84		912.20	9,032.04
Home Economics Service					6,300.00		1,604.02	7,904.02
Manitoba	43,069.82	4,285.90					9,801.08	57,156.80
Fish Inspection Laboratory—Winnipeg					28,432.50	1,868.32	9,368.18	39,669.00
Home Economics Service					6,000.00		4,206.50	10,206.50
Saskatchewan	20,007.44	12,089.89					2,911.00	35,008.33
Alberta	14,278.62	1,154.27					1,506.64	16,939.53
Home Economics Service					6,226.94		1,338.56	7,565.50
Yukon Territory	10,949.23	14,284.53					840.85	26,074.61
Northwest Territories—Protection	19,572.15	7,951.54	5,310.33	1,505.68			22,972.84	57,312.54
Inspection	20,278.66	7,924.02	5,409.38	1,510.46		1,109.52	4,209.84	40,441.88
Office Building							886.85	886.85
Staff House						3,382.08	4,200.64	7,582.72
Supervisor's Residence						493.60	2,289.54	2,783.14
Garage						5,127.20	4,198.06	9,325.26
Housing Units							8,483.40	8,483.40
Patrol Boat "Marila"							450.07	450.07
Patrol Boat "Mareca"							406.76	406.76
Home Economics Service—Central							3,670.99	3,670.99
Central Area Office							151.00	151.00
Miscellaneous							1,673.33	1,673.33
Headquarters—Ottawa—Protection						102,421.90	10.868.44	113,290.34
Headquarters—Ottawa—Inspection						45,133.04	11,756.85	56,889.89
Home Economics—H.Q.					31,678.68	3,671.93	6,943.61	42,294.22
	204,017.67	52,445.71	10,719.71	3,016.14	86,757.96	163,671.51	127,882.59	648,511.29

1961-62 PACIFIC AREA

	Officers		Guardians			Miscellaneous			Total
	Permanent Salaries	Other Expenditure	Permanent Salaries	Temporary Assistance	Other Expenditure	Permanent Salaries	Temporary Assistance	Other Expenditure	
	$	$	$	$	$	$	$	$	$
British Columbia—									
District No. 1	56,673.95	19,583.95		12,389.10	4,704.98			9,178.98	102,530.96
District No. 2	90,008.50	43,694.33		51,892.84	7,954.87			10,265.76	203,816.30
Queen Charlotte City—Office—Residence								1,922.71	1,922.71
Bella Bella—Office—Residence								697.63	697.63
Bella Coola—Office—Residence								807.89	807.89
Massett—Office—Residence								610.56	610.56
Kitimat—Office—Residence								52.02	52.02
Rivers Inlet—Office—Residence								1,564.24	1,564.24
Sandspit—Office—Residence								1,012.76	1,012.76
District No. 3	112,182.19	68,175.81		15,183.26	2,104.02			4,451.83	202,097.11
Quatsino—Office—Residence								1,826.14	1,826.14
Campbell River—Office—Residence								1,365.49	1,365.49
Alert Bay—Office—Residence								445.62	445.62
Pender Harbour—Office—Residence								446.13	446.13
Kuyquot—Office—Residence								2,257.72	2,257.72
Tofino—Office—Residence								734.57	734.57
Westview—Office—Residence								557.11	557.11
Port Hardy—Office—Residence								676.65	676.65
Tahsis—Office—Residence						570.00		183.36	753.36
Home Economics Service						6,420.00		2,102.71	8,522.71
Fisheries Area Office						20,299.92	2,203.48	4,117.50	26,620.90
Fisheries Station—Prince Rupert						12,903.83	8,592.00	5,152.60	26,648.43
Fisheries Station—New Westminster						51,053.38	3,135.55	8,972.96	63,161.89
Fisheries Inspection Laboratory—Vancouver						128,635.67		28,482.35	157,118.02
General—Protection								16,006.09	16,006.09
Inspection								1,195.86	1,195.86
B.C. District 2—Inspection								3,374.24	3,374.24
B.C. District 3—Inspection								1,370.43	1,370.43
	258,864.64	131,454.09		79,465.20	14,763.87	219,882.80	13,931.03	109,831.91	828,193.54

Particulars	Permanent Salaries	Temporary Assistance	Other Expenditure	Total
	$	$	$	$
BRITISH COLUMBIA—				
General				
Howay	58,103.09	25,184.38	59,221.25	142,508.72
Kitimat	30,938.68	7,050.81	24,881.35	62,870.84
Laurier	56,269.50	13,954.51	52,463.66	122,687.67
DISTRICT No. 1—				
Gavia	11,605.12	.....	2,390.66	13,995.78
Chilco Post	24,746.07	553.82	7,795.96	33,095.85
Diaphus	11,343.88	.....	1,592.71	12,936.59
Rissa	10,036.52	.....	2,109.07	12,145.59
Star Rock	10,003.40	.....	4,132.31	14,135.71
Seal Rock	10,198.33	.....	2,905.06	13,103.39
Tackla Rock	1,560.85	468.46	2,206.19	4,235.50
DISTRICT No. 2—				
Arrow Post	16,277.41	3,491.17	10,645.71	30,414.29
Babine I	.....	1,801.80	373.90	2,175.70
Babine Post	16,007.96	6,094.33	15,841.67	37,943.96
Beldis	9,119.04	548.00	3,612.60	13,279.64
Bonila Rock II	9,494.25	2,192.00	14,575.30	26,261.55
Egret Plume II	12,126.86	3,127.99	7,961.39	23,216.24
F.D. 202	7,673.54	.....	5,268.53	12,942.07
Nicola Post	4,487.04	.....	210.96	4,698.00
Onerka II	10,831.72	3,128.19	7,129.72	21,089.63
Sooke Post	18,027.50	3,920.00	15,962.91	37,910.41
Skeena	.....	.....	63.43	63.43
Agonus	11,125.42	11.91	4,787.16	15,924.49
Clavella	16,014.94	3,360.00	8,087.15	27,462.09
Branta	1,315.84	1,481.49	2,083.74	4,881.07
North Rock	7,319.26	879.70	5,485.38	13,684.34
Falcon Rock	10,290.25	3,713.82	5,705.86	19,709.93
Pillar Rock	8,098.04	1,776.88	5,579.79	15,454.71
Chartered Boats	.....	41,308.32	87,314.40	128,622.72
DISTRICT No. 3—				
Atlin Post	22,216.35	3,918.00	13,377.17	39,511.52
Black Raven II	1,122.92	548.00	552.98	2,223.90
Comox Post	17,129.77	4,162.46	8,937.52	30,229.75
F.D. 102	5,323.96	.....	1,430.87	6,754.83
F.D. 201	4,225.17	.....	2,061.47	6,286.64
Daphnia	5,617.30	.....	3,385.34	9,002.64
Pholus	4,889.33	.....	2,441.14	7,330.47
Stuart Post	16,408.04	3,701.76	25,081.52	45,191.32
Atolla	4,763.04	.....	2,220.93	6,983.97
Ciona	4,873.49	.....	4,399.96	9,273.45
Sarda	4,237.61	.....	1,937.01	6,174.62
Statistic	5,392.88	.....	2,430.44	7,823.32
Brama	10,420.04	.....	5,390.25	15,810.29
Temple Rock	11,566.50	822.00	3,985.76	16,374.26
Beaver Rock	9,877.74	3,668.69	5,773.54	19,319.97
Chartered Boats	.....	69,024.16	53,676.94	122,701.10
TOTALS	511,078.65	209,892.65	497,470.66	1,218,441.96

1961-62 PROTECTION AND INSPECTION SERVICES

SUMMARY

— —	Headquarters Ottawa	Newfoundland	East General	Nova Scotia	Prince Edward Island	New Brunswick	Quebec	Ontario
	$	$	$	$	$	$	$	$
Newfoundland Area		727,326.64						
Newfoundland Patrol		193,864.34						
Maritimes Area			103,490.87	1,307,521.01	199,633.29	628,943.18		
Maritimes Patrol			180,632.88	216,577.91	79,598.29	189,989.67		
Quebec Area							231,099.95	
Central Area								110,248.63
Central Patrol								
Pacific Area								
Pacific Patrol								
Headquarters—Ottawa	212,474.45							
TOTALS	212,474.45	921,190.98	284,123.75	1,524,098.92	279,231.58	818,932.85	231,099.95	110,248.63

— —	Central General	Manitoba	Saskatchewan	Alberta	British Columbia	Northwest Territories	Yukon Territory	Total
	$	$	$	$	$	$	$	$
Newfoundland Area								727,326.64
Newfoundland Patrol								193,864.34
Maritimes Area								2,239,588.35
Maritimes Patrol								666,798.75
Quebec Area								231,099.95
Central Area	5,495.32	107,032.30	35,008.33	24,505.03		126,815.79	26,074.61	435,180.01
Central Patrol							856.83	856.83
Pacific Area					828,193.54			828,193.54
Pacific Patrol					1,218,441.96			1,218,441.96
Headquarters—Ottawa								212,474.45
TOTALS	5,495.32	107,032.30	35,008.33	24,505.03	2,046,635.50	126,815.79	26,931.44	6,753,824.82

FISH CULTURE DEVELOPMENT

Expenditure by Provinces and Establishments

Establishment	Permanent Salaries	Temporary Assistance	Other Expenditure	Total
	$	$	$	$
NEWFOUNDLAND—				
Fisheries Area Office	50,019.91	7,683.04	1,564.30	59,267.25
Atlantic Salmon Programme—				
General	.....	2,745.65	307.19	3,052.84
General	.....	5,041.90	20,047.93	25,089.83
TOTAL	50,019.91	15,470.59	21,919.42	87,409.92
NOVA SCOTIA—				
Fish Culture Stations—				
Antigonish	28,686.00	11,963.30	23,060.21	63,709.51
Bedford	10,620.25	1,929.94	4,360.14	16,910.33
Cobequid	22,947.17	1,450.10	7,494.83	31,892.10
Coldbrook	9,248.20	4,691.90	10,258.26	24,198.36
Kejimkujik	14,435.80	6,637.96	8,178.13	29,251.89
Lindloff	17,279.38	13,420.17	9,240.84	39,940.39
Margaree	26,473.85	8,723.82	15,616.28	50,813.95
Margaree Retaining Pond and Collection	.....	.....	94.50	94.50
Middleton	12,132.49	2,228.20	3,079.20	17,439.89
River Philip Retaining Pond	.....	387.86	292.56	680.42
Sackville Retaining Pond	.....	.....	106.40	106.40
Yarmouth	15,895.08	7,436.30	18,269.28	41,600.66
Grand Lake	12,451.45	1,925.00	3,388.42	17,764.87
Mersey	3,843.85	3,640.58	5,657.35	13,141.78
Atlantic Salmon Programme—				
St. Mary's River	.....	2,371.20	1,209.44	3,580.64
General	.....	.....	491.06	491.06
Biological and Engineering Projects—				
Annapolis River	.....	3,926.12	7,201.39	11,127.51
Lake George	.....	.....	61.75	61.75
Medway River	.....	.....	39.26	39.26
Tusket River	.....	152.00	803.81	955.81
General	.....	206.88	1,425.70	1,632.58
Shellfish Culture—				
Malagash Station	.....	4,351.60	380.09	4,731.69
Orangedale Station	4,500.00	2,124.15	336.30	6,960.45
General	.....	.....	10.00	10.00
TOTAL	178,513.52	77,567.08	121,055.20	377,135.80
PRINCE EDWARD ISLAND—				
Fish Culture Stations—				
Kelly's Pond	.....	1,466.67	.....	1,466.67
Cardigan	7,469.03	4,797.62	6,273.40	18,540.05
Biological and Engineering Projects—				
General	.....	706.80	9.36	716.16
Shellfish Culture—				
Ellerslie Station	13,746.80	15,817.85	8,060.59	37,625.24
Ostrea Departmental Boat	.....	.....	32.20	32.20
General	.....	5,965.96	323.33	6,289.29
TOTAL	21,215.83	28,754.90	14,698.88	64,669.61

Expenditure by Provinces and Establishments—*Cont.*

Establishment	Permanent Salaries	Temporary Assistance	Other Expenditure	Total
	$	$	$	$
NEW BRUNSWICK—				
Fish Culture Stations—				
Chamcook Collection Camp	.....	375.36	15.10	390.46
Florenceville	26,526.24	12,765.85	14,478.14	53,770.23
Grand Falls	12,332.11	5,929.45	9,306.99	27,568.55
Miramichi	13,336.43	6,212.24	11,523.63	31,072.30
Miramichi Retaining Pond	.....	3,851.13	2,684.24	6,535.37
New Mills Retaining Pond	4,500.00	5,337.12	7,080.24	16,917.36
Saint John	26,406.80	20,606.59	23,118.97	70,132.36
Charlo	15,971.08	5,714.45	18,295.26	39,980.79
Haley Brook	8,334.10	5,854.88	6,852.48	21,041.46
Atlantic Salmon Programme—				
St. Croix River	.....	201.00	.....	201.00
St. John River	.....	1,361.76	5,314.53	6,676.29
Tobique River and Tributaries	.....	32.00	44.65	76.65
Bartholomew River	.....	.....	47.58	47.58
Great Salmon River	.....	.....	571.86	571.86
Rocky Brook	.....	.....	83.10	83.10
Magaguadavic River	.....	1,532.53	824.37	2,356.90
Miramichi River	.....	.....	1,556.01	1,556.01
General	.....	565.05	287.77	852.82
Biological and Engineering Projects—				
Crecy Lake	.....	3,409.29	6.24	3,415.53
Ritchie Lake	.....	.....	1.00	1.00
General	.....	876.00	17,809.60	18,685.60
Shellfish Culture—				
Newcastle	7,230.00	.....	1,889.88	9,119.88
Shippegan Station	4,500.00	2,631.20	1,725.69	8,856.89
General	.....	100.00	2.95	102.95
TOTAL	119,136.76	77,355.90	123,520.28	320,012.94
EAST—				
Biological and Engineering—				
Regional Supervisors Office	9,545.00	1,246.74	49,627.19	60,418.93
Maritimes Area Office	94,470.81	4,841.36	2,306.82	101,618.99
Shellfish Culture—				
Ellerslie Headquarters	16,583.80	537.50	8,723.59	25,844.89
Atlantic Salmon Programme—				
General	.....	.....	89.00	89.00
TOTAL	120,599.61	6,625.60	60,746.60	187,971.81
BRITISH COLUMBIA—				
Biological	.....	2,743.89	1,588.87	4,332.76
Engineering	.....	6,232.57	1,641.53	7,874.10
District No. 1—				
Biological	.....	28,189.08	17,635.61	45,824.69
Engineering	.....	2,470.30	1,245.67	3,715.97
District No. 2—				
Biological	4,890.00	17,592.61	43,224.87	65,707.48
Engineering	15,735.00	10,465.69	9,313.44	35,514.13

Expenditure by Provinces and Establishments—Conc.

Establishment	Permanent Salaries	Temporary Assistance	Other Expenditure	Total
	$	$	$	$
BRITISH COLUMBIA—*Conc.*				
District No. 3—				
Biological	6,465.00	17,113.56	12,438.54	36,017.10
Engineering	16,830.00	30,788.50	36,579.46	84,197.96
Pacific Area Office	.....	3,025.13	4,904.39	7,929.52
General	232,716.95	17,728.76	99,398.04	349,843.75
TOTAL	276,636.95	136,350.09	227,970.42	640,957.46
YUKON TERRITORY—				
Biological	.....	537.60	1,944.38	2,531.98
Engineering	.....	.....	786.60	786.60
TOTAL	.....	537.60	2,780.98	3,318.58
GRAND TOTAL	766,122.58	342,661.76	572,691.78	1,681,476.12

FISHERIES RESEARCH BOARD OF CANADA

(Operation and Maintenance)

Expenditure 1961-62

Particulars		Gross Expenditure	Revenue and *Recoverable	Net Expenditures
		$	$	$
Administration—General		210,023.12	11,118.79	198,904.33
Biological Stations:				
St. John's, Nfld.		345,536.39	.....	345,536.39
St. Andrews, N.B. (General Research)		759,877.90	.....	759,877.90
Montreal, Que. "Arctic Unit"		195,297.57	.....	195,297.57
London, Ont. (General Research)		248,916.29	.....	248,916.29
*London, Ont. (Lamprey Control)		307,742.07	307,742.07	.....
Nanaimo, B.C.		1,091.746.51	.....	1,091,746.51
Technological Stations:				
St. John's Nfld. (Unit)		51,838.94	.....	51,838.94
Halifax, N.S.		373,763.07	.....	373,763.07
Grand River, Que.		93,916.78	.....	93,916.78
London, Ont. (Unit)		48,162.41	.....	48,162.41
Vancouver, B.C.		299,848.02	.....	299,848.02
Oceanographic Groups:				
St. Andrews, N.B.		102,677.50	.....	102,677.50
Nanaimo, B.C.		232,854.28	.....	232,854.28
Contracts for Research		21,992.90	.....	21,992.90
Scholarships		25,460.00	.....	25,460.00
Vessels:				
St. John's, Nfld.:	"*A. T. Cameron*"	214,197.14	.....	214,197.14
	"*Investigator II*"	81,939.67	.....	81,939.67
	"*Marinus*"	41,345.52	.....	41,345.52
	"*Parr*"	8,882.42	.....	8,882.42
St. Andrews, N.B.:	"*Harengus*"	79,276.98	.....	79,276.98
	"*Pandalus*"	16,892.85	.....	16,892.85
	"*Mallotus*"	9,364.74	.....	9,364.74
London, Ont.:	"*Cottus*"	18,298.64	.....	18,298.64
	"*Stenodus*"	1,119.87	.....	1,119.87
Arctic:	"*Salvelinus*"	5,346.95	.....	5,346.95
	"*Calanus*"	20,803.88	.....	20,803.88
Nanaimo, B.C.:	"*Investigator I*"	31,570.08	.....	31,570.08
	"*Noctiluca*"	1,559.38	.....	1,559.38
	"*Alta*"	12,632.26	.....	12,632.26
	"*A. P. Knight*"	47,585.91	.....	47,585.91
Chartered Vessels:	"*Fort Ross*"	31,996.18	.....	31,996.18
	"*Western Crusader*"	28,105.11	.....	28,105.11
	"*Pacific Ocean*"	35,015.41	.....	35,015.41
		5,095,586.74	318,860.86	4,776,725.88

*Recovered from the Great Lakes Fishery Commission.

