PROVINCE OF BRITISH COLUMBIA

Provincial Department of Fisheries

REPORT

WITH APPENDICES

for the Year Ended December 31st

1956

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1957

To His Honour FRANK MACKENZIE ROSS, C.M.G., M.C.,
Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

I beg to submit herewith the Annual Report of the Provincial Department of Fisheries for the year ended December 31st, 1956.

WILLIAM RALPH TALBOT CHETWYND,
Minister of Fisheries.

Department of Fisheries,
Minister's Office, Victoria, B.C.

WILLIAM RALPH TALBOT CHETWYND

It is with regret that we record the death of the Honourable William Ralph Talbot Chetwynd, Minister of Fisheries.

Mr. Chetwynd was born in Staffordshire, England, on July 28th, 1890, and was educated at Clifton College. He came to British Columbia in 1908, arriving at Ashcroft and finally settling at Walhachin, where he became interested in cattle-raising and farming.

At the outbreak of World War I, Mr. Chetwynd joined up with the Royal Field Artillery and went overseas in 1916. He was wounded in action on the Somme in 1918, while Acting Battery Commander, and won the Military Cross.

Mr. Chetwynd returned to Canada in 1919 and resumed his cattle-raising business until 1942, when he joined the staff of the Pacific Great Eastern Railway as right-of-way agent, public relations officer, and general " trouble-shooter " for that company. He remained with the P.G.E. until he entered politics.

Mr. Chetwynd was first elected to the British Columbia Legislature in June, 1952, for the constituency of Cariboo. He was appointed Minister of Fisheries, Minister of Trade and Industry, and Minister of Railways on August 1st, 1952. He was re-elected in 1953 and again in 1956, at which time he was appointed Minister of Agriculture and Minister of Fisheries.

Mr. Chetwynd died on April 3rd, 1957. He leaves his wife, one son, and two grandsons.

ANNOUNCEMENT

The first report of the " Fisheries Office " of the Provincial Government dealing with the fisheries of British Columbia was published in 1901. This Report has been published annually for the past fifty-six years.

In 1947, by an Act of the Legislature, the Department of Fisheries was established with a Minister of Fisheries as head of the Department and a Deputy Minister as administrator.

On March 28th, 1957, the Department of Fisheries was abolished, and it became the Fisheries Branch of the new Department of Recreation and Conservation created by an Act of the Legislature. The Honourable Earle C. Westwood is the Minister and Dr. D. B. Turner, Acting Deputy Minister. All matters relating to the management and administration of the Fisheries Branch, Game Commission, Parks Branch, Photographic Branch, and the British Columbia Government Travel Bureau come under the jurisdiction of the Department of Recreation and Conservation.

Mr. George J. Alexander, Deputy Minister of the former Department of Fisheries, retired on October 31st, 1956. He served the Government of the Province in commercial fisheries work from 1934 to 1956, following extensive service in the fishing industry at points along the coast of British Columbia.

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REPORT OF THE PROVINCIAL DEPARTMENT OF FISHERIES FOR 1956

VALUE OF BRITISH COLUMBIA'S FISHERIES IN 1956 SHOWS AN INCREASE

The total marketed value of the fisheries of British Columbia for 1956 amounted to $67,522,000.* This was an increase of $6,854,000 over the production for 1955.

The principal species marketed in 1956 were salmon, with a value of $44,306,000; herring, with a value of $10,660,000; and halibut, with a marketed value of $6,636,000 (livers and viscera excluded). The value of the salmon production in 1956 was $1,436,000 more than in 1955, and the herring production in 1956 increased $3,337,000 in comparison with the year previous. It should be noted that the herring figures are for the calendar year and, consequently, somewhat distort the picture as this fishery extends from November to March. The herring values quoted also include those fish landed in the months of January and February, which properly belong to the 1955–56 herring-fishing season. The value of the halibut-catch was $2,712,000 more than in 1955.

In the 1956 season the marketed value of shell-fish amounted to $2,074,000. The clam production was $360,000; oyster production, $425,000; crab production, $984,000; and shrimp production, $305.000.

The value of boats engaged in commercial fishing in 1956 was $43,143,000, and the total value of gear used in British Columbia's fisheries during 1956 was $7,675,000.

The above figures were taken from the "Preliminary Fisheries Statistics of British Columbia," published by the Department of Fisheries of Canada, Vancouver, B.C.

REVIEW OF BRITISH COLUMBIA'S SALMON-CANNING INDUSTRY, 1956

During the 1956 season eighteen salmon-canneries were licensed to operate by the Provincial Department of Fisheries. This was two less than operated in 1955. The location of the canneries operated in 1956 was as follows: Fraser River and Lower Mainland, 10; Central Area, 2; Skeena River, 5; and Queen Charlotte Islands, 1. No canneries have been operated on the Nass River or on Vancouver Island for some years. There were no canning operations on Rivers Inlet during 1956.