BAIT SERVICE—NEWFOUNDLAND

Receipts and Payments—1961-62

RECEIPTS:		
Sales of Bait		$ 89,130.60
Storage and Other Service Charges		5,412.83
Refund of Previous Years' Expenditure		5,145.22
Total Receipts		$ 99,688.65
PAYMENTS:		
Operating Expenses:		
Purchase of Bait	$ 51,096.96	
Salaries and Wages	201,308.49	
Allowances	21,074.93	
Professional and Special Services	366.00	
Travelling and Removal Expenses	7,098.31	
Freight, Express and Cartage	3,056.69	
Postage	250.00	
Telephones and Telegrams	2,999.15	
Office Stationery, Supplies and Equipment	260.42	
Materials and Supplies	39,233.71	
Repairs and Upkeep of Buildings, etc.	53,272.49	
Rental of Buildings	3,480.00	
Repairs and Upkeep of Equipment	13,895.98	
Light, Heat and Power	8,305.37	
Unemployment Insurance	889.78	
Sundries	365.68	
		406,953.96
		307,265.31
CAPITAL EXPENDITURES:		
Acquisition and Construction of Buildings	13,664.13	
Acquisition of Equipment	28,950.87	
		42,615.00
Excess of payments over Receipts		$ 349,880.31

FISHING BOUNTY PAYMENTS 1961-62

Province and County	Boats	Men	Amount	Vessels	Tons	Men	Amount	Total Amount
NOVA SCOTIA—								
Annapolis	69	101	1,094.15	12	201	35	556.25	1,650.40
Antigonish	50	64	699.60	.....	.....	.....	.....	699.60
Cape Breton	168	264	2,847.20	63	2,033	285	4,925.55	7,772.75
Cumberland	10	22	233.30	3	39	6	99.90	333.20
Digby	125	189	2,043.35	67	1,002	142	2,443.30	4,486.65
Guysboro	298	426	4,621.90	40	1,700	239	4,125.85	8,747.75
Halifax	408	588	6,376.20	40	1,885	354	5,478.10	11,854.30
Inverness	92	159	1,705.85	24	615	81	1,437.15	3,143.00
Kings	21	28	305.20	3	52	4	92.60	397.80
Lunenburg	355	410	4,516.50	30	1,740	331	5,099.65	9,616.15
Pictou	18	30	322.50	.....	.....	.....	.....	322.50
Queens	104	166	1,788.90	28	557	82	1,389.30	3,178.20
Richmond	135	223	2,398.45	21	302	103	1,347.45	3,745.90
Shelburne	368	561	6,062.15	246	4,133	630	10,527.50	16,589.65
Victoria	141	197	2,140.55	5	106	13	237.95	2,378.50
Yarmouth	45	90	958.50	69	1,210	220	3,443.00	4,401.50
TOTAL	2,407	3,518	38,114.30	651	15,575	2,525	41,203.55	79,317.85
PRINCE EDWARD ISLAND—								
Kings	198	269	2,928.35	20	809	95	1,773.25	4,701.60
Prince	364	593	6,382.95	3	40	8	121.20	6,504.15
Queens	115	210	2,246.50	2	49	7	120.05	2,366.55
TOTAL	677	1,072	11,557.80	25	898	110	2,014.50	13,572.30

NEW BRUNSWICK—								
Charlotte	46	73	786.95	76	1,552	262	4,211.10	4,998.05
Gloucester	368	655	7,016.25	123	3,282	433	7,676.95	14,693.20
Kent	119	195	2,098.25	96	1,103	174	2,869.10	4,967.35
Northumberland	33	63	672.45	80	1,012	166	2,696.90	3,369.35
Restigouche	10	15	162.25	.....	.....	.....	.....	162.25
Saint John	3	8	84.20	.....	.....	.....	.....	84.20
Westmorland	6	8	87.20	1	11	1	21.15	108.35
TOTAL	585	1,017	10,907.55	376	6,960	1,036	17,475.20	28,382.75
QUEBEC—								
Bonaventure	107	148	1,609.20	18	392	64	1,041.60	2,650.80
Gaspe	526	771	8,351.65	88	1,752	322	5,020.30	13,371.95
Magdalen Islands	463	993	10,541.95	35	845	135	2,215.25	12,757.20
Matane	62	89	965.35	.....	.....	.....	.....	965.35
Saguenay	545	827	8,938.65	1	31	1	41.15	8,979.80
TOTAL	1,703	2,828	30,406.80	142	3,020	522	8,318.30	38,725.10
GRAND TOTAL	5,372	8,435	90,986.45	1,194	26,453	4,193	69,011.55	159,998.00

DISTRIBUTION OF EXPENDITURES

—	General	Newfoundland	East General	Nova Scotia	Prince Edward Island	New Brunswick
	$	$	$	$	$	$
Minister of Fisheries	17,000.00					
Departmental Administration	453,508.64					
Information and Educational Service	184,194.72	6,798.58	3,003.84	11,835.57		195.46
Economics Service	131,745.61	36,378.23	59,970.12			
Industrial Development Service	276,781.98	360,251.88	1,578.77	8.00	9.22	3,000.00
Fishing Bounty				79,317.85	13,572.30	28,382.75
Field Services Administration		292,479.04	172,575.22	17,001.85	10,178.08	22,825.99
Conservation and Development Service—						
Operation and Maintenance	113,290.34	613,895.12	437,064.92	1,164,550.60	254,208.46	960,860.08
Construction or Acquisition		938,415.10	42,640.18	66,359.79	24,252.29	52,177.04
Inspection and Consumer Service	99,184.11	394,705.78	35,030.64	736,684.12	89,692.73	178,085.71
Fishermen's Indemnity Plan Administration	17,559.23	65,253.68	19,971.93	27,887.61	6,317.67	12,176.75
Canadian share of expenses of the International Fisheries Commissions	516,416.69					
Acquisition of Land International Pacific Salmon Commission						
Newfoundland Bait Service		449,568.96				
Extension of Educational Works		18,954.05		30,084.27	7,061.20	14,554.53
Fisheries Prices Support Act—						
Administration	58,419.63	394.11	100.00	1,465.16	44.20	282.42
Payment of Assistance to Producers of Salted Fish		349,028.31		135,522.64	12,118.76	36,021.12
Assistance in Construction of Vessels		66,157.00		97,158.70	28,731.30	110,083.95
Assistance in Construction of Bait Freezers		3,675.00				
Destruction of dogfish and other predators						
Contribution towards a special Newfoundland Work Program, etc		266,632.23				
Recoup Lobster Trap Indemnity Account as at 31 March, 1962	99,000.00					
Fisheries Research Board of Canada—						
Headquarters Administration	198,904.33					
Operation and Maintenance	41,191.00	743,740.08	213,958.58	373,763.07	45,651.34	819,761.13
Construction or Acquisition		39,220.79	17,728.26	88,616.97	3,167.59	72,636.58
	2,207,196.28	4,645,547.94	1,003,622.46	2,830,256.20	495,005.14	2,311,043.51

DISTRIBUTION OF REVENUE

—	General	Newfoundland	East General	Nova Scotia	Prince Edward Island	New Brunswick
	$	$	$	$	$	$
Return on Investments	319,463.92	1,000.00				
Privileges, Licenses and Permits		15,768.54		17,572.16	5,632.58	10,866.81
Proceeds from Sales		103,569.35			1,656.25	
Service and Service Fees	6.59	8,980.17		101.00		
Refund of Previous Year's Expenditure	22,357.55					
Miscellaneous	417.40	4,628.28	.14	8,169.37	3,674.36	3,688.48
	342,245.46	133,946.34	.14	25,842.53	10,963.19	14,555.29

BY PROVINCES 1961-62

Quebec	Ontario	Central General	Manitoba	Saskat-chewan	Alberta	British Columbia	Yukon Territory	Northwest Territories	Total
$	$	$	$	$	$	$	$	$	$
.....	.....	.....	.....	.....	.....	.....	.....	.....	17,000.00
.....	.....	.....	.....	.....	.....	.....	.....	.....	453,508.64
.....	.....	694.42	.....	.....	.....	9,690.03	.....	.....	216,412.62
.....	.....	.....	.....	.....	.....	81,295.97	.....	.....	309,389.93
.....	47,148.31	.....	.....	.....	.....	1,348.27	.....	.....	690,126.43
38,725.10	.....	.....	.....	.....	.....	.....	.....	.....	159,998.00
35,399.71	6,667.50	40,226.52	25.61	1,020.65	.....	247,531.59	.....	14,326.60	860,258.36
1,190.58	.....	1,673.33	.....	.....	.....	2,514,436.16	29,393.19	67,494.63	6,158,057.41
.....	.....	.....	.....	.....	.....	1,100,779.24	3,492.59	7,309.31	2,235,425.54
229,909.37	110,248.63	3,821.99	107,032.30	35,008.33	24,505.03	173,156.80	.....	60,177.99	2,277,243.53
35,055.40	10.00	.....	.....	.....	.....	55,879.63	.....	.....	240,111.90
.....	.....	.....	.....	.....	.....	554,539.90	.....	.....	1,070,956.59
.....	.....	.....	.....	.....	.....	106,261.48	.....	.....	106,261.48
.....	.....	.....	.....	.....	.....	.....	.....	.....	449,568.96
27,096.59	.....	.....	.....	.....	.....	8,731.68	.....	.....	106,482.32
.....	.....	.....	.....	.....	.....	.....	.....	.....	60,705.52
29,769.98	.....	.....	.....	.....	.....	.....	.....	.....	562,460.81
.....	.....	.....	.....	.....	.....	.....	.....	.....	302,130.95
.....	.....	.....	.....	.....	.....	.....	.....	.....	3,675.00
.....	.....	.....	.....	.....	.....	147,714.99	.....	.....	147,714.99
.....	.....	.....	.....	.....	.....	.....	.....	.....	266,632.23
.....	.....	.....	.....	.....	.....	.....	.....	.....	99,000.00
.....	.....	.....	.....	.....	.....	.....	.....	.....	198,904.33
152,557.76	226,161.40	.....	48,191.83	.....	.....	1,870,701.38	.....	42,143.98	4,577,821.55
5,769.05	4,614.38	.....	1,359.29	.....	.....	1,293,634.92	.....	1,286.87	1,528,034.70
555,473.54	394,850.22	46,416.26	156,609.03	36,028.98	24,505.03	8,165,702.04	32,885.78	192,739.38	23,097,881.79

BY PROVINCES 1961-62

Quebec	Ontario	Central General	Manitoba	Saskat-chewan	Alberta	British Columbia	Yukon Territory	Northwest Territories	Total
$	$	$	$	$	$	$	$	$	$
.....	.....	.....	.....	.....	.....	.....	.....	.....	320,463.92
305.25	.....	.....	4.00	.....	.....	44,268.92	11,104.11	11,178.00	116,700.37
.....	7,087.96	.....	.....	.....	.....	4,536.03	.....	.....	116,849.59
.....	22,552.67	.....	.....	.....	.....	7,174.15	.....	.....	38,814.58
.....	.....	.....	.....	.....	.....	.....	.....	.....	22,357.55
.....	355.00	.....	.....	19.82	.....	32,459.42	81.05	97.88	53,591.20
305.25	29,995.63	.....	4.00	19.82	.....	88,438.52	11,185.16	11,275.88	668,777.21

61925-4—9

APPENDIX 2

FISH CULTURE DEVELOPMENT STATEMENTS, 1961

61925–4—9½

FISH DISTRIBUTED BY SPECIES 1961

Species	Fry	Advanced fry	Fingerlings	Yearlings and Older	Total Distributions
Salmo salar—Atlantic salmon	178,740	2,674,880	8,863,290	600,790	12,317,700
Salmo trutta—Brown trout	.....	.....	2,410,590	7,600	2,418,190
Salmo gairdneri—Rainbow trout	.....	36,000	324,290	19,230	397,520
Salmo salar sebago—Sebago salmon	18,330	.....	72,220	.....	90,550
Salvelinus fontinalis—Speckled trout	22,000	1,547,600	18,056,190	138,360	19,764,150
Salvelinus namaycush—Lake trout	.....	.....	30,000	.....	30,000
	219,070	4,258,480	29,774,580	765,980	35,018,110

DISTRIBUTIONS BY PROVINCES 1961

Fry, Fingerlings, Yearlings and Older Fish

Province	Fry	Advanced fry	Fingerlings					Yearlings and Older	Total Distribution	
			No. 1	No. 2	No. 3	No. 4	No. 5		By Species	By Province
NOVA SCOTIA—										
Atlantic salmon	138,740	217,280	2,093,760	444,700	628,670	38,000	122,040	269,380	3,952,570	
Brown trout	.....	.....	808,190	753,990	292,130	71,240	112,240	7,600	2,045,390	
Rainbow trout	.....	36,000	90,000	65,410	30,000	41,300	14,220	7,190	284,120	
Sebago salmon	18,330	.....	.....	.....	.....	.....	.....	.....	18,330	
Speckled trout	2,000	61,600	4,666,030	3,071,840	1,233,290	479,480	215,270	108,860	9,838,370	
	159,070	314,880	7,657,980	4,335,940	2,184,090	630,020	463,770	393,030	16,138,780	16,138,780
NEW BRUNSWICK—										
Atlantic salmon	40,000	2,457,600	3,049,320	1,081,320	982,900	300,160	.....	323,210	8,234,510	
Brown trout	.....	.....	60,000	300,000	12,800	.....	.....	.....	372,800	
Lake trout	.....	.....	30,000	.....	.....	.....	.....	.....	30,000	
Rainbow trout	.....	.....	39,810	.....	13,550	.....	.....	8,340	61,700	
Sebago salmon	.....	.....	36,140	.....	36,080	.....	.....	.....	72,220	
Speckled trout	20,000	1,479,000	4,728,500	2,220,520	654,730	307,700	37,830	24,800	9,473,080	
	60,000	3,936,600	7,943,770	3,601,840	1,700,060	607,860	37,830	356,350	18,244,310	18,244,310
PRINCE EDWARD ISLAND—										
Atlantic salmon	.....	.....	.....	.....	122,420	.....	.....	8,200	130,620	
Rainbow trout	.....	.....	.....	.....	4,000	44,000	.....	3,700	51,700	
Speckled trout	.....	7,000	4,000	.....	168,000	263,100	5,900	4,700	452,700	
	.....	7,000	4,000	.....	294,420	307,100	5,900	16,600	635,020	635,020
TOTALS	219,070	4,258,480	15,605,750	7,937,780	4,178,570	1,544,980	507,500	765,980	35,018,110	35,018,110