For the past few years the tendency has been to operate fewer canneries in remote areas and concentrate canning operations in more central locations. This has been made possible by the use of large, fast packers capable of carrying sufficient ice to transport the salmon in good condition over long distances to the processing plants, and equipped with radio-telephones for direct communication with the fishermen and shore plants.

The only disruption in the 1956 fishing season occurred during the period October 15th to December 5th, due to a price dispute between the herring seine-fishermen and the fishing companies.

The reader, when referring to the canned-salmon pack, should take into consideration the quantities of spring, cohoe, and chum salmon which find an outlet in the fresh and frozen-fish trade, also the large amount of chum salmon which is exported to the United States for processing each fall. Since 1947 fresh chum salmon have been permitted to be exported to the United States after September 1st in each year, which has had the effect of reducing the British Columbia canned-salmon pack.

* This figure does not include Japanese-caught tuna canned in British Columbia.

THE CANNED-SALMON PACK FOR BRITISH COLUMBIA, 1956

The total canned-salmon pack for British Columbia in 1956, according to the annual returns submitted to the Provincial Department of Fisheries by those canners licensed to operate, was 1,112,844 cases, compared with 1,410,298 cases canned in the year previous. The 1956 pack was the lowest since 1944. The 1956 pack was 297,454 cases less than in 1955 and 367,705 cases below the average annual pack for the previous five-year period.

The 1956 canned-salmon pack was composed of 320,093 cases of sockeye, 11,672 cases of springs, 1,254 cases of steelheads, 212,140 cases of cohoe, 363,614 cases of pinks, and 204,070 cases of chums.

The 1956 sockeye-pack of 320,093 cases was 75,272 cases higher than the pack for the previous year and 129,040 cases less than the cycle-year 1952. The spring-salmon pack of 11,672 cases was the smallest pack since 1952, in which year 9,279 cases were canned. The total cohoe-pack of 212,140 cases was the largest since the record pack of 313,674 cases in 1951. The 1956 pink-salmon pack was 363,614 cases, compared with 831,225 cases in 1955 and 337,060 cases in the cycle-year 1954. The chum-salmon pack in 1956 was 204,070 cases. This is compared with 128,289 cases in the year previous and 96,005 cases in 1952, which was the smallest pack for this species on record.

In considering the pack of chum salmon, due allowance must be made for the large numbers which are exported to the United States each year.

The reader is referred to the tables in the Appendix to this Report for a breakdown of the different species of canned salmon by districts.

In the Appendix to this Report is published, for the first time, a table giving a complete summary of the total numbers and weight of all salmon caught by commercial fishermen in British Columbia during 1956. These figures are compiled from sales-slips received by the Department of Fisheries of Canada, Vancouver, B.C. The reader is cautioned that the total figures include all species of salmon used for processing, canning, fresh and frozen, and exported in the raw state to the United States.

Any attempt to estimate the total run of any species of salmon to any river system should take into consideration the escapement to the spawning-beds. The reader is referred to "The Salmon-spawning Report, British Columbia, 1956," and "Catch Statistics," published in the Appendix to this Report.

BRITISH COLUMBIA'S CANNED-SALMON PACK BY DISTRICTS

Fraser River

The total canned-salmon pack for the Fraser River in 1956 amounted to 113,954 cases, compared with previous packs for this river system, as follows: 1955, 294,238 cases; 1954, 563,087 cases; 1953, 496,396 cases; and 1952, 151,147 cases. The 1956 pack was composed of 88,132 cases of sockeye, 2,873 cases of springs, 337 cases of steelheads, 12,273 cases of cohoe, 348 cases of pinks, and 9,989 cases of chums.

Sockeye Salmon.—In 1956 the Canadian pack of sockeye salmon for the Fraser River amounted to 88,132 cases. This was the smallest pack for this species since 1950, when the pack amounted to 108,223 cases. The 1956 pack was 124,784 cases less than the average annual pack for this river system for the previous five-year period. The 1952 cycle-year for Fraser River sockeye produced a pack of 134,625 cases.

The Fraser River sockeye-salmon fishery is regulated by the International Pacific Salmon Fisheries Commission under treaty between Canada and the United States. The Commission is composed of six members, three of whom are appointed by the Canadian Government and three by the United States Government.

The Commission regulates the Fraser River sockeye-salmon fishery in such a way that the nationals of each country share the catch equally. The Fraser River Sockeye Salmon Fishery Regulations are formulated by the International Pacific Salmon Fisheries Commission and are enforced by the Department of Fisheries of Canada. In 1956 the Commission recommended a special closed period extending from June 28th to September 19th for the purpose of providing an adequate escapement to the spawning-beds and to obtain a closer division of the catch between Canadian and American fishermen. The efforts of the Commission are producing excellent results.

According to the figures released by the Commission in 1956, the total sockeye-catch was 1,801,708 fish. The Canadian catch amounted to 894,836 fish and was 49.7 per cent of the total catch. The following table shows the percentage of catch by American and Canadian fishermen since 1939.

	American (Per Cent)	Canadian (Per Cent)
1939	44.50	55.50
1940	37.50	62.50
1941	39.30	60.70
1942	37.20	62.80
1943	37.42	62.58
1944	29.77	70.23
1945	39.90	60.10
1946	43.90	56.10
1947	16.60	83.40
1948	59.47	40.53
1949	49.98	50.02
1950	57.70	42.30
1951	46.78	53.22
1952	49.74	50.26
1953	50.31	49.69
1954	50.44	49.56
1955	48.00	52.00
1956	50.30	49.70

In the Appendix to this Report is a table showing the total sockeye-salmon packs of the Fraser River arranged in accordance with the four-year cycles, from 1895 to 1956, inclusive, and showing the catches made by British Columbia and Washington fishermen in the respective years.

The report of the activities of the International Pacific Salmon Fisheries Commission for 1956 is published in the Appendix to this Report.

Spring Salmon.—The fresh- and frozen-fish trade consumes large quantities of spring salmon; therefore, the canned pack of this species is never indicative of the size of the catch or the size of the run. The spring-salmon pack for 1956 was 2,873 cases, compared with 6,843 cases in 1955, 8,298 cases in 1954, 5,620 cases in 1953, and 2,279 cases in 1952.

Cohoe Salmon.—The Fraser River produced a pack of 12,273 cases of cohoe in 1956. This is compared with 15,910 cases in 1955 and 11,948 cases in 1954. In 1953, the cycle-year, 15,480 cases were canned. Large quantities of cohoe caught in the Fraser River area enter the fresh- and frozen-fish market and, of course, are in addition to the canned-salmon pack.

Pink Salmon.—The pink-salmon run to the Fraser River occurs only every alternate year, the runs coinciding with the odd-numbered years. In 1956 the Fraser River produced a pack of 348 cases, compared with 160,187 cases in 1955, 17 cases in 1954, and 204,421 cases in 1953.

Chum Salmon.—The chum-salmon pack on the Fraser River for 1956 was 9,989 cases. This is compared with the 1955 pack of 7,350 cases and the 1954 pack of 45,444 cases. The 1956 chum pack was disappointing and was 9,647 cases below the average annual pack for the past five years.

Skeena River

The Skeena River in 1956 produced a total salmon-pack of 55,527 cases. This was the smallest pack for the Skeena since 1947, when 79,718 cases were canned. Fishing in this river was curtailed by special regulatory measures designed to increase salmon escapements in an effort to re-establish the salmon runs depleted as a result of the rock-slide which blocked the Babine River, a major spawning area, during the 1951–52 brood-year.

The total pack in 1956 was 67,980 cases less than were packed in the year previous and 75,322 cases below the average annual pack on the Skeena for the past five years. The 1956 pack is compared with the pack of 1955, in which year there were a total of 123,507 cases canned. The 1954 pack was 136,500 cases, while 117,406 cases were canned in 1953.

In 1956 the canned-salmon pack on the Skeena River was composed of 14,663 cases of sockeye, 371 cases of springs, 312 cases of steelheads, 8,265 cases of cohoe, 25,633 cases of pinks, and 6,283 cases of chums.

The sockeye run to the Skeena River has been decreasing in latter years, and the special regulatory measures enforced to increase the escapement to the spawning-beds were justified. As a conservation measure, fishing for all species of salmon was curtailed, which resulted in the lowest salmon-pack ever recorded for the Skeena River.

The reader should note that any consideration of the canned-salmon pack as a measure of the total run of any species should take into account the escapement to the spawning-beds. This is contained in the " Salmon-spawning Report, British Columbia, 1956," published in the Appendix to this Report.

Sockeye Salmon.—The pack of sockeye salmon on the Skeena River in 1956, amounting to 14,663 cases, was again disappointing. This is compared with 14,649 cases packed in 1955 and 60,816 cases canned in 1954. The 1953 pack was 65,003 cases, and 114,775 cases were packed in 1952.

Spring Salmon.—Spring salmon on the Skeena River, as on other river systems in the Province, are usually caught incidental to fishing for other species and find an outlet in other than the canned-salmon market; therefore, the size of the spring-salmon pack is not indicative of the size of the run of this species to any river system.