CO-OPERATIVE OR SPECIAL TRANSFERS AND STOCK SUPPLIED FOR SCIENTIFIC INVESTIGATIONS

Species	From	To	Number	Details	Date
Atlantic Salmon.....	Cobequid Fish Culture Station.....	Fisheries Research Board.....	20,700	Yearlings	June 10–24
	Grand Lake Fish Culture Station.....	Fisheries Research Board.....	6	Adult	Nov. 15
	Kejimkujik Fish Culture Station.....	Nova Scotia Department of Lands and Forests, Charleston Ponds.....	300,000	Fingerlings	June 1–5
	Margaree Fish Culture Station.....	Memorial University, St. John's, Nfld.....	600	Fingerlings	Apr. 18–May 9
	Florenceville Fish Culture Station.....	University of New Brunswick, Fredericton.....	800	Fry	June 15
	Florenceville Fish Culture Station.....	University of New Brunswick, Fredericton.....	3,000	Fingerlings	July 8–Dec. 1
	Florenceville Fish Culture Station.....	University of New Brunswick, Fredericton.....	800	Yearlings	June 15–July 15
	Florenceville Fish Culture Station.....	Department of Fisheries.....	2,575	Yearlings	May 25–July 3
	Miramichi Fish Culture Station.....	Jasper National Park, Jasper, Alta.....	105,300	Eyed eggs	Mar. 11
	Miramichi Fish Culture Station.....	Banff National Park, Banff, Alta.....	257,400	Eyed eggs	Mar. 11
	Miramichi Fish Culture Station.....	New York Conservation Department, Gansevoort.....	304,200	Eyed eggs	Mar. 14
	Miramichi Fish Culture Station.....	Vermont Fish and Game Service, Montpelier.....	202,800	Eyed eggs	Mar. 14
	Miramichi Fish Culture Station.....	U.S. Fish and Wildlife Service, Craig Brook, Maine.....	202,800	Eyed eggs	Mar. 16
	Miramichi Fish Culture Station.....	U.S. Fish and Wildlife Service, Augusta, Maine.....	50,700	Eyed eggs	Mar. 16
	Miramichi Fish Culture Station.....	Department of Fisheries.....	771	Yearlings	May 27–Oct. 9
	Miramichi Fish Culture Station.....	U.S. Fish and Wildlife Service, Craig Brook, Maine.....	501,600	Eyed eggs	Oct. 27
Brown trout.....	Bedford Fish Culture Station.....	Memorial University, St. John's, Nfld.....	100	Eyed eggs	Jan. 9
Lake trout.....	Vermont Fish and Game Service.....	Middleton Fish Culture Station.....	100,000	Eyed eggs	Nov. 13
	New York Conservation Department, Crown Point.....	Grand Falls Fish Culture Station.....	196,473	Eyed eggs	Nov. 8
Rainbow trout.....	New York Conservation Department, Crown Point.....	Antigonish Fish Culture Station.....	100,000	Eyed eggs	Feb. 2
	U.S. Fish and Wildlife Service, Lamar, Pa....	Antigonish Fish Culture Station.....	150,120	Eyed eggs	Oct. 21
	New York Conservation Department, Crown Point.....	Cobequid Fish Culture Station.....	100,000	Eyed eggs	Feb. 2
	U.S. Fish and Wildlife Service, Lamar, Pa....	Cobequid Fish Culture Station.....	101,000	Eyed eggs	Oct. 21
	U.S. Fish and Wildlife Service, Lamar, Pa....	Lindloff Fish Culture Station.....	100,965	Eyed eggs	Oct. 21
	U.S. Fish and Wildlife Service, Wytheville, Va.	Lindloff Fish Culture Station.....	112,000	Eyed eggs	Nov. 22
	Department of Northern Affairs and National Resources.....	Margaree Fish Culture Station.....	100,450	Eyed eggs	May 12
	U.S. Fish and Wildlife Service, Cortland, N.Y.	Middleton Fish Culture Station.....	100,000	Eyed eggs	Feb. 2
	U.S. Fish and Wildlife Service, Lamar, Pa....	Middleton Fish Culture Station.....	155,000	Eyed eggs	Oct. 19
	Saint John Fish Culture Station.....	Yukon Fish and Game Association, Whitehorse.....	250,000	Eyed eggs	May 27
	Cardigan Fish Culture Station.....	Fisheries Research Board.....	500	Adult	Sept. 19
	Cardigan Fish Culture Station.....	Fisheries Research Board.....	150	Fingerlings	Nov. 29
Speckled trout.....	Antigonish Fish Culture Station.....	Dalhousie University, Halifax, N.S.....	41	Yearlings	Aug. 10–Sept. 4
	Antigonish Fish Culture Station.....	Dalhousie University, Halifax, N.S.....	2	2 years	Sept. 4
	Antigonish Fish Culture Station.....	Nova Scotia Department of Lands and Forests, Moser River Ponds.....	275,630	Fingerlings	July 19–Oct. 4
	Bedford Fish Culture Station.....	Memorial University, St. John's, Nfld.....	100	Eyed eggs	Jan. 9
	Margaree Fish Culture Station.....	Nova Scotia Department of Lands and Forests, Moser River Ponds.....	32,000	Fingerlings	Sept. 26–29
	Florenceville Fish Culture Station.....	Department of Fisheries.....	400	Yearlings	June 5
	Florenceville Fish Culture Station.....	University of New Brunswick, Fredericton.....	100	Fingerlings	Oct. 23
	Florenceville Fish Culture Station.....	University of New Brunswick, Fredericton.....	5	Yearlings	Oct. 23
	Miramichi Fish Culture Station.....	Department of Fisheries.....	305	Fry	June 6
	Cardigan Fish Culture Station.....	Fisheries Research Board.....	900	Adult	Sept. 20
	Cardigan Fish Culture Station.....	Fisheries Research Board.....	2,000	Fingerlings	Nov. 29

COLLECTION AND DISPOSAL OF EGGS BY SPECIES 1961

Species	Collection Area	Egg Collecting Period	Number Collected	Disposal-Establishment at	Date Eggs Received	Number	Total by Species
Atlantic Salmon	Margaree Station, N.S.	Nov. 6–27	1,949,030	Margaree	Nov. 6–27	1,949,030	
	River Philip, N.S.	Nov. 8–27	3,707,440	Cobequid	Nov. 8–27	2,507,440	
				Kejimkujik	Nov. 14–16	1,200,000	
	Miramichi Pond, N.B.	Oct. 24–Nov. 13	9,749,600	Antigonish	Oct. 30	501,600	
				Florenceville	Oct. 30	902,000	
				Grand Falls	Nov. 1	903,000	
				Miramichi	Oct. 24–Nov. 13	6,941,400	
				Craig Brook, Maine	Oct. 26	501,600	
	New Mills Pond, N.B.	Oct. 23–Nov. 11	2,668,420	Charlo	Oct. 23–Nov. 11	2,668,420	
	Restigouche River, N.B.	Oct. 30–Nov. 9	135,300	Charlo	Oct. 30–Nov. 9	135,300	
	Saint John Ponds, N.B.	Oct. 30–Nov. 9	499,750	Saint John	Oct. 30–Nov. 9	499,750	18,709,540
Brown Trout	Antigonish Ponds, N.S.	Nov. 6–27	188,140	Antigonish	Nov. 6–27	188,140	
	Cobequid Ponds, N.S.	Oct. 30–Nov. 7	409,360	Cobequid	Oct. 30–Nov. 7	409,360	
	Kejimkujik Ponds, N.S.	Nov. 9–24	13,500	Kejimkujik	Nov. 9–24	13,500	
	Lindloff Ponds, N.S.	Oct. 26–Dec. 7	1,623,190	Lindloff	Oct. 26–Dec. 7	1,623,190	
	Yarmouth Ponds, N.S.	Oct. 24–Dec. 4	2,307,900	Yarmouth	Oct. 24–Dec. 4	2,307,900	4,542,090
Rainbow Trout	Lindloff Ponds, N.S.	Apr. 13–May 15	388,450	Lindloff	Apr. 13–May 15	388,450	
	Saint John Ponds, N.B.	May 4–9	435,880	Saint John	May 4–9	435,880	824,330
Sebago Salmon	Chamcook Lake, N.B.	Nov. 13–25	130,500	Saint John	Nov. 13–25	130,500	
	Palfrey Lake, N.B.	Nov. 2–14	36,890	Florenceville	Nov. 2–14	36,890	167,390
Speckled Trout	Antigonish Ponds, N.S.	Nov. 2–20	6,947,660	Antigonish	Nov. 2–20	6,947,660	
	Cobequid Ponds, N.S.	Oct. 25–Nov. 14	3,716,550	Cobequid	Nov. 1–14	2,216,550	
				Yarmouth	Oct. 25–Nov. 1	1,500,000	
	Lindloff Ponds, N.S.	Nov. 10–Dec. 7	4,235,580	Lindloff	Nov. 10–Dec. 7	4,235,580	
	Margaree Ponds, N.S.	Nov. 6–27	5,833,030	Margaree	Nov. 6–27	3,824,430	
				Middleton	Nov. 6–14	2,008,600	
	Florenceville Ponds, N.B.	Oct. 17–Nov. 6	2,862,800	Florenceville	Oct. 17–Nov. 6	1,909,600	
				Grand Falls	Oct. 17–30	953,200	
	Grand Falls Ponds, N.B.	Oct. 25–Nov. 7	369,960	Grand Falls	Oct. 25–Nov. 7	369,960	
	Saint John Ponds, N.B.	Oct. 27–Nov. 22	7,190,750	Saint John	Oct. 27–Nov. 22	7,190,750	31,156,330
							55,399,680

DISTRIBUTIONS

Key to Abbreviations

Species

- A Atlantic salmon
- B Brown trout
- C Arctic char
- G Lake trout
- L Landlocked or Sebago salmon
- R Rainbow trout
- S Speckled trout

Stages of Development

- a Green eggs
- b Eyed eggs
- c Fry
- d Advanced fry
- 1 No. 1 fingerlings
- 2 No. 2 fingerlings
- 3 No. 3 fingerlings
- 4 No. 4 fingerlings
- 5 No. 5 fingerlings
- f Yearlings
- g Two years
- h Three years
- k Older fish

Classifications

Advanced Fry: Fish for a period of two weeks following complete absorption of the yolk sac.

Fingerlings:

- No. 1 From two to eight weeks after complete absorption of the yolk sac.
- No. 2 From eight to fourteen weeks after complete absorption of the yolk sac.
- No. 3 From fourteen to twenty weeks after complete absorption of the yolk sac.
- No. 4 From twenty to twenty-six weeks after complete absorption of the yolk sac.
- No. 5 From twenty-six weeks to one year from date of hatch.

61925–4—10

Distribution Statements By Fish Culture Stations

NOVA SCOTIA

Antigonish Fish Culture Station

Antigonish County—
Afton River—
Delhanty's Lake—5,160 S2.
Merland Lake—2,580 S2.
Lochaber Lake—38,700 S2, 650 S4, 1, 200 Sf.
MacMillan Lake—6,800 S2.
Middleton Lake—6,000 S2.
Stewarts Pond—5,000 S2.
Maryvale Brook—1,000 S3.
Monastery River—
Ash Lake—500 S2, 900 S3.
Linwood Lake—6,000 S2, 900 S3.
Monastery Pond—500 S2.
North Lake—1,000 S3, 450 Sg.
North River—600 S3.
Pomquet River—
Black River—2,580 S2.
Glenroy River—6,000 S2.
Springfield Brook—5,000 S2.
Rights River—2,000 S2.
Clydesdale Brook—2,000 S2.
South River—1,200 B4.
MacDonald Lake—9,675 S2, 200 Sg.
MacGillvrays Lake—1,800 S2, 100 Sf.
Pinevale Lake—9,675 S2, 200 Sg.
Polson Brook—5,000 S2.
South River Lake—260 Bg, 19,350 S2, 900 S3, 1,200 Sf.
Copper Lake—5,000 S2, 325 S4.
Grants Lake—5,000 S2.
MacKinnons Lake—4,000 S2.
West River—450 Sg.
Brierly Brook Lake—4,000 S2, 1,000 S3.
Cameron Lake—1,800 S2.
Gaspereaux Lake—11,100 S2, 146 Sg.
MacLean Lake—4,000 S2.
Mooney Lake—3,000 S2.
St. Joseph Lake—9,300 S2, 100 Sg.
Thompsons Lake—5,800 S2.

Guysborough County—
Bear Lake—5,950 S2.
Coddles Harbour—
Coddles Harbour System—22,000 S2.
Eastern Brook—21,000 S2.
Goose Lake—6,000 S2.
Long Lake—7,000 S2.
Sister Lakes (2)—7,000 S2.
Cole Harbour—
Cooee Coffre Lake—7,000 S2.
Dobson Lake—7,000 S2.
Cooper's Lake—5,000 S2.
Country Harbour River—25,000 Ad, 4,000 Af, 450 Sg.
Chain Lake—5,000 S2.
Christie Lake—5,000 S2.
Country Harbour Lake—7,000 S2. 900 S3.
Davies Lake—5,000 S2.
Dummy Lake—10,000 S2.
Eight Island Lake—5,000 S2, 1,000 S3.
Frog Lake—7,000 S2.
Goshen Lake—5,000 S2, 1,000 S3, 325 S4.
Grassy Lake—9,000 S2, 900 S3.
Horahan Lake—10,000 S2, 1,000 S3.
Hurley Lake—900 S3, 300 Sf.
Jones Lake—7,000 S2.
Letter "G" Lake—5,000 S2.
Mells Lake—10,000 S2, 900 S3.
Mills Lake—3,000 S2.
Polson Lake—11,000 S2.
Pringle Lake—19,350 S2, 325 S4, 600 Sf, 185 Sg.
Shingle Lake—7,000 S2.
Tate Lake—6,000 S2.
Trout Lake—6,000 S2.
Dover Bay—
Hazel Hill Lake—7,000 S2.
Three Mile Lake—7,000 S2.
Watkins Lake—7,000 S2.
Whistle Lake—7,000 S2.
Ecum Secum River—30,000 A1, 6,000 Af.
Ash Lake—6,000 S2.
Spider Lake—6,000 S2.
West River Lakes—6,000 S2.
Fishermans Harbour Lake—7,000 S2.
Gegoggin Lake—5,950 S2.
Guysboro River—9,030 B4.
Cudahy Lake—5,000 S2.
Donahue Lake—12, 640 S2, 1,550 Sf.
First Pond—2,580 S2.
Fougere Lake—5,000 S2.
Second Pond—2,580 S2.
Toms Lake—7,740 S2, 1,000 S3.
Trout Lake—5,000 S2.
Meaghers Lake—6,000 S2.
Nickerson Lake—6,000 S2.
Simpson Lake—2,580 S2, 900 S3.
Harts Lake—2,580 S2.
Hawbolt Lake—6,000 S2.
Indian Harbour—
Indian Harbour Lakes—8 Bg, 8 Sg.
Indian Lakes—5,000 S2.
Isaacs Harbour River—25,000 A1, 4,000 Af.
Kavaughner Lake—3,500 S2.
Leonard Lake—5,160 S2.
Liscomb River—14,000 A1, 6,000 Af.
Gaspereaux Brook—16,000 A1.
Hardwood Lake—1,000 S2.
Smith Lake—1,000 S2.
Whidden Lake—1,000 S2.
Louse Lake—6,000 S2.
MacPherson Lake—900 S3, 600 Sf.

Guysborough County—cont.
Manassette Lake—5,160 S2.
Mattie Lake—5,160 S2. 900 S3.
Morrison Lake—6,000 S2, 900 S3, 450 Sg.
New Harbour—
Canter Lake—5,000 S2, 1,000 S3.
Canter Pond—3,000 S2.
First Lake—6,000 S2.
New Harbour River—25,000 A1.
Peasbrook Lake—3,500 S1.
Port Hilford Brook—4,000 S2.
St. Mary's River—
Archibald Brook—4,480 S2, 818 Sf.
Archibald Lake—6,000 S2.
Birch Brook Lake—4,000 S2.
Cameron Lake—600 Sf.
Cargill Lake—1,000 S3.
Demmons Lake—1,800 S2, 450 Sg.
East River—60,000 Ad, 25,000 A1, 16,000 Af.
Cumminger Lake—300 Sf.
Melrose Lake—300 Sf.
Murray Lake—1,000 S3.
North West Arm Lakes—1,350 S2.
Taylors Lake—500 S3.
Two Mile Lake—15,480 S2, 325 S4, 600 Sf.
Elbow Lake—4,000 S2.
Glencross Lake—4,000 S2.
Kirk Lake—6,000 S2.
Little Lake—2,250 S2.
Long Lake—4,000 S2.
MacDonald Lake—7,000 S2.
MacIntosh Lake—3,000 S2.
MacKeen Lake—7,000 S2.
MacLeod Lake—3,600 S2.
MacMullin Lake—7,000 S2.
Murray Lake—5,000 S2.
North Lake—1,350 S2.
Scanlon Brook—5,000 S2.
Sherbrooke Lake—8,000 S2, 600 Sf.
Square Lake—7,000 S2.
Taylor Lake—5,000 S2.
Trout Lake—6,000 S2.
Twin Oak Lakes—4,000 S2.
West River—60,000 Ad, 25,000 A1, 12,434 Af.
Salmon River—5,880 B4.
Beaver Dam Lake—900 S3, 300 Sf.
Bordens Lake—11,000 S2, 1,000 S3.
Charley Lake—9,580 S2.
Cross Lake—750 S4.
Desbarres Lake—3,000 S2.
Eastern Pond—2,000 S2.
Frasers Lake—1,800 S2.
Gearys Lakes—5,160 S2.
Glencove Lake—5,000 S2.
Grants Lake—3,000 S2.
Hardwood Lake—600 S4.
Harts Lake—1,670 S2.
Island Lake—750 S4.
Kellys Lake—2,580 S2.
Lawlor Lake—1,000 S2, 750 S3, 1,400 Sf.
Long Lake—6,800 S2, 900 S3.
Millers Lake—2,000 S2.
Narrow Lake—4,000 S2.
North Branch Lake—2,000 S2.
Priests Lake—8,000 S2, 1,000 S3.
Quirks Lake—1,800 S2.
Rocky Lake—1,670 S2.
Ross Lake—2,580 S2.
Round Lake—11,160 S2.
Square Lake—1,800 S2.
Susie Lake—2,580 S2.
Three Corner Lake—2,000 S2.
Western Pond—2,000 S2.
Whites Lake—1,800 S2.
Seal Harbour—
Goldbrook Lake—7,000 S2.
Seal Harbour Lake—7,000 S2.
Shepherds Lake—6,000 S2.
South River—
Giants Lake—31,000 R2.
Kennedy Lake—5,000 S2.
McInnis Lake—3,000 S2.
Sullivan Lake—5,000 S2.
Sundown Lake—2,580 S2.
Tracadie River—7,000 S2.

Halifax County—
Moser River—
Bear Lake—18,000 S1.
Kellys Lake—30,000 R3.
Kinderwater Lake—18,000 S1.
Round Lake—4,000 S1.
Musquodoboit River—192,320 A1.
Dollar Brook—55,260 A1.
Gibraltar Brook—59,640 A1.
Gleason Brook—32,120 A1.
Plaster Brook—32,120 A1.
West River—15,000 A1.

Pictou County—
Caribou River—
Barrie Dam—3,600 S2.
Cole Pond—1,800 S2.
English Pond—1,800 S2.
Graham Pond—1,800 S2.
Peterson Pond—1,800 S2.
Chance Harbour Lake—450 Sg.
East River—3,225 S2.
Beaver Lake—2,960 S2.
Burrough Lake—5,160 S2.
Calder Lake—6,450 S2, 1,400 S3, 500 Sf.
Grant Lake—3,225 S2, 1,300 S3, 500 Sf.
Hunter Lake—3,000 S2.
Kittle River—2,960 S2.
McKinnon Lake—5,000 S2.
MacLean Lake—3,225 S2, 1,300 S3.
McLellan Brook—3,225 S2.
McPherson Lake—4,000 S2, 1,400 S3.
Smith Lake—4,800 S2.
Spaid Lake—1,500 S2.
Sutherland Lake—2,960 S2.
Taylor Lake—6,000 S2.
West Branch Lake—6,960 S2.
Wood Lake—2,000 S2.
Eden Lake—9,160 S2.
Jocks Lake—5,160 S2.

61925-4—10½

Antigonish Fish Culture Station—Conc.

Pictou County—conc.
Merrigomish Harbour—
Barney River—6,330 B2, 2,940 B4, 7,860 S2.
Brora Lake—5,400 S2.
Indian Lake—2,000 S2.
Malcomn Lake—2,700 S2.
Robertson Lake—5,400 S2.
French River—6,330 B2, 2,580 S2.
Sutherland River—6,330 B2, 2,940 B4, 5,160 S2.
Middle River—1,300 S2.
Gairloch Lake—2,580 S2.
Hood Lake—1,500 S2.
River John—5,400 S2.
West Branch—5,400 S2, 500 Sf.
Toney River—450 Sg.

Atlantic Salmon	739,894
Brown Trout	41,248
Rainbow Trout	61,000
Speckled Trout	1,091,627
Total	1,933,769

Bedford Fish Culture Station

Colchester County—
De Bays Pond—4,000 Sd.

Halifax County—
Alma Lake—9,600 Sd.
Black Brook—9,600 Sd.
Chezzetcook River—13,482 Ad.
East River—
Anti-Dam Lake—9,600 Sd.
Cruikshank Lake—9,600 Sd.
Echo Lake—6,200 S1.
Gammon Lake—6,200 S1.
Hubbards River—13,440 A1.
Ingram River—13,440 Ad.
Lily Lake—19,200 Sd.
Misener Lake—6,200 S1.
Musquodoboit River—
Dollar Brook—70,000 Ac.
Gibraltar Lake—6,200 S1.
Higgens Lake—6,200 S1.
Mill Lake—6,200 S1.
Nine Mile River—13,440 Ad.
Pennant River—
Grand Lake—9,300 S1.
Hatchet Lake—9,300 S1.
Moody Lake—6,200 S1.
Porters Lake—
Cow Bay Lake—6,200 S1.
Snow Lake—6,200 S1.
Queens Land Lake—6,200 S1.
Sackville River—13,440 Ad.
Barretts Lake—9,300 S1.
Lewis Lake—9,300 S1.
Little Sackville River—68,741 Ac.
Snair Lake—6,200 S1.
Williams Lake—9,300 S1.

Hants County—
Coxcomb Lake—6,200 S1.
Kennetcook River—13,482 Ad.
Lewis Lake—18,332 Lc, 6,200 S1.
Long Lake—8,700 S1.
Piggot & Lily Lake—6,200 S1.

Lunenburg County—
East River—15,360 A1.
Collander Lake—6,200 S1.
Little Whitford Lake—6,200 S1.
Eisnor Lake—6,200 S1.
Hutts Lake—6,200 S1.
Mahone Bay—
Gold River—23,040 A1.
Clarke Lake—6,200 S1.
Martins River—13,440 A1.
Spondo Lake—6,200 S1.
Mushamush River—13,440 A1.
Middle River—8,960 B1.

Atlantic Salmon	284,745
Brown Trout	8,960
Sebago Salmon	18,332
Speckled Trout	240,800
Total	552,837

Cobequid Fish Culture Station

Colchester County—
Bass River—15,000 S1, 5,000 S2.
British Lake—500 Sf.
Silica Lake—9,000 S1.
Bass River of Five Islands—20,000 S1, 3,500 S2.
Bowers Pond—4,000 S1.
Chiganois River—30,000 S1.
Black Lake—6,000 S3.
Clear Lake—4,000 S3.
Farm Lake—9,000 S2.
Galloping Brook—12,500 S1, 4,000 S3, 500 Sf.
Guyons Lake—5,000 S2.
Whippy Lake—10,000 S2.
East River at Five Islands—8,000 S1, 5,000 S2.
Beaver Brook—12,000 S1.
Economy River—18,000 A2.
Economy Lake—30,000 S1, 25,000 S2, 12,000 S3.
Moose Lake—2,000 S2.
Newton Lake—20,000 S1, 25,000 S2, 10,000 S3.
Simpson Lake—48,000 S1, 22,000 S2, 500 Sf.
Folly River—15,000 S1, 15,000 S2.
Folly Lake—25,000 S1, 15,000 S2, 12,000 S3,1,600 Sf.
French River—25,000 S1, 10,000 S2.

Cobequid Fish Culture Station—Conc.

Colchester County—conc.
Hart Lake—26,000 S1, 4,000 S2.
Irving Lake—4,500 S3.
Irwin Lake—6,000 S2.
Jenks Brook—10,500 S2.
North River—25,000 A3, 9,000 S3.
North River, South Branch—8,000 S3.
Portapique River—22,000 A3, 25,000 S1, 11,000 S2.
Raynor Gravel Pit—2,000 S2.
Salmon River—27,000 A3.
Earltown Lake—12,000 S2. 1,000 Sf.
Proudfoot Lake—2,500 S3.
Truro Gravel Pit—200 Sf, 100 Sh.
Shatter Lake—4,500 S3.
Snare Lake—5,000 S3.
Stewiacke River—
Deyarmonds Lake—18,500 S1.
Twin Lake—4,000 S1.
Little River—5,000 S2.
Trenholm Pond—2,000 S2.
Moose Lake—13,500 S2.
Waughs River—60,000 B1, 28,000 B2, 39,400 B3.
West Lake—7,500 S2.

Cumberland County—
Apple River—25,000 A3, 12,000 S2, 6,000 S3.
Dewar Lake—400 Sh.
Fox River—20,000 S1, 5,000 S2.
Hatfield's Pond—1,500 S3.
Lake Killarney—400 Sh.
Maccan River—22,500 A2, 40,000 A3, 1,000 Sf.
Cleveland Lake—400 Sf.
Fordyce Brook—12,000 S1, 8,000 S3.
Harrison Lake—30,000 B1, 7,500 B2.
Lawrence Brook—17,000 S1, 18,000 S3.
South Brook—8,000 S1, 3,000 S3.
Mattatall Lake—235 Sg.
Parrsboro Aboideau—100 Sf.
Parrsboro River—
Leaks Lake—500 Sf.
McAloney Lake—14,000 S2.
Pont a' Buot Bog—3,500 S2.
Portapique River—
Fountain Lake—18,000 S1, 8,000 S3.
Isaac Lake—15,000 S1, 7,000 S2, 4,000 S3, 750 Sf.
Newfound Lake—10,000 S1, 10,000 S2, 4,000 S3, 700 Sf.
Little Lake—4,000 S1, 2,000 S3.
Otter Lake—3,500 S2.
Sutherland Lake—25,000 S1, 37,500 S2, 2,000 Sf.
Webb Lake—3,600 S2.
Pugwash River—10,000 S1.
Victoria Lake—400 Sh.
Ramshead River—18,000 S1, 5,000 S2.
Ramshead Lake—11,000 S2.
River Hebert—18,000 S1, 9,000 S2, 14,500 S3.
Gilbert Lake—500 Sf.
Halfway River Lake—400 Sh.
River Philip—100,000 A1, 38,974 A3, 20,000 S3, 72 Sh.
Black River—21,000 S1.
Little River—5,000 S2.
Mountain Brook—15,000 S1, 6,000 S2, 4,500 S3.
Polly Brook—10,000 S1.
Sugarloaf Brook—18,000 S1, 7,000 S2, 4,500 S3.
Tillies Creek—15,000 S1.
West Branch—18,000 S1, 9,000 S2, 18,500 S3.
Shinimicas River—20,000 A3, 25,000 S1, 13,000 S2.
Smiths Pond—1,000 S2.
Tidnish River—20,000 S1, 10,000 S2, 6,000 S3.
Wallace River—50,000 A3, 95,000 S1, 59,000 S2
49,000 S3, 1,500 Sf.
Barbour Lake—3,000 S2
West Branch—30,000 S1, 37,000 S2.

Westmorland County—
Bulmer Pond—8,000 S2.
Palmers Pond—7,500 S2, 12,000 S3.
Silver Lake—20,000 S1, 20,000 S2, 10,000 S3, 1,500 Sf.
Calhouns Brook—10,000 S2.
Tantramar River—
Big Lake (Jolicure)—700 Sf.
Carters Brook—5,500 S2.
North Brook—3,500 S2.
Robinson Brook—20,000 S1, 5,000 S2.
Clarklyn Brook—10,000 S2.
Wards Pond—5,000 S2.

Atlantic Salmon	388,474
Brown Trout	164,900
Speckled Trout	1,690,557
Total	2,243,931

Coldbrook Fish Culture Station

Annapolis County—
Annapolis River—16,700 Af.

Digby County
Mistake River—1,400 Sf.

Halifax County—
Baker Lake—525 S3.
Beaver Harbour Lake—1,000 Sf.
Bissets Lake—1,550 S4.
Black Duck Run—2,625 S4.
Brine Lake—25,700 S1.
Chezzetcook River—5,320 Af.
Conrad Lake—2,625 S4.
Gammon Lake—500 Sf.
Goose Lake—500 Sf.
Grassy Lake—1,750 S3.
Harnish Lake—1,050 S3.
Hartling Lake—1,000 Sf.

Halifax County—Conc.
Hosier River—3,500 S1.
Five Island Lake—5,000 S1.
Fraser Lake—3,000 S1.
Long Lake—2,000 Sf.
Sheldrake Lake—1,000 Sf.
Hubbards River—
Dorey Lake—1,300 S4.
Kip Hill Lake—1,050 S3, 1,000 Sf.
Quack Lake—1,050 S3.
Skinner Lake—1,050 S3.
Vinegar Lake—1,050 S3.
Ingram River—7,600 Af.
Lake Charlotte—2,000 Sf.
McEwan Lake—300 S4.
MacKeen Lake—300 S4.
Moser River—84,000 S2.
Bear Lake—500 Sf.
Kindervater Lake—500 Sf.
Mill Lake—1,000 Sf.
Musquodoboit River—10,640 Af.
Cooks Lake—1,000 Sf.
Pace Lake—1,000 Sf.
Rocky Lake—2,000 Sf.
Nine Mile River—2,000 Af.
Cox's Lake—5,000 S1.
Nowlan Lake—1,000 Sf.
Patient Ross Lake—1,000 Sf.
Queens Land Lake—1,325 S4.
Sackville River—4,460 Af.
Lewis Lake—3,620 S4.
Sandy Lake—1,000 Sf.
Scraggy Lake—1,000 Sf.
Spar Lake—1,000 Sf.
Stillwater Lake—1,000 Sf.
Tangier River—
First Lake—1,150 S4.
Forth Lake—1,000 Sf.
Island Lake—1,200 S4.
River Lake—1,000 Sf.
Sluice Lake—1,000 Sf.
West Lake—1,550 S4.
West River—4,460 Af.
Blackie Lake—1,925 S4.
Fish Lake—1,178 S4.
Horseshoe Lake—1,147 S4.
Williams Lake—5,000 S1, 1,100 S4, 1,000 Sf.

Hants County—
Avon River—
Armstrong Lake—4,000 S4.
Card Lake—10,000 S5.
North Canoe Lake—7,000 S4.
Otter Lake—3,500 S4.
Shey Lake—4,000 S4.
Cameron Lake—3,620 S4.
St. Croix River—
Ponhook Lake—20,000 S5, 4,000 Sf.
Uniacke Lake—5,000 S1.
Valley Lake—4,000 S4.

Kings County—
Aylesford Lake—10,320 S4.
Lake George—15,000 S5.
Loon Lake—5,160 S4.
Bass Creek—10,000 S1.
Boylen Pond—1,000 S1.
Canard River—10,000 S1.
Cornwallis River—16,034 B4.
Brandywine Brook—20,052 B1.
McGee Lake—10,320 S4.
Mill Brook—10,000 S1.
Sutton Pond—2,000 S5.
Tupper Lake—10,000 S1, 10,000 S4.
Gaspereau River—6,455 Af.
Murphy Lake—3,620 S4.
North River—10,000 S1.
Sunken Lake—6,600 Rf.
Habitant River—15,000 S1.
LaHave River—
Hardwood Lake—5,160 S3.
Lake Paul Stream—5,160 S3.
Mill Creek—10,000 S1.
Millet Pond—500 S1.
Pereau Creek—15,000 S1.
Porter's Pond—2,000 Sc.

Lunenburg County—
Backman Lake—1,000 Sf.
East River—5,320 Af.
Bezanson Lake—3,500 S4.
Isnor Lake—5,000 S1.
Mill Lake—4,000 S4.
Mountain Lake—1,000 Sf.
Rocky Lake—3,500 S4.
Taylor Lake—5,000 S1.
Timber Lake—1,000 Sf.
Fox Point Lake—1,000 Sf.
Gold River—15,000 Af.
Duck Lake—3,500 S4.
Harris Lake—3,500 S4.
Horseshoe Lake—7,000 S4.
Indian Lake—10,000 S4.
Lake Ramsey—3,500 S4.
Lewis Lake—5,000 S4.
Loon Lake—3,500 S4.
McGinnis Lake—3,500 S4.
Otter Lake—3,500 S4.
Round Lake—5,000 S4.
Seffern Lake—3,500 S4.
Wallaback Lake—7,500 S4.
Western Lake—5,000 S1.
Whelan Lake—3,500 S4.
Gull Lake—3,500 S4.
LaHave River—
Holbert Lake—5,000 S5.
Pear Lake—5,000 S5.
Whetstone Lake—5,000 S5.
Middle River—
Cress Lake—3,500 S4.
Millet Lake—3,500 S4.
Nine Mile River—3,500 S4.
Whitney Lake—3,500 S4.
Mill Lake—2,000 Sf.
Mush-a-mush Lake—5,000 S1.
Spectacle Lake—1,000 Sf.

Atlantic Salmon	77,955
Brown Trout	36,086
Rainbow Trout	6,600
Speckled Trout	546,380
Total	667,021

Grand Lake Fish Culture Station

Halifax County—
Brigley Lake—7,200 S1.
College Lake—9,600 S1.
Conrod Lake—18,200 S1.
Half Mile Lake—1,000 Sf.
Hosier River—
Black Point Lake—1,000 Sf.
Five Island Lake—1,000 Sf.
Lily Lake—6,336 S2.
McGrath Lake—1,000 Sf.
Musquodoboit River—
Grand Lake—1,000 Sf.
Hamiltons Lake—9,600 Sl.
Paper Mill Lake—49 B1.
Quacks Lake—7,200 S1.
Sackville River—5,000 Ad.
Lewis Lake—9,600 S1.
Little Springfield—9,600 S1.
McCabe Lake—10,000 S1.
Sawlor Lake—800 Sf.
Second Beaver Dam—1,000 S4.
Shankle Lake—7,200 S1.
Shubenacadie River—
Grand Lake—35,295 A5, 1,000 Af.
Hamilton Lake—500 Sf.
Lake William—4,552 S2, 500 Sf.
Rassley Lake—5,000 S1.
Tucker Lake—5,000 S1.
Skinner Lake—7,200 S1.
Tangier River—19,200 A1.
Newcomb Brook—19,200 A1.
Vinegar Lake—7,200 S1.

Hants County—
Cameron Lake—9,600 S1.
Kennetcook River—10,000 S1.
Long Lake—1,000 Sf.
Shubenacadie River—
Maitland Pond—5,000 S1.
Withrow Lake—5,000 S1.
West Lake—9,600 S1.

Atlantic Salmon	79,695
Brown Trout	49
Speckled Trout	171,488
Total	251,232

Kejimkujik Fish Culture Station

Annapolis County—
Annapolis River—9,000 A3, 7,000 A5.
Lequille River—10,000 A1, 8,000 A3, 3,500 A4.
Meadowvale—4,095 A4.
Round Hill River—20,000 A1, 8,000 A3, 3,500 A4.
LaHave River—8,200 A3.
Little River—31,500 B2.
Mersey River—58,000 B2.

Kings County—
Annapolis River—31,000 A1, 102,700 A3, 18,828 Af.
Greenwood—4,550 A4.

Lunenburg County—
LaHave River—30,000 A1, 92,000 A2, 90,000 A3, 19,400 A4, 27,000 A5.
North Branch—7,000 A5.
Ohio River—2,955 A4, 28,000 A5.

Queens County—
Kejimkujik Lake—28,000 B2.
Grafton Brook—14,657 B3.

Atlantic Salmon	534,728
Brown Trout	132,157
Total	666,885

Lindloff Fish Culture Station

Cape Breton County—
Bruen Ponds—25,000 S2, 10,000 S4.
Campbell Pond—5,000 S3.
Chain Lake—15,000 S3.
East Bay—
Gillis Lake—10,000 S4.
MacAdam Lake—30,000 S2.
Gabarus Lake—15,000 S3, 10,000 S4, 6,000 S5.
Giant Lake—20,000 S2.
Grand Lake—5,000 S3, 10,000 S4.
Hardys Lake—15,000 S3.
Hub. Dam—5,000 S4.
Jackson Lake—10,000 S3.
Kilkenny Lake—40,000 B1, 35,000 B2, 30,000 B3, 10,000 B5.
Levers Lake—36,005 Rd, 40,000 R1, 7,216 R5.
Long Lake—15,000 S3.
McCuish Lake—10,000 S4.
MacDonald Lake—5,000 S4.
MacInnis Lake—30,000 S2.
MacIntyre Lake—10,000 S4.
MacLeod Lake—5,000 S3.
MacMillan Lake—15,000 S2.
Mira Bay—
Catalone Lake—21,000 S2.
Cochran Lake—10,000 S4.
Loon Lake—25,000 S2.
McCormick Lake—10,000 S3.
MacDonald Pond—5,000 S3.
MacIntyre Lake—10,000 S3.
Mira River—810 Bg.
Cranberry Lake—5,000 S3.
Front Lake—5,000 S3.
Gaspereaux River—25,000 B2, 60,000 B3.
Salmon River—90,000 B1, 200,000 B2, 15,000 B3.
Morrison Lake—5,000 S3.
Pottles Lake—25,000 S2.