In 1956 the canned pack of spring salmon amounted to 371 cases. This is compared with 1,430 cases in 1955, 1,260 cases in 1954, 1,174 cases in 1953, and 2,082 cases in 1952.

Cohoe Salmon.—The Skeena River is never a large producer of cohoe salmon. In 1956 there were 8,265 cases of cohoe canned, compared with 14,192 cases in 1955 and 10,449 cases in 1954. The 1956 pack was 1,040 cases below the average annual pack for this river system for the previous five-year period.

Pink Salmon.—The 1956 pack of pink salmon, amounting to 25,633 cases, was disappointing after the large pack of 86,788 cases in 1955. The 1956 pack was 13,691 cases less than the cycle-year 1954, in which year 39,324 cases were canned. The 1953 pack was 29,884 cases.

Chum Salmon.—In 1956 the Skeena River produced a pack of chum salmon amounting to 6,283 cases. This is compared with 5,471 cases in 1955 and 23,135 cases in 1954. In 1953 the chum-salmon pack was 15,114 cases, while in 1952 only 4,638 cases were canned. The chum-salmon pack was 4,645 cases below the average annual pack for the previous five-year period.

Nass River

The canned-salmon pack for the Nass River in 1956 amounted to 111,414 cases. This was the largest pack for the Nass since 1951, when the total pack was 152,742 cases. The Nass River pack has been rather consistent since 1953. In 1955 the pack was 62,081 cases, compared with 69,358 cases in 1954 and 66,510 cases in 1953.

The Nass River pack in 1956 was composed of 22,505 cases of sockeye, 536 cases of springs, 217 cases of steelheads, 8,165 cases of cohoe, 44,402 cases of pinks, and 35,588 cases of chums.

Sockeye Salmon.—In 1956 the Nass River produced a sockeye-salmon pack of 22,505 cases, compared with 13,654 cases in 1955, 10,285 cases in 1954, 18,162 cases in 1953, and 29,429 cases in 1952. The 1956 sockeye-pack was 3,698 cases above the average annual pack for the previous five-year period.

Spring Salmon.—Spring salmon on the Nass River are caught only incidentally while fishing for other species of salmon, consequently the pack is not always an indication of the size of the run or of the catch.

In 1956 the Nass produced 536 cases of springs, compared with 1,028 cases in 1955, 398 cases in 1954, 527 cases in 1953, and 641 cases in 1952.

Cohoe Salmon.—The pack of cohoe salmon on the Nass River in 1956 amounted to 8,165 cases, compared with 9,356 cases in 1955, 6,024 cases in 1954, 5,118 cases in 1953, and 1,223 cases in 1952.

Pink Salmon.—The Nass River produced a pack of pink salmon in 1956 amounting to 44,402 cases. This pack is compared with the cycle-years 1954 and 1952, when 36,448 and 13,016 cases, respectively, were canned. The pack in 1955 was 29,040 cases, and in 1953 there were 16,635 cases canned.

Chum Salmon.—The chum-salmon pack for the Nass River in 1956, amounting to 35,588 cases, must be considered a large one when compared with the size of former packs of this species for this river system. The 1956 chum-salmon pack was the largest pack since 1951, when 37,742 cases were canned. In 1955 the pack of chums was 8,904 cases; in 1954, 15,965 cases; in 1953, 25,756 cases; and in 1952, 13,112 cases.

Rivers Inlet

Rivers Inlet is mainly a sockeye gill-net area. In 1956 the total pack amounted to 146,683 cases, producing a good pack of sockeye salmon. The Rivers Inlet pack in 1956 was composed of 124,634 cases of sockeye, 419 cases of springs, 55 cases of steelheads, 6,601 cases of cohoe, 12,046 cases of pinks, and 2,926 cases of chums.

Sockeye Salmon.—Rivers Inlet in 1956 was one of the top sockeye-producing areas. The pack amounted to 124,634 cases, compared with 50,702 cases in 1955, 50,639 cases in 1954, 132,925 cases in 1953, and 84,297 cases in 1952. The sockeye-pack in 1956 was 35,995 cases above the average annual pack for this species for the previous five years and 34,063 cases above the average annual pack for the previous ten-year period.

Spring Salmon.—Spring salmon are usually caught incidentally while fishing for sockeye in Rivers Inlet; therefore, the pack is never large in this area. The pack of spring salmon amounted to 419 cases in 1956, compared with 813 cases in 1955, 649 cases in 1954, 865 cases in 1953, and 865 cases in 1952.

Cohoe Salmon.—Rivers Inlet is never a large producer of cohoe salmon. The 1956 pack of 6,601 cases was the largest since 1951, when 12,416 cases were canned. The pack in 1955 amounted to 5,316 cases, while in 1954 the pack was 4,669 cases. In 1953 there were 1,979 cases of cohoe canned from Rivers Inlet caught fish and 3,415 cases in 1952.