Lindloff Fish Culture Station—Conc.

Cape Breton County—Conc.
Power Lake—10,000 S3.
Quarry Ponds—5,000 S3.
Scotch Lake—10,000 S4.
Silver Lake—10,000 S4.
Southwest Brook—50,000 B1, 200 Bg.
Stewart Lake—10,000 S3.
Sydney River—
Blackett Lake—60,000 S1.
Dutch Brook Lake—25,000 S2.
Meadow Brook—90,000 S1.
Wentworth Park—5,000 S3.

Inverness County—
Brawley Lake—5,000 S3.
Johnson Lake—15,000 S1.

Richmond County—
Beaver Lake—10,000 S3.
Black River—40,000 S2, 300 Sg.
Buchanan Lake—10,000 S2.
Bras D'Or Lake—
Lynch River—700 Sg.
MacDonald Lake—20,000 S3, 509 Sg.
Straughton Brook—30,000 S1.
Mackenzie Lake—15,000 S2.
MacNab Lake—5,000 S3.
Mary Ann's Lake—10,000 S2.
Pringle Lake—10,000 S2.
St. George Channel—683 Sg.
Scott Brook—74,000 S1.
Campbell Pond—15,000 S3.
Chain Lake—5,000 S4.
Ferguson Brook—30,000 S1.
Ferguson Lake—30,000 S1, 10,000 S3.
Forrest Lake—15,000 S2.
Framboise River—
Bell Lake—15,000 S2.
Five Island Lake—10,000 S2, 10,000 S3.
Reid's Lake—20,000 S2.
Grand River—20,000 A1, 35,000 Af.
Barren Hill Lake—10,000 S2.
Loch Lomond—30,000 S2, 80,000 S3, 3,000 Sf.
Isle Madame—
Grand Lake—40,000 S2.
Latimore Lake—10,000 S2.
Potties Lake—10,000 S2.
Shaw Lake—15,000 S2.
Landry Lake—10,000 S3.
Mannette Lake—15,000 S3.
River Inhabitants—8,043 Af.
River Tillard—90,000 S1.
Kyte's Lake—24,000 S1.
Lindloff Lake—10,000 R1, 7,000 R5, 425 Rf, 169 Rk.
Mill Lake—15,000 S2, 700 Sg.
Thompson Lake—10,000 S2.

Atlantic Salmon	63,043
Brown Trout	556,010
Rainbow Trout	100,815
Speckled Trout	1,395,892
Total	2,115,760

Margaree Fish Culture Station

Inverness County—
Bras D'Or Lake—
Little Narrows Pond—16,010 S1, 5,000 S3, 544 Sf.
MacKenzie Brook—30,000 S1, 5,000 S3.
Skye Brook—35,000 S1, 5,000 S3.
Brigend Brook—30,000 S1, 5,000 S3.
Cheticamp River—150,000 A1.
Cheticamp Mt. Lake—1,000 Sf.
Corney Brook—1,000 Sf.
Eustabes Pond—400 Sh.
French Mountain Lake—1,000 Sf.
Grand Anse Brook—1,000 Sf.
Grand Etang Brook—40,000 S1.
Hector Lake—7,500 S3.
Horton Lake—15,000 S3.
Lac Du Rosseau—50,000 S1.
Lewis Brook—169 Sf.
MacIntyre Lake—7,500 S3.
MacKenzie Mountain Lake—1,000 Sf.
Margaree River—2,990 Ag.
Gallant Brook—40,000 S1, 12,000 S4.
Northeast Margaree—20,000 A2.
Big Brook—48,000 S1.
Egypt Brook—40,000 S1, 200 Sf, 212 Sg.
Forest Glen Brook—50,000 S1, 12,393 S4, 300 Sf.
Hatchery Pool—2,000 Af.
Ingraham Brook—50,000 A1, 12,000 A5, 40,000 S1, 15,000 S3, 277 Sg, 78 Sh.
MacLeod Brook—20,000 S1.
Lake O Law Brook—150,000 A1, 35,000 S1.
Lake O Law Lake—72,000 S1, 600 Sf, 200 Sg.
Lake O Law Lake (Lower)—64,000 S1.
Lake O Law Lake (Upper)—64,000 S1.
Levis Brook—35,000 S1, 200 Sf.
Marsh Brook—40,000 S1, 200 Sf.
Mill Brook—223 Sg.
Murray Brook—30,000 S1, 5,000 S4.
Salt Brook—30,000 S1.
Stewart Brook—20,000 S1, 5,000 S4.
Watson Brook—30,000 S1.
Scotch Hill Brook—20,000 S1.
Southwest Margaree River—
Captain Allan's Brook—48,000 S1.
Collins Brook—40,000 S1.
MacDonnell Brook—240 Sf.
McGinnis Brook—116 Sf.
Mull River—100,000 A1.
Pembroke Lake—15,000 S3.
Plateau Brook—40,000 S1.
Presquile Lake—10,000 R1.
River Denys—50,000 S1.
Big Brook—45,000 S1.
Glen Brook—40,000 S1, 10,000 S4.

Margaree Fish Culture Station—Conc.

Inverness County—Conc.
River Inhabitants—5,000 S3.
McColl Brook—50,000 S1, 5,000 S3.
McPherson Brook—50,000 S1, 5,000 S3.
Rough Brook—50,000 S1, 5,000 S3.
Strathlorne Brook—64,000 S1, 400 Sf.

Victoria County—
Barachois River—75,000 S1.
Bras D'Or Lakes—
Baddeck River—70,000 S1, 15,000 S3, 500 Sf, 300 Sg.
Farquhar Angus Brook—40,000 S1, 5,000 S3.
Gillis Brook—60,000 S1.
North Branch—40,000 S1.
Peters Brook—40,000 S1.
Breton Cove Pond—15,000 S1.
Burton Lake—30,000 S1.
Church Brook—35,000 S1.
Clyburn Brook—2,000 Sf.
Dingwall Lake—30,000 S1, 5,000 S3, 100 Sf. 100 Sg.
Fresh Water Lake—10,000 R1, 6,207 R2, 5,000 Sf.
Giffin Lake—30,000 S1, 5,000 S3, 100 Sf, 100 Sg.
Jigging Cove Lake—3,000 Sf.
MacDonald Lake—200 Sg.
MacDonald Pond—15,000 S1.
Middle River—150,000 A1.
Beaver Brook—35,000 S1.
Black Brook—35,000 S1, 5,000 S3.
Mary Ann Brook—1,000 Sf.
Cold Brook—40,000 S1, 5,000 S3.
Indian Brook—70,000 S1, 5,000 S3.
MacLeod Brook—40,000 S1.
MacLeod Pond—400 Sf.
Morrison Lake—5,000 S3, 100 Sf, 100 Sg.
North Aspy River—2,000 Sf.
North River—150,000 A1.
Warren Lake—20,000 R1, 28,207 R2, 10,000 S5, 500 Sf.
White Point Pond—30,000 S1.
Wreck Beach—1,000 Sf.

Atlantic Salmon	786,990
Rainbow Trout	74,414
Speckled Trout	2,316,262
Total	3,177,666

Mersey Fish Culture Station

Halifax County—
Governor Lake—4,675 S1.
Hosier River—
Cranberry Lake—4,675 S1.
Lewis Lake—4,675 S1.

Lunenburg County—
Beaver Brook—6,375 S1.
Bickle Pond—1,000 S1.
Conrad Lake—5,000 S1.
Fitch Brook—8,700 S1.
Frog Pond—1,000 S1.
Island Pond—1,500 S5.
Kaulback Pond—1,980 S5.
Keddys Pond—5,100 S1.
LaHave River—
Beck Lake—8,000 S2.
Rhodenizer Lake—2,442 S5.
Medway River—
Island Lake—5,000 S2.
Spectacle Lake—5,000 S2.
Mush-a-mush River—30,000 'A1, 12,000 A3.
Petite River—30,000 A1, 12,000 A3.
Branch Lake—4,000 S2.
Wallace Lake—8,700 S1.
Romkeys Pond—1,980 S5.
Sperry Lake—8,640 B5.
Stage Pond—1,000 S1.
Westhaver Pond—6,375 S1.
Whynot Pond—1,000 S1.

Queens County—
Five Rivers—5,000 S1, 3,000 S2.
Herring Cove Lake—10,000 S1.
Louis Lake—8,040 S4.
McAlpine Brook—5,000 S1.
Medway River—94,500 A1.
Cameron River—16,875 A1.
Christopher Lake—17,850 S1, 6,000 S2.
Dean Brook—2,000 S2.
Fifteen Mile Brook—2,000 S2.
Freeman Lake—4,125 S5.
Labelle Brook—22,500 A1.
Ponhook Lake—22,500 A1, 40,900 A3.
Russel Lake—5,000 S2.
Salter's Brook—22,500 A1, 3,410 S5.
Wentworth Brook—22,500 A1, 3,000 S2.
Mersey River—24,500 A3.
Bar Pond—7,000 S2.
Deep Brook—5,000 S1.
Deep Brook, Head Pond—5,000 S2.
Grafton Brook—4,092 S5.
Nos. 3 & 4 Head Ponds—12,000 B3, 6,000 B4, 25,500 B5.
No. 2 Tailrace—5,850 B5.
Ten Mile Lake—10,000 S2.
Mitchell Brook—5,100 S1, 3,000 S2.

Shelburne County—
East Brook—4,360 S4.
Green Harbour Lake—7,250 S1, 6,000 S2.
Ogden's Brook—5,000 S4.
Sable River—
Log Brook—5,000 S2.
Tom Tigney River—12,750 S1, 5,000 S2.
Wall Lake Brook—14,500 S1.

Atlantic Salmon	350,775
Brown Trout	57,990
Speckled Trout	261,654
Total	670,419

Middleton Fish Culture Station

Annapolis County—
Annapolis River—35,000 S1.
Bloody Creek—6,000 S2.
Foster Lake—6,200 S2.
Morton Brook—4,000 S1.
Neily Pond—500 S2.
Nictaux River—16,000 B2, 13,445 B3, 20,000 S2, 9,000 S4.
Connell Lake—5,000 S2.
Little River—3,000 S4.
McGill Lake—10,000 S2.
Oaks Brook—3,000 S3.
Private Brook—5,000 S2.
Quilty Lake—5,000 S2.
Scrag Lake—5,000 S5.
Trout Brook—2,000 S1.
Trout Lake—3,000 S5.
Waterloo Lake—5,000 S1.
Zwicker Lake—2,296 R4.
Paradise Brook—8,000 S2.
Paradise Lake—20,000 S3, 15,000 S4.
Walker Brook—4,000 S1.
Wiswal Brook—4,000 S1.
Bear River—
Baillie Lake—5,000 S2.
Beeler Lake—5,000 S2.
Katy Lake—5,000 S2.
Lake Mulgrave—8,000 S4, 8,000 S5.
Nigger Line Brook—6,000 S2.
Power Lot Brook—4,000 S2.
Sundown Lake—8,000 S3.
Upper Mink Lake—10,000 S3.
Chute Lake—2,000 S4.
LaHave River—10,000 S2, 8,000 S5.
Lake Pleasant—5,000 S1, 8,000 S4.
Sixty Brook—5,000 S2.
Sixty Lake—8,000 S4.
Springfield Brook—3,000 S1.
Springfield Lake—10,000 S3.
Ridge Road Brook—4,000 S1.
Thirty Lake—7,000 S3.
LeQuille River—
Evan Brook—6,000 S2.
Gibson Lake—13,200 S2.
Grand Lake—10,000 S2.
Lake LaRose—9,000 S2.
Lamb Lake—5,000 S2, 5,000 S5.
Mickey Hill Brook—5,000 S2.
Ten Mile River—5,000 S5.
Wrights Lake Road—8,400 S2.
Medway River—
Long Lake—5,000 S5.
Spectacle Lake—10,000 S4.
Mersey River—8,000 S5.
Boot Lake—5,000 S2.
Fisher Lake—4,500 S2.
Pike Lake—2,000 S3.
Sandy Bottom Lake—5,000 S2.
Milbury Lake—5,000 S3.
Rumsey Lake—13,000 R4.
Sand Lake—5,000 S3.
View Lake—4,500 S2.
Woster Lake—5,000 S3.
Young Lake—5,000 S3.

Kings County—
Annapolis River—10,000 S1, 8,000 S4.
Fales Stream—3,000 S5.
South River—15,000 S3.
Zeke Brook—5,000 S3.
Whynot Pond—100 S2.
LaHave River—
Armstrong Lake—7,000 S2, 8,000 S4.
Chain Lake—8,000 S2.
East Twin Lake—5,000 S2.
Mack Lake—5,000 S2.
North Twin Lake—4,000 S4.
Shell Camp Lake—8,000 S4.
Spectacle Lake—10,000 S2.
Upper Sixty Lake—5,000 S2.
West Twin Lake—5,000 S2.
Lake Paul—10,000 S4.
Lake Torment—5,000 S2, 8,000 S4.
Sunken Lake—26,000 R4.

Lunenburg County—
Birch Meadow Pond—5,000 S3.
Holbert Lake—8,000 S3.
LaHave River—7,000 S1, 10,000 S2.
Blystone Lake—10,000 S3.
Church Lake—10,000 S3.
Deminson Run—5,000 S3.
Grant Lake—5,000 S3.
Hirtle Lake—5,000 S3.
New Canada Lake—5,000 S3.
New Germany Lake—5,000 S3.
North River—5,000 S2.
Rhyno Lake—5,000 S3.
St. George Lake—5,000 S3.
Solomon Brook—12,000 S3.

Queens County—
Medway River—16,000 S3.
Bear Trap Lake—8,000 S3.
Christopher Lake—10,000 S3.
Coles Brook—3,000 S3.
Collins Lake—5,000 S3.
Eighteen Mile Brook—2,000 S3.
Harmony Brook—2,400 S3.
Harmony Lake—5,000 S3.
Molega Lake—7,000 S3.
Ponhook Lake—8,000 S3.
West Branch—3,000 S3.
Wildcat River—5,000 S3.
Mersey River—8,000 S5.
Whiteburn Brook—3,000 S3.
Turtle Lake—8,000 S3.

Brown Trout	29,445
Rainbow Trout	41,296
Speckled Trout	761,800
Total	832,541

Yarmouth Fish Culture Station

Digby County—
- Arno Brook—1,000 S1.
- Bear River—
  - Barne's Lake—8,000 S2, 1,000 S3.
  - Hill Lake—8,000 S2.
  - Lake Jolly—8,000 S2, 3,000 S3.
  - Lake LeMarchant—8,000 S2, 1,000 S3.
- Belliveau River—6,486 S2.
- Budds or Handspiker Brook—1,000 S3, 1,700 S5.
- Carleton River—
  - Bear's Back Lake—3,200 S1.
  - Bear Brook—3,000 S2.
  - Bear Lake & Brook—4,800 S1, 2,200 S4.
  - Bill John Lake—9,600 S1, 750 S5.
  - Briar Lake Brook—3,200 S1, 2,300 S4.
  - Bright's or Clearwater Lake—3,000 S1, 7,579 S2, 3,000 S3, 1,500 S5.
  - Hourglass Lake—4,800 S1, 7,579 S2, 750 S5.
  - Hunter Lake—1,600 S1.
  - Klondyke Brook—6,400 S1.
  - Oliver Lake—6,736 S2, 750 S5.
  - Paul Lake—6,400 S1, 750 S5.
  - Payson's Meadow Brook—6,400 S1, 7,806 S2.
  - Sprague Lake—9,729 S2, 2,000 S3.
  - Placid Lake—7,579 S2.
  - Porcupine Lake—4,800 S1.
  - Seven Pence Ha'Penny Brook—3,200 S1.
  - Shingle Mill Brook—7,806 S2.
  - Sullivan Lakes—7,579 S2, 750 S5.
  - Toad Brook—1,600 S1.
  - Wentworth Lake & Brook—14,308 S2.
- Church Point Brook—3,200 S1.
- Doctor's Lake—4,000 Sl.
- Gaudet's Mill Pond—3,200 S1.
- Grosses Coques River—9,729 S2.
  - Bartlett Lake & Brook—2,000 S1.
  - Mill Brook—2,000 S1.
  - Thibeault Lake & Brook—3,243 S2.
- Lint Lake—8,000 S2.
- Little Brook—1,000 S1.
- Long Island Brook—2,400 S5.
- Loud Lake—8,000 S2.
- Metegan River—
  - Anselem Lake & Brook—2,000 S1, 550 S5.
  - Arthur Lake—7,579 S2.
  - Blackador's Brook—8,000 S1, 550 S5.
  - Bonaventure Lake—6,486 S2, 550 S5.
  - Bourneuf Lake—6,175 S2, 550 S5.
  - Bull Lake—2,000 S1, 550 S5.
  - Comeau Lake—16,215 S2, 2,250 S5.
  - Cranberry Lake—6,486 S2.
  - Danver's Lake—9,600 S1.
  - Eel Lake—9,729 S2, 750 S5.
  - Gatien Thibeault Brook—4,800 S1.
  - Griffith Lake—6,175 S2.
  - Irishman's Brook—8,000 S1.
  - Long Lake (Hassett)—7,579 S2.
  - Long Lake (Margo Road)—2,000 S1, 750 S5.
  - Margo River—3,000 S1, 750 S5.
  - Metegan Lake—2,000 S1, 1,125 S5.
  - Metegan River (East)—3,000 S1, 1,125 S5.
  - Metegan River (Hassett)—9,600 S1.
  - Negro Lake—9,729 S2.
  - Nowlan Lake—7,579 S2.
  - Philip Lake—3,000 S1.
  - Prime Lake Brook—6,175 S2.
  - Rocky Brook—7,400 S1.
- Salmon River—132,200 A1, 59,400 A2, 5,746 A5, 24,000 Af.
  - Boney Lake—3,200 S1, 1,220 S5.
  - Dean's Brook—3,000 S1.
  - Doucett Lake (East)—3,000 S1.
  - English Lake—3,000 S1, 750 S5.
  - Farish Lake—2,400 S1, 1,200 S5.
  - Gaspereaux Lake—9,729 S2.
  - Hectanooga Lake—3,200 S1, 1,200 S5.
  - Pierce Lake—6,000 S1, 9,729 S2, 2,400 S3.
  - Springdale Brook—16,000 S1, 9,729 S2.
- Silver River—
  - Carrying Road Lake—5,000 S2, 550 S5.
  - Whistler Lake—5,000 S2.
- Sissiboo River—
  - Andrews Lake—4,800 S2.
  - Dunbar Brook—3,400 S1, 6,175 S2.
  - Everett Lake—3,400 S1, 6,175 S2.
  - Hanes Lake—4,800 S2.
  - Mallett's Lake—1,700 S1, 6,737 S2.
  - Mistake Lake—3,400 S1, 10,975 S2.
  - Wallace River—4,800 S2.
  - Wright Lake—3,400 S1.
- Snarl Lake—13,400 B1, 250 Bf.
- Syda Lake—3,400 S1.
- Ticken Lake—4,000 S3.