Pink Salmon.—In Rivers Inlet, pink salmon are caught in gill-nets incidentally while fishing for sockeye salmon. The pack in 1956 amounted to 12,046 cases, while the previous years' packs were: 1955, 8,658 cases; 1954, 2,581 cases; 1953, 7,304 cases; and 1952, 12,469 cases.

Chum Salmon.—In 1956 the chum-salmon pack in Rivers Inlet amounted to 2,926 cases, compared with 5,588 cases in 1955, 12,352 cases in 1954, 5,627 cases in 1953, and 3,711 cases in 1952.

Smith Inlet

Smith Inlet is similar to Rivers Inlet, in that both are predominantly sockeye gill-net fishing areas. Other species of salmon caught in Smith Inlet are usually caught incidently while fishing for sockeye. The total canned-salmon pack for Smith Inlet in 1956 amounted to 42,652 cases, composed of 36,898 cases of sockeye, 166 cases of springs, 2,249 cases of cohoe, 1,664 cases of pinks, and 1,642 cases of chums.

Sockeye Salmon.—In 1956 Smith Inlet produced a pack of 36,898 cases of sockeye, compared with the previous year's pack of 28,864 cases. This area produced 18,937 cases of sockeye in 1954, 29,947 cases in 1953, and 34,834 cases in 1952, the cycle-year. The 1956 pack was 7,002 cases above the average annual pack for Smith Inlet for the previous five-year period.

Spring Salmon.—The spring-salmon pack for Smith Inlet is never large as this species is only caught incidental to fishing for sockeye. In 1956 there were 166 cases of spring salmon canned from Smith Inlet caught fish, compared with the 1955 pack of 326 cases. In 1954 the pack was 177 cases; in 1953 it was 176 cases; and in 1952, 367 cases.

Cohoe Salmon.—The cohoe-pack for 1956 amounted to 2,249 cases. This was the largest pack since 1951, when 3,259 cases were canned. The packs for the previous years were: 1955, 1,014 cases; 1954, 868 cases; and 1953, 615 cases.

Pink Salmon.—The pink-salmon pack for Smith Inlet has never been very large. This species also is caught incidental to fishing for sockeye. In 1956 pink salmon caught in Smith Inlet produced a pack of 1,664 cases, compared with 2,275 cases in 1955, 523 cases in 1954, and 1,017 cases in 1952.

Chum Salmon.—There were 1,642 cases of chum salmon canned in 1956 from Smith Inlet caught fish, compared with 2,070 cases in 1955, 2,992 cases in 1954, and 4,015 cases in 1953. In 1952 the pack for this species dropped to 315 cases.

Queen Charlotte Islands

The principal species of salmon caught in the Queen Charlotte Islands District are pinks and chums, although a considerable number of cohoe and springs are caught for the fresh- and frozen-fish markets. Pink salmon are caught only every alternate year in this district, the runs coinciding with the even-numbered years. All other species are caught every year.

In 1956 the Queen Charlotte Islands produced a total pack of canned salmon amounting to 44,891 cases, composed of 1,323 cases of sockeye, 7,314 cases of cohoe, 18,809 cases of pinks, and 17,443 cases of chums.

Sockeye Salmon.—In 1956 the sockeye-pack amounted to 1,323 cases, compared with 433 cases in 1955, 107 cases in 1954, and 246 cases in 1953. In 1952 the pack was 635 cases. In the Queen Charlotte Islands District, sockeye are caught only incidentally while fishing for other species.

Spring Salmon.—As previously mentioned, spring salmon caught in this area usually enter the fresh- and frozen-fish trade. In 1956, 1 case of spring salmon was canned, compared with 16 cases in 1955, 6 cases in 1954, and 1 case in 1953.

Cohoe Salmon.—In 1956 there were 7,314 cases of cohoe salmon canned from Queen Charlotte Islands caught fish, while in 1955 the pack was 11,666 cases. In 1954 the pack amounted to 11,289 cases, and in 1953, 2,437 cases were canned.

Pink Salmon.—In the Queen Charlotte Islands, pink salmon run only in the even-numbered years. The expected run for 1956 did not materialize; therefore, the pink-salmon pack of 18,809 cases was most disappointing. In 1955 the pack was 548 cases, while in 1954, the cycle-year, the pack amounted to 105,123 cases.

Chum Salmon.—The 1956 pack of chum salmon in the Queen Charlotte Islands District, amounting to 17,443 cases, was again disappointing. In 1955 the pack was 9,402 cases, compared with 83,805 cases in 1954 and 17,304 cases in 1953. Commenting on the spawning conditions in the area in 1956, the Chief Supervisor of Fisheries says: "The chum-salmon failure in the Queen Charlotte Islands area was pronounced and is the fourth consecutive season of poor chum-salmon runs, calling for immediate application of extraordinary measures for the rehabilitation of one of the prolific chum-streams in this area. Pink returns to this area were also disappointingly light and will also require special conservation attention."