Queens County—
- Big Robertson Lake (Robinson)—30,000 B3, 4,000 B4, 3,090 B5, 3,000 Bf.
- Mersey River—38,125 B1.

Shelburne County—
- Alvin Lake—1,000 S1, 6,300 S3, 900 S5.
- Barrington River—3,200 S1, 8,421 S2, 5,920 S3, 5,100 S4, 1,200 S5.
- Birchtown Brook—6,000 S2, 6,300 S3, 900 S5.
- Black's Brook—14,000 S1, 6,400 S3, 900 S5.
  - McQuhae Meadow Brook—6,000 S1.
- Churchover Lake Brook—4,000 S2.
- Clyde River—23,400 A1, 109,400 A2, 51,000 A3, 24,100 Af.
  - Barn Brook—6,000 S1.
  - Beaver Pond—905 S5.
  - Big Goose Creek—3,200 S1, 2,790 S3, 1,200 S5.
  - Birch Hill Brook—6,000 S1.
  - Bloody Creek—6,386 S3, 905 S5.
  - George A. Brook—6,400 S1.
  - Hamilton Branch—6,000 S1, 6,386 S3.
  - Hemlock Creek—3,000 S2, 2,000 S3, 905 S5.
  - Hemlock Run—4,386 S3.
  - Little Goose Creek—3,200 S1.
  - Long Bridge Brook—6,400 S1, 2,000 S2.
  - McDonald Creek—6,000 S1.
  - Potter's Run—6,000 S1, 2,000 S3.
  - Purdy Hill Brook—6,400 S1.
  - Salmon Creek—8,000 S1, 2,300 S3, 905 S5.
  - Spring Creek—6,000 S1.
  - Stalker's Run—6,400 S1, 920 S5.
  - Thurston Creek—6,000 S1.

Shelburne County—Conc.
Dexter's Lake Brook—4,000 S2.
Downey's Brook—3,200 S1, 3,243 S2, 2,700 S3.
Oak Park Lake—4,000 S1, 8,421 S2, 5,980 S3, 1,200 S5.
Fresh Brook—1,200 S5.
Purney's Brook—7,729 S2, 2,700 S3, 900 S5.
Roseway River—
Beaver Creek—6,000 S3.
Beech Hill Dam—4,000 S1.
Clam Creek—4,000 S1.
Courtenay Lake—3,000 S2, 2,700 S3, 900 S5.
Deception Lake—9,729 S2, 16,700 S3, 1,970 S5.
Indian Field Brook—4,000 S1, 4,000 S3, 750 S5.
Little Beech Hill Brook—5,600 S1.
Logging Creek—4,000 S1, 2,000 S3, 750 S5.
Lower Ohio School Brook—1,500 S1.
Mark's Brook—800 S1.
McKay Lakes—1,000 S1, 18,200 S3, 1,950 S5.
Morine's Brook—1,000 S1.
Nick Davis Brook—1,000 S1.
Oak Hill Brook—2,400 S1.
Phillip's Lake—2,000 S3, 1,200 S5.
Ryers Brook—1,500 S1.
Ryers Lake—800 S1.
Sucker Creek—2,400 S1.
Upset Falls Brook—3,000 S1, 2,000 S3, 1,500 S5.
White's Falls—7,200 S1.
Round Bay River—6,000 S2, 6,300 S3, 1,220 S5.
Beaver Dam Lake & Brook—2,000 S1, 4,000 S2, 3,600 S3, 900 S5.
Sandy Point Brook—2,000 S2, 2,700 S3, 920 S5.
Shag Harbour Brook—8,421 S2, 1,640 S3, 1,220 S5.

Yarmouth County—
Allen Lake—8,000 S1, 1,500 S5.
Annis River—55,200 B1, 37,200 B2, 20,720 B4, 3,090 B5.
Annis Brook—10,000 B2.
Big Brazil Lake—24,400 B1, 18,400 B2, 1,030 B5, 50 Bf, 130 Bg, 170 Bh, 1,500 S4.
Brazil Lake—2,500 B4.
Brazil Lake Brook—24,000 B1, 7,000 B2.
Crosby Brook—12,000 B1.
Gardener's Brook—14,000 B1.
Gardener's Mill Pond—9,600 B1, 15,400 B2, 8,920 B5.
Harris Lake & Brook—10,000 B2.
Hawley Road Brook—18,000 B1.
Hooper Lake—36,000 B2, 590 Bf, 170 Bh.
Lake Annis—81,200 B1, 7,000 B2, 7,742 B3, 5,830 B5, 164 Bg, 170 Bh, 1,500 S4.
Lake Edward—26,000 B1, 7,000 B2, 30,000 B3, 6,520 B5, 200 Bf.
Lake Ellenwood—28,800 B1, 10,000 B2, 5,714 B3, 3,090 B5, 590 Bf, 303 Bh.
Lake Jessie—30,800 B1 1,030 B5, 50 Bf, 100 Bg, 170 Bh, 1,500 S4.
Little Brazil Lake—22,400 B1, 8,400 B2, 5,830 B5.
Lots Lake Brook—1,030 B5.
Pleasant Valley Brook—47,200 B1, 20,400 B2, 8,920 B5. Salmon Lake—30,400 B2, 5,714 B3, 5,222 B5.
Saunder's Mill Brook—36,000 B1, 61,400 B2, 7,742 B3, 3,430 B5.
Scott Lake Brook—28,000 B1, 7,000 B2.
Snarl Lake—170 Bh.
Argyle River—23,400 A1, 5,250 Af.
Frost Pond—3,300 S2.
Mespark Lake Brook—5,610 S2.
Moses Lake & Brook—5,610 S2.
Randall Lake—3,300 S2.
Brenton Lake—4,800 S1.
Carleton River—8,000 S1.
Bird Lake—4,250 S1, 1,700 S4, 1,500 S5.
Bullerwell's Brook—12,000 S1.
Fanning Lake—5,000 S2.
Hamilton Lake—3,400 S1, 1,700 S4, 1,500 S5.
Hicks Brook—8,000 S1.
Nickerson's Brook—8,000 S1.
Richardson's Lake—3,400 S1.
Ryerson's Brook—8,000 S1.
Sloan's Lake—3,400 S1, 1,700 S4, 1,500 S5.
Cedar Lake & Brook—18,000 S1, 5,610 S2.
Chegoggin River—
Chegoggin Lake & Brook—18,000 S1, 19,458 S2, 1,500 S5.
Wellington Lake—4,800 S1, 9,729 S2.
Churchill Lake—7,018 S2.
Coggin's Lake Brook—8,000 S1.
Corning Lake—5,400 S3.
Darlings Lake—10,000 S1, 7,018 S2, 1,500 S5.
Mallett Lake—5,610 S2.
Pubnico Lake—4,950 S2.
Salmon River—15,000 B3.
Winter's Lake—9,729 S2.
Silver River—
Braddie's Meadow Brook—5,000 S2.
Burrell's Brook—5,000 S2.
Tedford Lake—9,729 S2.
Trefry's Lake—4,250 S1, 9,729 S2.
Tusket River—28,800 A1, 123,400 A2, 14,400 A3, 21,778 Af.
Bear Brook—8,000 S1.
Beaver Lake—6,000 S2, 2,000 S3.
Big Meadow Brook—9,600 S1, 2,000 S3.
Canoe Lake & Brook—3,400 S1, 2,805 S2.
Clearwater Lake & Brook—6,000 S2, 2,000 S3.
Coldstream River—3,400 S1.
Grey's Brook—6,400 S1.
Harris Lake—20,400 B2, 5,714 B3, 5,222 B5, 50 Bf, 6,000 S2.
James Lake—3,400 S1.
Kegeshook Lake—3,400 S1.

Yarmouth Fish Culture Station—Conc.

Yarmouth County—Conc.
Tusket River —*Conc.*
Little Meadow Brook—8,000 S1.
Louis Lake—4,035 S2.
Mill Brook—5,610 S2.
Rushy Lake—3,400 S1.
Salter Lake Brook—1,700 S1, 5,000 S2.
Schoolhouse Brook—3,200 S1.
Soloman's Lake—6,000 S2.
Sunday Lake—6,000 S2.
Welchard Brook—3,300 S2.
Wilson Brook—4,950 S2.

Atlantic Salmon	646,274
Brown Trout	1,018,552
Speckled Trout	1,361,917
Total	3,026,743

NEW BRUNSWICK

Charlo Fish Culture Station

Gloucester County—
Antinori Lake—5,090 S3.
Clarniere Lake—7,900 S4.
Elmtree River—2,315 S4.
Middle River—75,000 Ad, 48,000 A2, 23,000 S1.
Millstream River—5,090 S3, 2,315 S4.
Nigadoo River—5,090 S3, 2,315 S4.
Nipisiguit River—8,200 Af.
Bass River—15,440 S3.
Forty Mile Brook—24,000 S1, 1,325 S3, 1,690 S4.
Forty-four Mile Brook—3,180 S3, 3,180 S4.
Gordon Brook—75,000 Ad.
Harts Lake—1,300 S3.
Nine Mile Brook—23,000 S1, 1,325 S3, 1,690 S4.
Papineau Brook—40,000 A3.
Papineau River—123,000 A1, 48,000 A2.
Portage Brook—2,650 S3, 3,180 S4.
Portage Lake—9,540 S4, 700 Sf.
Tetagouche River—8,200 Af.
North Branch Caraquet River—3,950 S4.
North West Upsalquitch River—40,000 A3.
Pokemouche River—9,540 S4.
South Branch Caraquet River—3,950 S4.
Teagues Lake—6,600 S3.
Tracadie River—75,000 Ad, 123,000 A1, 42,670 A2.

Restigouche County—
Big Berry Brook—5,090 S3.
Christopher Brook—40,000 S1, 11,440 S3.
Black Brook—30,000 S1.
Loch Lomond Lake—2,000 S2.
D'Amours Lake—2,545 S3.
Eel River—7,150 S3.
Robinson Lake—500 Sf.
Sharps Lake—5,090 S3.
Jacquet River—160,000 Ad, 48,000 A1, 96,600 A2, 42,000 A3, 8,200 Af, 7,635 S3.
Black Lake—3,000 S2, 2,545 S3.
Little Berry Brook—2,545 S3.
Louson River—35,000 S1, 2,650 S4.
Murray Pond—3,000 S2.
Nash Creek—35,000 S1.
North Branch Charlo River—35,000 S1, 8,090 S3, 5,589 S4, 155 Sf.
Restigouche River—75,000 Ad, 123,000 A1, 197,280 A2, 8,200 Af.
Cheaters Brook—800 S3.
Five Fingers Brook—8,580 S3.
Kedgwick River—75,000 Ad, 171,000 A1, 130,000 A3, 12,920 Af.
Eight Mile Lake—3,000 S3.
Meadow Brook—47,000 A2, 40,000 A3.
Little Main River—123,000 A1, 48,000 A2, 6,390 Af.
Gunamitz River—48,000 A1, 44,000 A3, 6,390 Af.
Upsalquitch River—5,538 Af.
Grog Brook—35,000 S1, 4,770 S4.
Two Brooks Lake—4,770 S4.
Murray Lake—2,860 S3.
North West Upsalquitch River—75,000 Ad, 75,000 A1, 48,000 A2, 43,000 A3, 7,595 Af.
Burntland Brook—5,090 S3.
Burntland Lake—2,545 S3.
Ritchey Brook—1,600 S3.
South East Upsalquitch River—75,000 Ad, 65,000 A1, 89,000 A2, 8,200 Af.
Island Lake—2,860 S3, 1,390 S4.
Meadow Brook Lake No. 1—2,860 S3, 1,390 S4.
Meadow Brook Lake No. 2—2,860 S3, 1,390 S4.
Murray Lake—1,390 S4.
Tongue Lake—2,860 S3, 1,390 S4.
White Brook—35,000 S1.
South Branch Charlo River—40,000 Ac, 200 A1, 50 Af, 20,000 Sc, 35,000 S1, 500 S2, 4,640 S4, 15 Sf, 20 Sg.
Tetagouche River—6,950 S4.
Walker Brook—35,000 S1.

Atlantic Salmon	2,747,633
Speckled Trout	637,909
Total	3,385,542

Florenceville Fish Culture Station

Carleton County—
- Debec Brook—22,500 Sd, 11,200 S1.
  - McLeod Brook—4,800 S1.
- Eel River—
  - Bull Creek—9,600 S1.
  - Gidney Brook—16,000 S1.
  - Pokamoonshine Brook—12,800 S1.
- Miramichi River—
  - North Branch, Miramichi River—2,880 Af.
    - Gould Brook—3,840 S2.
    - West Brook—7,680 S2.
  - School House Brook—2,880 S2.
  - South Branch, Miramichi River—29,760 A2.
    - Argyle Pond—332 Sh.
    - Big Tague Brook—7,930 S2, 9,200 S3.
    - Bigger Brook—2,880 S2.
    - Bogan Brook—1,440 S2.
    - Bradley Brook—3,840 S2.
    - Elliot Brook—7,930 S2.
    - Harvey Brook—1,920 S2.
    - Little Clearwater Brook—1,920 S2.
    - Little Tague Brook—7,930 S2, 4,600 S3.
  - Southwest Miramichi River—14,400 A2, 77,760 A3.
    - Brandy Brook—2,400 S2.
- Rose Pond—500 S2.
- Saint John River—9,710 Af.
  - Acker Brook—1,800 S3.
  - Becaguimac River—120,960 A3.
    - Beaver Brook—2,560 S2.
    - Birmingham Brook—9,200 S3.
    - Burlock Brook—3,840 S3, 200 Sf.
    - Burnt Land Brook—2,560 S2.
    - Coldstream Brook—5,760 S2, 9,200 S3.
      - Brown Brook—4,600 S3.
      - Dry Brook—2,560 S2.
      - Hamilton Brook—14,400 S1, 1,280 S2, 4,000 S4.
      - Hartley Brook—1,920 S2, 4,600 S3, 6,000 S4.
      - Hatfield Brook—4,600 S3.
      - Hayden Brook—2,560 S2, 2,000 S4.
      - Markie Brook—4,600 S3.
    - Cross Creek—1,960 S2.
    - Day Brook—2,560 S2, 4,000 S4.
    - Dug Hill Brook—3,840 S3, 200 Sf.
    - Gin Brook—1,280 S2.
    - Howard Brook—4,600 S3.
    - Indian Brook—3,200 S2.
    - South Branch—2,560 S2.
  - Big Guisiguit River—18,750 Sd, 6,900 S3.
  - Bulls Creek—22,500 Sd, 4,800 S1.
    - Bedell Brook—18,750 Sd.
    - Big Bedell Brook—16,000 S1.
    - Little Bedell Brook—16,000 S1.
    - Rosemond Lake—9,600 S1.
      - Crane Brook—6,400 S1.
  - Buttermilk Creek—11,250 Sd, 6,400 S1, 4,000 S4.
  - Deep Brook—1,800 S3.
  - Downey Brook—1,800 S3.
  - Gibsons Creek—6,400 S1.
  - Hatheway Brook—1,280 S3.
  - Johnsville Pond—5,760 S2.
  - Kilpatrick Brook—2,000 S4.
  - Lanes Creek—18,750 Sd.
  - Lily Brook—16,000 S1.
  - Little Guisiguit River—18,750 Sd.
  - Lower Guisiguit River—6,900 S3, 6,000 S4.
  - Madaox Stream—3,200 S1.
  - Meduxnekeag River—92,400 Ad, 67,200 A1.
    - Carter Brook—9,600 S1.
    - Gartley Brook—9,600 S1.
    - Marven Brook—12,800 S1.
    - McQuarrie Brook—9,600 S1.
  - Monquart River—18,040 S2, 11,5320 S3.
    - Boyd Beaver Pond—1,920 S3.
    - Cronin Beaver Pond—1,920 S3, 240 Sf.
    - Holmes Brook—2,560 S2.
    - Little Monquart River—5,760 S2.
    - Mud Lake—360 Sf.
    - North Branch—5,760 S2.
    - Sal Crain Brook—2,560 S2.
    - Smith Brook—7,160 S2.
  - Nackawic River—14,085 A3.
  - Nashwaak River—45,600 A3, 7,200 Af.
  - Olmstead Brook—9,600 S1, 2,000 S4.
  - Presquile River—
    - Big Presquile River—61,600 Ad, 1,000 A3.
      - Bradley Brook—11,250 Sd, 4,000 S4.
      - Burpee Brook—4,000 S4.
      - Dingee Brook—11,250 Sd, 4,000 S4.
      - Gallivans Brook—6,400 S1, 4,000 S4.
      - Harold Brook—11,250 Sd, 4,000 S4.
      - Mile Brook—18,750 Sd, 1,850 S3.
      - Reids Lake—350 Sf.
      - Two Mile Brook—2,000 S4.
    - Ketch Lake—19,000 S1.
    - Little Presquile River—100,800 Ad, 143,200 A1, 6,720 Af, 30,000 Sd, 13,800 S3, 14,000 S4.
      - Davenport Lake—8,000 S1.
      - Gowan Lake—8,000 S1.
      - Ketch Lake Brook—24,000 S1, 4,000 S4
      - Lakeville Pond—6,000 S4, 445 Sh.
      - Stewart Brook—24,000 S1.
      - Williamstown Lake—6,000 S4, 1,000 Sf.
    - Priest's Lake—700 Sf.
    - Rivière de Chute—11,250 Sd. 24,000 S1, 13,800 S3.
    - Rosemond Pond—4,800 S1.
    - Shiktahawk River—29,760 A2, 34,560 A3, 2,880 Af, 19,200 S3, 6,000 S4.
      - Green Brook—1,920 S2.
      - Little Shiktahawk River—1,920 S2.
        - Laing Brook—1,920 S2.
      - North Branch—7,680 S2.
      - South Branch—7,680 S2.
    - Stickney Brook—7,680 S2, 6,000 S4.
      - Campbell Brook—6,000 S4.
      - Cullins Brook—4,000 S4.
    - Upper Guisiguit River—6,000 S4.
    - White Marsh Brook—10,000 S4, 200 Sf.
      - Tweedie Lake—350 Sf.
    - White Marsh Creek—20,000 S1.
  - Simond's Pond—500 S1.