The Chief Supervisor's report on the spawning-beds, also the catch summary for each district, will be found in the Appendix to this Report.

Central Area

The Central Area includes all the salmon-fishing areas from the Skeena River to Cape Calvert, with the exception of Rivers Inlet. The total production of canned salmon from fish caught in this area in 1956 amounted to 324,164 cases, compared with 214,998 cases in 1955 and 327,820 cases in 1954. The 1956 pack consisted of 17,967 cases of sockeye, 1,364 cases of springs, 273 cases of steelheads, 40,299 cases of cohoe, 205,658 cases of pinks, and 58,602 cases of chums.

Sockeye Salmon.—Again in 1956 the Central Area sockeye-pack was small, and the 17,967 cases canned was the smallest pack of this species since 1949, when 16,140 cases were packed. In the previous years the packs were as follows: 1955, 19,648 cases; 1954, 30,858 cases; 1953, 25,845 cases; and 1952, 26,583 cases. The sockeye-pack in the Central Area was 6,213 cases below the average annual pack of sockeye in this area for the previous five-year period.

Spring Salmon.—In 1956 the pack of spring salmon in the Central Area amounted to 1,364 cases, compared with 1,864 cases in 1955, 1,645 cases in 1954, 1,568 cases in 1953, and 1,261 cases in 1952.

Cohoe Salmon.—The cohoe-pack of 40,299 cases in 1956 was the largest pack of this species in this area since 1951, when 61,423 cases were canned. In 1955 the pack amounted to 24,846 cases; in 1954 it was 25,611 cases; in 1953, 21,502 cases were canned; and 17,289 cases were packed in 1952. The cohoe-pack in 1956 was 9,970 cases above the average annual pack for this area for the previous five-year period.

Pink Salmon.—For years the Central Area has been a heavy producer of pink salmon. In 1956 the pink-salmon pack amounted to 205,658 cases, compared with 122,371 cases in 1955, 118,538 cases in 1954, 92,517 cases in 1953, and 207,055 cases in 1952. The pink-salmon pack in 1956 was 56,421 cases above the average annual pack for this area for the previous five-year period.

Chum Salmon.—The chum-salmon pack for the Central Area in 1956, amounting to 58,602 cases, must be considered disappointing when compared with the 1955 pack of 45,950 cases. In 1954 the chum-pack was 149,672 cases, while in 1953 the Central Area produced a pack of 175,289 cases. In 1952 there were 36,605 cases canned.

Reports from the spawning-grounds on the escapement of chums in the Central Area indicate that "the runs were light and below those of 1952."

Vancouver Island

The Vancouver Island District, like the Central Area, supports numerous races of salmon migrating to different streams. No attempt is made to deal with the various races separately. It should be pointed out, however, that the sockeye salmon caught in the Sooke traps and vicinity are not credited to Vancouver Island, but to the Fraser River, where most of them are known to migrate. Similarly, sockeye caught in Johnstone Strait between Vancouver Island and the Mainland are also credited to the Fraser River in this Report and not to Vancouver Island. These fish are known to be migrating to the Fraser River.

For statistical purposes of this Report, salmon, other than sockeye, caught in Johnstone Strait between Vancouver Island and the adjacent Mainland are credited to Vancouver Island.

The total salmon-pack from Vancouver Island caught fish amounted to 265,523 cases in 1956, compared with 581,599 cases in 1955 and 349,586 cases in 1954. The Vancouver Island salmon-pack in 1956 was composed of 13,970 cases of sockeye, 5,941 cases of springs, 25 cases of steelheads, 118,938 cases of cohoe, 55,052 cases of pinks, and 71,595 cases of chums.

Sockeye Salmon.—In 1956 Vancouver Island and the adjacent Mainland area produced a pack of 13,970 cases, compared with 13,192 cases in 1955, 12,051 cases in 1954, 46,895 cases in 1953, and 24,252 cases in 1952.

For details of the escapement to the spawning-grounds, the reader should refer to the spawning report published in the Appendix to this Report.

Spring Salmon.—The 1956 pack of spring salmon credited to Vancouver Island and the adjacent Mainland was 5,941 cases, compared with 5,534 cases in 1955. This area produced 1,649 cases in 1954 and 3,115 cases in 1953. A considerable amount of spring salmon is caught each year by trolling off the west coast of Vancouver Island. The canned-salmon pack figures are not indicative of the size of the catch because troll-caught salmon from this area also find an outlet in the fresh, frozen, and mild-cured markets.

Cohoe Salmon.—Cohoe are caught in large quantities by trolling off the west coast of Vancouver Island and, like spring salmon, also find a market in the fresh- and frozen-fish trade. For this reason the canned pack is not indicative of the size of the catch. Bluebacks are included with the cohoe-pack.

In the Vancouver Island and adjacent Mainland area in 1956 the cohoe-pack amounted to 118,938 cases, compared with 101,349 cases in 1955, 54,783 cases in 1954, and 57,773 cases in 1953.

Pink Salmon.—The pink-salmon pack for Vancouver Island and the adjacent Mainland in 1956 was 55,052 cases. This is compared with the packs in the even-numbered cycle-years—namely, 1954, when 32,913 cases were packed, and the 1952 pack of 171,812 cases. The largest pink-salmon runs and packs for this area, according to records, are produced in the odd-numbered years. In 1955 the pack amounted to 421,355 cases, compared with 439,173 cases in 1953 and 303,102 cases in 1951.

Chum Salmon.—The chum-salmon pack for Vancouver Island in 1956 was 71,595 cases, compared with 40,105 cases in 1955, 248,098 cases in 1954, 124,840 cases in 1953, and a small pack of 24,039 cases in 1952.

In 1956 there were 8,034 cases of cohoe imported from Alaska canned in British Columbia.

OTHER CANNERIES

Pilchard-canneries.—Since 1949 there have been no pilchards in British Columbia waters. No pilchard-cannery licences were issued during the 1956 season.

Herring-canneries.—In 1956 one herring-cannery was licensed to operate in British Columbia, producing a pack of 11,728 cases. This pack is compared with the year previous, when a total of 25,508 cases of herring were canned in various sizes, including sardines and oval snacks.

Tuna-fish Canneries.—The first commercial tuna-fish canning operation in British Columbia was licensed by the Provincial Department of Fisheries in 1948. In 1956 one tuna-fish cannery was licensed to operate. This cannery produced 56,256 cases of 7-ounce cans, 19,181 cases of 48/6-ounce cans, and 22,828 cases of 4-ounce cans. In 1955 one tuna-fish cannery operated, producing 73,126 cases of 7-ounce cans and 29,675 cases of 4-ounce cans. In 1956, as in 1955, all of the tuna canned in British Columbia were imported from Japan in a frozen condition.

The tuna-fishery off the west coast of British Columbia is still in an experimental condition, consequently the catch will vary from year to year.

Shell-fish Canneries.—In 1956 eight shell-fish canneries were licensed in British Columbia, all of which operated. This was two less than operated in 1955. The eight shell-fish canneries produced the following packs in 1956:—

Crabs: 32,995 cases of 24/½'s, 1,552 cases of 48/½'s, and 2,281 cases of 48/¼'s.

Clams: 2,206 cases of 48/1's, 9,634 cases of 24/1's, 2,709 cases of 48/½'s, and 7,109 cases of 24/½'s.

Oysters: 5,085 cases of 48/¼'s, 1,026 cases of 48/10-oz., and 1,114 cases of 48/10-ounce oyster stew.

Abalones: 10 cases of 48/1's.

MILD-CURED SALMON

Six plants were licensed to mild-cure salmon in 1956, all of which operated. These six plants produced 703 tierces of mild-cured salmon, totalling 5,985 hundredweight. This operation is compared with the production of five plants licensed to operate in 1955 which produced a pack of 553 tierces of mild-cured salmon containing 5,085 hundredweight.

DRY-SALT SALMON

Since the end of World War II the business of dry-salting salmon has not been revived. In 1947 two licences were issued, but no operation took place. No licences have been issued for salmon dry-salteries since that time.

DRY-SALT HERRING

In 1956 one herring dry-saltery was licensed to operate, producing 1,202 boxes of dry-salt herring. This is compared with the production of one plant licensed in 1955, which produced 1,016 boxes of salt herring.

HALIBUT-FISHERY

The halibut-fishery on the Pacific Coast of North America is regulated by the International Pacific Halibut Commission, which Commission is set up under treaty between Canada and the United States for the protection and rehabilitation of the halibut-fishery. This is a deep-sea fishery and is shared by the nationals of the two countries, Canada and the United States. The Commission regulates the fishery on a quota basis and, on that account, there is little fluctuation in the amount of halibut landed from year to year, except when the quotas are changed by the Commission for any reason. There is, however, some fluctuation from year to year in the quantity landed by the nationals of each country.

For the purpose of regulation, the coast was originally divided into a number of areas, the principal ones, from the standpoint of production, being Areas 2 and 3. The Commission has found it necessary to subdivide these areas into a number of sub-areas in order to facilitate its work and to make better use of the stock of halibut on the different banks. For a more detailed breakdown of the areas and the geographical limits of each, the reader is referred to the Pacific Halibut Regulations for 1956.