Northumberland County—
- Everett Brook—5,000 S3.
- Hazelton Brook—5,000 S3.

Florenceville Fish Culture Station—*Conc.*

Victoria County—
- Tobique River—
  - Big Gulquac River—5,000 S3.
  - Haley Brook—5,000 S3.
  - Ralston Lake—5,000 S3.
  - Riley Brook—5,000 S3.
  - Two Brooks—5,000 S3.
- Wolverton Brook—5,000 S3.

York County—
- Bolton Lake—6,400 S1.
- Brewer's Pond—1,000 S1, 1,000 S2.
- Eel River—
  - Dead Brook—22,400 S1, 3,840 S3.
  - Fish Creek—16,000 S1.
  - Four Mile Brook—16,000 S1, 1,920 S3.
  - Risteen Brook—16,000 S1, 3,840 S3.
  - Risteen Lake—9,200 S3.
- Five Mile Brook—6,900 S3.
- Greenland Brook—6,400 S1.
- Long Creek—12,800 S1.
- Magaguadavic River—
  - Beaver Brook—4,800 S1.
  - Clinch Brook—6,500 L3.
  - Cranberry Brook—8,000 S1.
  - Davis Brook—4,800 S1.
  - North Branch—12,800 S1.
  - Stewart Brook—12,800 S1.
  - Sugar Brook—8,000 S1.
- McKenzie Brook—1,440 S2.
- Mistake Brook—6,400 S1.
- Mud Lake—1,440 S2.
- Musquash Lake—9,600 S1.
- North Lake—1,200 Sf.
- Palfrey Lake—18,400 S3, 16,000 S4, 1,000 Sf.
  - Lacoute Brook—11,700 L3, 16,000 S1, 6,520 S3.
  - Palfrey Brook—11,700 L3, 16,000 S1, 3,840 S3.
  - Skiff Lake—6,175 L3, 1,525 Sf.
- Saint John River—
  - Garden Creek—12,800 S1.
  - Gardiners Mill Creek—400 Sf.
  - Kelly Brook—8,000 S1.
- Keswick River—24,000 A2, 7,200 Af.
  - Green Hill Lake—3,600 S3.
- Kilarney Lake—3,840 S3, 500 Sf.
- Mactaquac River—43,200 A3, 600 Sf.
- Mazerall Brook—4,800 S1.
- Nackawic River—21,600 A2.
  - Fiddle Brook—3,900 S3.
  - Indian Lake—7,200 S3. 280 Sf.
  - N.E. Lakes—3,000 S3, 630 Sf.
  - Taffy Lake—5,400 S3.
- Nashwaak River—24,000 A2.
  - Big Tay River—3,840 S3.
  - Cathal Brook—2,300 S3.
  - Currie Lake—400 Sf.
  - Fleetwood Lake—400 Sf.
  - Lime Kiln Brook—4,600 S3.
  - Little Tay River—3,840 S3.
  - Lower Nashwaak River—800 Sf, 190 Sg.
  - Manzer Mill Stream—1,440 S2.
  - McCallums Brook—2,880 S2.
  - McLean Brook—1,440 S2.
  - Middle Brook—1,440 S2.
  - Penniac Stream—2,880 S2, 500 Sf.
  - Tinkettle Brook—3,840 S3.
- Pokiok River—19,200 S1, 3,840 S2, 148 Sh.
  - Davinson Lake—190 Sg.
  - Tweedie Lake—850 Sf, 189 Sg.
- Shogomoc River—3,840 S2.
  - Brown Pond—4,600 S3.
  - Charlie Lake—3,840 S2.
  - Crooked Brook—4,600 S3.
  - Dow Brook—4,800 S2, 4,600 S3.
  - Gulliver's Brook—4,600 S3.
  - Waterloo Creek—8,000 S1.
- Sears Brook—6,400 S1.
- Sucker Brook—5,280 S2.
- Yoho Stream—4,800 S1.

Atlantic Salmon	982,475
Sebago Salmon	36,075
Speckled Trout	1,480,479
Total	2,499,029

Grand Falls Fish Culture Station

Madawaska County—
- Black Lake—20,000 Sd.
- Glazier Lake—10,000 G1.
- St. John River—
  - Albert Pond—5,000 Sd.
  - Baker Brook—10,000 S2.
    - Baker Lake—10,000 G1, 20,000 S2.
    - Ben's Pond—15,000 Sd.
    - Reed Brook—7,000 S1.
  - Cedar Grove Pond—10,000 Sd.
  - Coomb's Brook—15,000 Sd, 19,600 S1.
  - Couturier Pond—10,000 Sd.
  - Daigle Brook—20,000 S2.
  - Dugal Brook—10,000 S1.
  - Foley Brook—10,000 S1.
  - Grand River—2,000 S4.
  - Green River—20,000 S2.
    - Martin Brook—8,000 S1.
    - Thibodeau Brook—10,000 S1.
    - Third Green Lake—10,000 G1.
    - Twin Lakes—9,000 S1.
  - Grew Brook—15,000 S1.
  - Iroquois River—5,000 S4.
    - Belanger Brook—10,000 S1.
    - Blanchette Brook—15,000 S1.
  - Lavoie Brook—15,000 S1.
  - Levasseur Brook—15,000 S1.
  - Little River—
    - Deadwater Brook—25,000 S1.
    - Godbout Pond—10,000 Sd.
  - Pelletier Pond—10,000 Sd.
  - Michaud Brook—10,000 S1.
  - Millstream—5,000 Sd, 27,800 S1.
  - Ouellette Pond—20,000 Sd.
  - Pelletier Brook—15,000 S1.
    - Caron Brook—10,000 S1.
      - Caron Lake—30,000 S1.
      - Pichette Lake—10,000 Sd, 20,000 S1.

Grand Falls Fish Culture Station—*Conc.*

Madawaska County—Conc.
St. John River—*Conc.*
Powers Brook—9,600 S1.
Powers Creek—10,000 Sd.
Quisibis River—20,000 S2.
Quisibis Lake—25,000 S1.
Rob Brook—5,000 S1.
Siegas River—
Clark Brook—10,000 S1.
Durett Pond—5,000 Sd.
Siegas Lake—25,000 S1.
Tedley Brook—10,000 S1.
Smith Brook—12,000 S1.
Sylvain Brook—10,000 S1.
Thompson Lake—25,000 S1.
Three Mile Brook—10,000 Sd.
Upper Iroquois River—25,000 Sd.
White Birch Pond—10,000 Sd.
Trout River—10,000 S2.
Couturier Twin Ponds—75,000 Sd.
Unique Lake—50,000 S1.

Northumberland County—
Everett Brook—3,000 S2.
Hazelton Brook—3,000 S2.

Restigouche County—
Big Cedar Brook—40,000 S1.
Burnt Land Lake—4,000 S5.
Haile's Brook—50,000 S1.
Miller Lake—18,000 S1.
Stillwater Brook—50,000 S1.

Victoria County—
East Limestone River—2,500 S4.
Gillespie Brook—2,500 S4.
Jardine Brook—25,000 S1.
Nary Brook Lake—1,000 S2.
Portage Lake—1,000 S2.
Ring Brook—5,000 S1.
St. John River—167,040 A1, 58,500 A2, 2,350 A3, 3,600 S2.
Bishop Brook—5,000 S1.
Boutard Brook—17,600 S1.
Brown Brook—5,000 S1.
Cochrane Brook—5,000 S1.
Curry Brook—5,000 S1.
Grand River—15,000 S2.
Big Forks Brook—15,000 S1.
Black Brook—30,000 S1.
Violette Brook—10,000 S1.
Grant Brook—5,000 S1.
Jamer Brook—5,000 S1.
Little River—112,000 A1, 25,000 S1, 20,000 S2.
Basley Brook—10,000 S1.
Beaverdam Brook—50,000 S1.
Downing Brook—12,000 Sd.
Lake Edward—10,000 Sd.
McCluskey Brook—15,000 S1.
Perkins Brook—10,000 S1.
Ryan Brook—42,000 S1, 1,500 S4.
Lovelly Brook—5,000 S1.
McCarthy Brook—5,000 S2.
Mill Brook—5,000 S2.
Miller Brook—5,000 S1.
Millicatte Brook—5,000 S1.
Morrell Brook—5,000 S2.
Muniac River—35,000 A1, 2,250 S4.
Inman Brook—5,000 S1.
Rapide de Femme Brook—1,000 S4, 590 S5.
Salmon River—100,800 Ad, 324,320 A1. 58,500 A2, 3,000 Af, 38,000 S2, 1,000 S5.
Barney Brook—16,000 S1.
Bogan Brook—16,000 S1.
Cedar Brook—1,000 S5.
Little Salmon River—102,000 A1.
Mooney Brook—16,000 S1.
Outlet Brook—25,000 S1.
Rain Brook—15,000 S1.
Scott Brook—5,000 S1.
Tibbitts Brook—5,000 S1.
Tobique River—48,000 S1.
Big Flat Brook—5,000 S1.
Burnt Land Brook—3,000 S2.
Caldwell Brook, East—5,000 S1.
Caldwell Brook, West—5,000 S1.
Haley Brook—3,000 S2.
Indian Brook—5,000 S1.
Narrows Brook—3,000 S1.
Pokiok River—2,500 S4.
Left Branch Pokiok River—1,250 S4.
Quaker Brook—5,000 S1.
Riley Brook—3,000 S2.
Sisson Brook—3,000 S2.
Three Brooks—30,000 S1.
Trout River—10,000 S1.
Two Brooks, Left Branch—3,000 S2.
Wolverton Brook—3,000 S2.
Wark Brook—5,000 S1.

Atlantic Salmon	963,510
Lake Trout	30,000
Speckled Trout	1,676,290
Total	2,669,800

Haley Brook Fish Culture Station

Carleton County—
St. John River—63,930 Af.

Northumberland County—
Mamozekel River—11,520 A3.
Serpentine River—23,040 A3, 2,000 Af.

Restigouche County—
Little Tobique River—11,520 A3, 29,760 A4, 2,250 Af.

Victoria County—
Tobique River—10,200 Af.
Little Tobique River—2,000 Af.
Mamozekel River—2,250 Af.
Odell River—2,000 Af.
Serpentine River—29,760 A4.

Atlantic Salmon	190,230

Miramichi Fish Culture Station

Kent County—
- Buctouche River—5,500 S3.
- Cocagne River—5,000 S3.
- Grand Alduane River—8,500 S1.
- Kouchibouguac River—25,000 S1, 4,750 S3.
- Kouchibouguassis River—17,000 S1, 4,750 S3.
- Richibucto River—
  - Bass River—2,500 S3.
  - St. Nicholas River—5,000 S3.
- Salmon River—54,000 A1.
- Swallow's Pond—2,000 Sd.

Northumberland County—
- Island Lake—2,000 S3.
- Miramichi River—
  - Bartibog River—8,600 S3.
    - Goodfellow Brook—2,000 S3.
    - Little Bartibog River—2,000 S3.
    - North Brook—2,000 S3.
  - Bay Du Vin River—21,500 S1.
  - Black Brook—500 S3.
  - Black River—6,500 S1, 2,500 S3.
  - Burnt Church River—21,500 S1, 1,300 S3.
  - Horton's Creek—2,000 S3.
  - Little Black River—2,500 S3.
  - Little S.W. Miramichi River—186,000 Ad, 126,000 A1, 8,750 A2, 35,500 A3.
    - North Lake—3,000 S3.
  - Napan River—13,000 S1.
  - Northwest Miramichi River—530,400 Ad, 226,500 A1, 78,500 A3.
    - Goodwin Lake—1,200 S3.
    - Little Brook—1,600 S3.
    - Little River—21,500 S1.
    - Little Sevogle River—54,000 A1.
      - Estey Lake—2,600 S3.
    - Millstream River—18,600 Ad.
    - Mullin Stream—4,000 S3.
    - Sevogle River—54,000 A1.
      - Shaddoc Lake—1,300 S3.
    - Trout Brook—6,500 S1, 1,600 S3.
    - Wildcat Brook—1,600 S3.
  - Peabody Lake—1,200 S3.
  - River DeCashe—2,000 S1.
  - Southwest Miramichi River—180,000 Ad, 33,250 A3.
    - Barnaby River—43,000 Ad.
    - Bartholmew River—48,000 Ad.
    - Bett's Mill Brook—1,500 S3.
    - Big Hole Brook—1,500 S3.
    - Burnt Land Brook—2,500 S3.
    - Cains River—135,000 Ad, 30,500 A3.
    - Dungarvon River—93,000 Ad, 34,000 A3.
      - Peaked Mountain Lake—1,500 S3.
    - Morse Brook—2,000 S3.
    - Renous River—93,000 Ad, 84,000 A1.
      - North Branch—8,750 A2.
      - South Branch—8,750 A2.
    - White Rapids Brook—2,000 S3.
  - Tabusintac River—4,600 Af, 10,000 S1, 4,500 S3.
    - Eskedelloc River—10,000 S1, 6,000 S3.
  - North Renous Lake—4,900 S3.
  - Portage River—3,100 S3.

York County—
- Southwest Miramichi River—292,500 A1, 900 Af.
  - Burnthill Brook—37,500 A1.
  - Burnt Land Brook, East Branch—1,700 S3.
  - McKinley Brook—1,700 S3.
  - North Cains River—1,700 S3.
  - Rockey Brook—37,500 A1, 2,000 Af.
  - Taxis River—90,000 Ad.
    - Clear Water Brook—37,500 A1, 2,000 S3.

Atlantic Salmon	2,666,000
Speckled Trout	272,600
Total	2,938,600

Saint John Fish Culture Station

Albert County—
- Crooked Creek—39,808 R1, 8,342 Rf.
  - McFadden Lake—4,000 S2.
- Demoiselle Creek—64,000 Sd.
- Petitcodiac River—
  - Fords Pond—200 S2.
  - Pollett River—130,000 A2, 2,008 Af.
  - Turtle Creek—96,000 Sd.
    - East Branch—96,000 Sd.
  - Weldon Creek—64,000 Sd.

Charlotte County—
- Campobello Island—2,900 S4.
- Chamcook Lake—36,143 L1.
- Cox Meadow Brook—4,800 S4.
- Cranberry Lake—5,000 S2.
- Crecy Lake—13,550 R3.
- Deer Island—1,000 S4.
- Digdeguash River—300,000 B2, 12,800 B3.
  - Anderson Brook—16,000 S1.
  - Bailey Brook—16,000 S1, 670 S4.
  - Bog Brook—48,000 S1.
  - Craig Brook—16,000 S1.
  - Dyer Brook—24,000 S1.
  - Jones Brook—16,000 S1.
  - North West Branch—1,338 S4.
  - Orange Cove Brook—3,000 S2.
  - Wellington Brook—16,000 S1.
  - William Brook—80,000 S1.
- Gallop Lake—40,000 S2.
- Lepreau River—6,560 A3, 6,786 Af.
- Limeburner Lake—100 Sf, 75 Sg.
- Magaguadavic River—1,084 S4.
  - Black Brook—40,000 S1.
  - Clarence Stream—48,000 S1.
  - Cox Brook—16,000 S1.
  - Deadwater Brook (Lower)—2,164 S4.
  - Deadwater Brook Upper—2,164 S4.
  - Red Rock Lake—70,000 S1.
  - Sparks Lake—70,000 S1.
  - Trout Brook Lower—536 S2, 1,623 S4.
  - Trout Brook Upper—1,623 S4.

Charlotte County—Conc.
Meadow Brook—16,000 S1.
New River—8,000 A4, 5,742 Af, 40,000 S1.
New River (Little)—4,500 A4, 25,000 S1.
Pocologan River—8,000 A4, 6,575 Af, 40,000 S1.
Pocologan River (Little)—4,500 A4, 25,000 S1.
St. Croix River—48,000 A4, 11,368 Af.
Billy Weston Brook—3,536 S2.
Canoose River—80,000 S2, 450 Sf, 70 Sg, 50 Sh.
Big Goat Brook—40,000 S2, 1,338 S4.
Bonaparte Lake—100 Sf, 75 Sg.
Doodle Brook—8,000 S1, 1,338 S4.
Goat Brook—100 Sf. 75 Sg.
Goat Brook (Little)—16,000 S1, 30,000 S2.
Green Brown Brook—44,144 S2, 1,240 S5.
Kirk Brook—16,000 S1.
North West Branch—16,000 S1.
Sandy Brook—16,000 S1, 10,000 S2.
Sawyer Brook—32,000 S1, 1,338 S4.
Denny River—1,338 S4, 200 Sf, 120 Sg, 40 Sh.
Denny Stream—24,000 S1, 70,000 S2, 250 Sf.
Bush Brook—10,000 S2.
Dickerson Brook—8,000 S1.
Dunham Brook—16,000 S1.
Moore Mills Brook—40,000 S2.
Kelly Brook—16,000 S1.
Mohannas Creek—8,680 S5.
Waweig River—40,000 S1.
Berry Brook—16,000 S1, 670 S4.
Gidden Brook—16,000 S1.
McCarlies Brook—32,000 S1, 1,338 S4.
McGuire Brook—1,338 S4.
Twin Lake—100 Sf, 75 Sg.
South Oromocto Lake—5,000 S2, 300 Sf.
Stein Brook—16,000 S1.

Kent County—
Cocagne River—4,223 S5.

Kings County—
Canaan River—
Cole Brook—24,000 S1.
McMackin Brook—32,000 S1.
Prices Brook—48,000 S1.
Spring Hill Brook—32,000 S1.
Kennedy Lake—16,000 S1.
Lily Lake—1,200 S4.
McLeod Brook—20,000 S1.
McMohan Pond—100 S2.
Mechanic Lake—25,000 S1, 1,467 S4, 210 Sf, 120 Sg.
Peters Brook—2,000 S2.
Rocky Lake—1,200 S2.
St. John River—
Camp Gagetown—280,000 S1.
Harvey Lake—500 S2.
Kennebecasis River—31,784 A4, 20,016 Af, 41,000 S1, 75,000 S2, 2,834 S4, 150 Sf.
Bellisle Creek—24,000 S1, 24,000 S2.
Cochrane Lake—10,000 S2.
Jollies Brook—8,000 S2.
Bovard Pond—1,500 S2.
Butler Ponds—1,500 S2.
Cassidy Lake—3,434 S4, 460 Sf. 120 Sg.
Dee Brook—8,000 S1, 30,000 S2.
Hammond River—97,000 S1, 35,000 S2, 1,768 S5.
Harry Brook—8,000 S1.
Jefferies Brook—10,000 S1, 10,000 S2.
Law Farm Pond—200 S2.
Millstream—32,000 S1, 22,000 S2.
Searville Brook—8,000 S2.
Moosehorn Creek—8,000 S1, 1,467 S4.
Moss Glen Lake—5,000 S2.
Picket Lake—20,000 S2.
Pikwaket Brook—12,000 S2.
Reicker Brook—500 S2.
Smith Creek—16,000 S1, 100 Sf.
Foley Brook—8,000 S1.
Sally Brook—8,000 S1, 60,000 S2.
Windgap Brook—8,000 S1.
Windgap Creek—35,000 S2.
Stone Brook—10,000 S1.
Trout Creek—46,000 S1, 65,000 S2, 1,467 S4.
Cedar Camp Brook—24,000 S2.
Cedar Hill Brook—10,000 S1.
Mill Brook—23,000 S1.
Parlee Brook—15,000 S1, 60,000 S2.
Wards Creek—15,000 S1, 40,000 S2, 800 S4.
Wetmore Lake—5,000 S2.
Sears Lake—10,000 S1.

Northumberland County—
N.W. Miramichi River—5,000 Af.

Queens County—
Clear Water Lake—2,000 S2.
Cumberland Bay Creek—2,400 S3.
Douglas Brook—8,000 Sd.
Grand Lake—
Newcastle Creek—2,142 S4.
Young Cove Stream—1,200 S3.
Grassy & Upper Tilly Lakes—10,000 S2.
McDonald Point Pond—300 S2.
Queens Lake—20,000 S2.
Salmon River—1,071 S4, 800 Sf, 600 Sg.
Big Forks—2,400 S3.
Castaway Brook—2,400 S3.
Friel Brook—1,200 S3.
Gaspereaux River—2,142 S4.
Little Forks—2,400 S3.
North Forks—2,142 S4.
Salmon Creek—2,400 S3, 1,071 S4.
Straight Pond—1,000 S2.

St. John County—
Ashburn Lake—10,000 S2.
Balls Lake—5,000 S2.
Big Salmon River—34,580 A1, 7,380 Af, 23,428 Ag, 107 Ak.
Crow Brook—10,640 A1.
Donnelly Lake—10,000 S2.
Falls Brook—10,640 A1.
Four Mile Lake—10,000 S2.

Saint John Fish Culture Station—Conc.

St. John County—Conc.
- Big Salmon River—*Conc.*
  - Pats Lake—10,000 S2.
  - Rody Lake—10,000 S2.
  - Tufts Lake—10,000 S2.
- Walker Lake—5,000 S2
- Black River—75,000 A1, 18,444 A4, 3,196 Ag.
  - Brown Lake—5,000 S1.
  - Grassy Lake—45,000 S2, 2,500 S5.
- Blindman Lake—5,000 S1, 30 Sf.
- Browns Lake—400 S4.
- Hammond River—
  - Barnesville Brook—18,000 S1.
  - Germaine Brook—30,000 S1, 1,768 S5.
  - Hanford Brook—30,000 S1, 1,768 S5.
- Hanson Brook—30,000 S1.
- Henry Lake—30,000 S1.
- Kennebecasis River—
  - Cherry Lake—3,000 S2.
  - Dolan Lake—25,000 S2, 400 S4, 52 Sg.
    - Adams Lake—25,000 S2, 400 S4.
      - McCormac Lake—5,000 Sd, 25,000 S2, 400 S4.
- Limestone Lake—15,000 S1.
- Little River—
  - Boaz Lake—3,000 S2.
  - Douglas Lake—60,000 B1, 10,000 S1, 6,000 S2, 120 S4.
  - Elderly Brook—10,000 S1, 300 S4.
  - Graham Lake—40,000 S2, 1,066 S5.
  - Treadwell Lake—15,000 S1, 6,000 S2, 400 S4, 50 Sg.
- Mispec River—50,000 A1, 30,000 S1.
  - Beaver Lake—10,000 S2.
  - Brandy Brook—10,000 S2, 700 S5.
  - Loch Lomond Lake—85,000 S1, 18,000 S2, 400 S4, 509 Sf.
  - Taylor Lake—6,000 S2.
  - McCracken Lake—30,000 S2, 400 S4.
  - Second Lake—20,000 S1, 60 Sf.
  - Terrio Lake—30,000 S2, 400 S4.
  - Wilmot Stream—10,000 S1, 400 S4.
- Musquash River—
  - Clear Lake—10,000 S2.
  - Loch Alva Lake—25,000 S1.
  - Musquash River(East)—60,000 S2.
  - Musquash River (West)—60,000 S2, 1,200 S5, 480 Sf.
- Rays Lake—2,000 S2.
- Round Lake & Nelson Lake—10,000 S4.
- St. John River—
  - Back Dam—5,000 S1, 350 S5.
  - Kelly's Lake—20,000 S1, 700 S5.
  - Mary Ann Hole—5,000 S1, 350 S5.
  - Mayflower or Dark Lake—10,000 S1, 700 S5.
- Tynemouth Creek—15,000 A1, 4,408 A4.

Sunbury County—
- Oromocto Lake—54,000 A4.
- Oromocto River—
  - Boone Brook—16,000 Sd.
  - Dan Brook—16,000 Sd.
  - Hardwood Creek—24,000 Sd.
  - Lyons Stream—2,500 S3.
  - Mill Brook—8,000 Sd.
  - Monday Brook—8,000 Sd.
  - Morance Brook (Big)—24,000 Sd.
  - Morance Brook (Little)—16,000 Sd.
  - Nason Brook—8,000 Sd.
  - Otter Brook—8,000 Sd.
  - Peltoma Stream—24,000 Sd.
    - Peltoma Lake—56,000 Sd, 35,132 S2, 300 Sf, 50 Sg.
  - Pete Brook—8,000 Sd.
  - Piskahegon Stream—32,000 Sd.
  - Porcupine Brook—16,000 Sd.
  - Scribner Brook—8,000 Sd.
  - Three Tree Creek—40,000 Sd.
- Yoho Lake—17,500 S3.

Westmorland County—
- Abougoggan River—65,000 S2.
- Gosselin Pond—5,000 S2.
- Hayward Brook—18,000 S1.
- Petitcodiac River—
  - Cameron Brook—3,000 S3.
  - Chapman Brook—24,000 S1.
  - Hasty Brook—12,000 S1.
  - Hayward Brook—1,000 S3.
  - Intervale Creek—12,000 S1.
  - Killam Brook—12,000 S1.
  - Mill Creek—4,000 S3.
  - Nigus Brook—6,000 S1.
  - North River—96,000 S1, 4,000 S3.
    - Bennet Brook—24,000 S1.
  - Blakney Brook—18,000 S1.
    - Cochrane Brook—12,000 S1.
  - Tannery Brook—6,000 S1.
- Shediac River—100,000 S2, 4,223 S5, 350 Sf.
  - Scoudouc River—65,000 S2, 150 Sf.

York County—
- Didgeguash River—128,000 Sd.
  - McAdam Lake—200 Sf, 90 Sg, 60 Sh.
- Holland Lake—10,000 S3.
- Magaguadavic River—10,000 Af, 600 Sf, 200 Sg.
  - Cranberry Brook—80,000 Sd.
    - Sugar Brook—72,000 Sd.
  - Cranberry or Harvey Lake—59,000 A4, 10,000 Af.
  - Kedron Lake (Big)—35,132 S2, 300 Sf, 50 Sg.
  - Kedron Lake (Little)—35,132 S2, 300 Sf, 18 Sg, 19 Sh.
  - McAdam Reservoir—350 Sf, 170 Sg, 100 Sh.
- Oromocto Lake—50,000 S3.
- St. Croix River—
  - Sears Brook—24,000 Sd.
  - White Beaver Brook—16,000 Sd.

Atlantic Salmon	684,662
Brown Trout	372,800
Rainbow Trout	61,700
Sebago Salmon	36,143
Speckled Trout	5,405,979
Total	6,561,102

PRINCE EDWARD ISLAND

Cardigan Fish Culture Station

Kings County—
Bear River—2,000 S3.
Boughton River—1,600 S4.
Greystone Creek—1,600 S4.
Ross' Pond—4,800 S4.
Wigginton Stream—1,600 S4.
Brudenell River—
Jackson's Pond—3,200 S4.
Munn's Pond—7,200 S4.
Cardigan River—5,400 S4, 1,500 S5, 100 Sf.
Lewis Pond—1,600 S4.
Cherry Hill Stream—2,400 S4.
Dickson's Pond—1,200 Sf.
East Lake—4,000 S3.
Easton's Pond—3,200 S4.
Fitzpatricks Pond—4,800 S4, 1,200 S5.
Fortune River—20,000 A3.
Big Brook—4,800 S4.
Dingwells Stream—4,800 S4.
Fox River—4,000 S3.
Grahams Pond—2,000 S3.
Greek River—2,000 S3.
Finlaysons Pond—4,000 S3.
Hay River—2,000 S3.
Lakeside Pond—5,000 R4.
Lavandier's Pond—4,800 S4.
McCarnies Pond—2,000 S3.
MacKenzie's Pond—3,200 S4, 1,200 S5.
MacKinnon's Pond—6,400 S4.
McLauchlin's Pond—5,000 Sd.
McMillans Pond—2,000 S3.
Midgell River—20,000 A3, 3,200 S4.
MacDonald's Pond—6,400 S4.
McKinnon's Stream—3,000 S3.
Montague River—6,400 S4.
Knox's Pond—4,800 S4.
G. MacDonald's Pond—1,600 S4.
McRae's Pond—3,200 S4.
Valleyfield Stream—3,200 S4.
Morell River—37,420 A3, 8,200 Af, 4,800 S4.
Crane's Stream—4,800 S4.
Leards Pond—4,800 S4.
MacAulays Pond—2,400 S4.
Mooneys Pond—2,400 S4.
Morrison's Brook—1,000 Sf.
Morrison's Pond—4,000 S4.
Naufrage River—20,000 A3, 3,000 S3.
Larkins Pond—5,000 S3.
North Lake—5,000 S3.
Pine Brook—1,000 S3.
Priests Pond—2,000 S3.
Quigleys Stream—2,000 S3.
Stricklands Pond—6,000 S3.
Sturgeon River—4,000 S3.
Moore's Pond—5,600 S4.
Town Pond—2,000 S3.
Warren's Stream—4,000 S4.

Prince County—
Auld's Brook—2,000 S3.
Barbara Weit River—3,200 S4.
Black Pond—4,000 S4.
Carr's Brook—1,600 S4.
Clarks Stream—1,600 S4.
Conroy's Pond—1,600 S4.
Dunk River—4,800 S4.
Calbeck's Pond—5,000 S3.
Scales Pond—3,000 R4, 5,000 S3.
Wrights Pond—4,000 S3.
Enmore River—2,000 S5.
Gordons Pond—3,200 S4.
Grand River—
Barlow's Pond—3,000 S3.
Fitzgeralds Stream—2,000 S3.
Greenan's Stream—2,000 S3.
Ira Banks Pond—3,000 S3.
Kellys Stream—3,200 S4.
Lockerbys Pond—2,400 S4.
Luttrel Stream—3,200 S4.
MacLellans Stream—4,000 S3.
McNallys Pond—3,200 S4.
Mill River—
Bells Stream—2,400 S4.
Cains Stream—6,000 S3.
Gards Stream—3,200 S4.
Richards Pond—3,200 S4.
Myers Stream—3,200 S4.
Norrings Pond—2,000 S1.
Pierre Jacques River—4,000 S3.
Round Pond—3,200 S4.
Sheas Pond—2,200 S4.
Sheep River—3,200 S4.
Tignish River—25,000 A3, 5,300 S4.
Harpers Stream—2,200 S4.
Little Tignish River—4,800 S4.
Trout River—3,200 S4.
Getsons Pond—6,000 S3.
Leards Pond—4,000 S3.
Tryon River—
Ives Pond—4,000 S3.
Lords Pond—2,000 S3.
Warrens Stream—4,000 S3.
Wilmot River Pond—4,000 S4.

Queens County—
Blooming Point or Deroche Point Pond—8,000 R4.
Brander's Pond—2,000 S3.
Brazil Pond—5,600 S4.
Comptons Pond—3,200 S4.
Cooks Pond—3,200 S4.
Cousins Pond—2,000 S3.
Dalvay Lake—10,000 R4.
Dixons Stream—2,000 S3.
Fergusons Pond—2,000 S3.
Flat River—
Beatons Mill Pond—3,200 S4.
McPhersons Pond—3,200 S4.
Gurneys Stream—3,200 S4.
Hillsboro River—
East River—2,000 S3.
Glenfinnan Lake—10,000 R4, 3,700 Rf.
Glenfinnan River—2,400 S4.
Hope River—4,000 S3.
Simpsons Pond—4,000 R3, 4,000 S3.
Howatts Pond—2,000 Sd.
Hunter River—
Bagnalls Pond (Hazel Grove)—4,000 S3.
Bagnalls Pond (Rae)—4,000 S3.

Cardigan Fish Culture Station—*Conc.*

Queens County—Conc.
- Hunter River—*Conc.*
  - Campbells Pond—3,000 S3.
- Leard's Pond—2,000 S3.
- Long Pond—8,000 R4.
- MacGee Pond—3,200 S4.
- Orwell River—2,000 S3.
- Parsons Pond—1,200 Sf.
- Pinette River—
  - McPhersons Pond—3,200 S4.
  - Twin Ponds—3,200 S4.
- Rackhams Pond—1,200 Sf.
- Redmond's Pond—3,200 S4.
- Stanley River—
  - Coles Pond—2,400 S4.
  - Howetts Pond—4,000 S4.
- Stevensons Pond—10,000 S3.
- Tracadie Bay—
  - Donaldston Pond—1,000 S1.
  - MacAuleys Stream—4,000 S4.
  - Winter River—3,200 S4.
- Vernon River—
  - Lanes Brook—1,600 S4.
  - McLeans or Ross' Pond—4,000 S3.
  - McMillans Pond—4,000 S3.
- Warrens Pond—3,200 S4.
- West River—3,200 S4.
  - Carraghers Pond—3,200 S4.
  - Clyde River—6,400 S4.
  - Strathaven Pond—1,000 S1.

Atlantic Salmon	130,620
Rainbow Trout	51,700
Speckled Trout	452,700
Total	635,020