The 1956 catch-limits set by the Commission for the different areas were as follows: Area 2, 26,500,000 pounds, and Area 3, 28,000,000 pounds. These were the same quantities as were permitted in 1955.

In 1956 the total landings by all vessels in all ports amounted to 67,566,000 pounds, compared with 59,094,000 pounds in 1955. The 1956 catch was derived by areas as follows: Area 1A, 430,000 pounds; Area 1B, 174,000 pounds; Area 2, 35,372,000 pounds; Area 3A, 30,928,000 pounds; and Area 3B, 662,000 pounds.

The total halibut-landings by all vessels in Canadian ports in 1956 was 25,935,000 pounds. This is compared with 22,601,000 pounds in 1955. The total landings by all vessels in Canadian ports in 1956 were caught as follows: Area 2, 15,686,000 pounds; Area 3A, 10,102,000 pounds; Area 3B, 147,000 pounds.

Canadian vessels landed in Canadian ports in 1956 a total of 22,934,000 pounds of halibut. This catch is compared with Canadian landings by Canadian vessels in 1955 amounting to 19,850,000 pounds. The Canadian vessels took their catches by areas as follows: Area 2, 14,988,000 pounds; Area 3A, 7,799,000 pounds; and Area 3B, 147,-000 pounds.

In addition to the above, Canadian vessels landed in American ports in 1956, 2,723,000 pounds of halibut, compared with the same landings in 1955 of 2,298,000 pounds. The halibut landed by Canadian vessels in American ports in 1956 was caught as follows: Area 2, 93,000 pounds; Area 3A, 2,456,000 pounds; and Area 3B, 174,000 pounds.

American vessels landed in Canadian ports in 1956 a total of 3,001,000 pounds of halibut, compared with the same landings in 1955 amounting to 2,751,000 pounds. The American catch landed in Canadian ports was caught as follows: Area 2, 698,000 pounds, and Area 3A, 2,303,000 pounds.

The average price paid for Canadian halibut in Prince Rupert and the average price for all Canadian landings in Canadian ports in 1956 was 21.7 cents per pound, compared with 13 cents per pound in 1955. There was no average price immediately available for Prince Rupert alone when these figures were compiled. The average price of halibut in the Province as a whole usually reflects the Prince Rupert price.

A breakdown of the value of halibut-livers and vitamin-bearing halibut viscera, which is usually included in this Report, is not available at this time. However, it is known that halibut-livers to the value of $34,708 and Vitamin A bearing viscera to the value of $5,232 were landed by the United States fleet. The Canadian fleet will have, no doubt, received proportionately a similar amount for livers and Vitamin A bearing viscera landed in Canada.

The above figures relating to the halibut-catch are to the nearest thousand pounds.

The statistical information for the halibut-fishery was supplied by the International Pacific Halibut Commission and is hereby gratefully acknowledged.

FISH OIL AND MEAL

The production of fish-oil and edible fish-meal has been an important branch of British Columbia's fisheries for a number of years. Previous to World War II, pilchards and herring were the principal species used for reduction to meal and oil. The products of the reduction plants found a ready market, the meal being used as a supplementary food for animal-feeding and the oil being used in manufacturing processes of many kinds.

The demand for natural sources of vitamins stimulated the production of vitamin oils from fish products, and at the outbreak of World War II the demand for natural sources of vitamins greatly increased the production of fish-oils of high vitamin content. This increased demand brought into use other fish besides herring and pilchards during the war years and immediately afterwards. Dogfish and shark livers were in high demand in those years. Recently, however, the increased production of synthetic Vitamin A has lessened the demand for fish-liver oil as a natural source of this vitamin, and if the price of synthetic Vitamin A falls much lower, the market for livers containing this vitamin may very soon disappear.

In addition to the production of oils from British Columbia's various fish and fish-livers in recent years, there has been considerable activity in the use of cannery-waste and viscera for the production of various pharmaceutical products. Besides the high vitamin-content oils used in the medicinal field, British Columbia's fish-oils of lower vitamin potency find an outlet in many manufacturing processes, and large quantities are used for the feeding of poultry and live stock.

Fish-liver Oil.—In 1956, only four plants were licensed to reduce fish-livers to oil, all of which operated. The four plants processed 648,134 pounds of livers and produced Vitamin A to the extent of 2,355,410 million U.S.P. units. This production is compared with that of 1955, in which year four plants operated and produced a total of 4,760,668 million U.S.P. units of Vitamin A from 1,198,010 pounds of fish-livers.

Herring Reduction.—The winter herring-fishery has developed into British Columbia's second important fishery in dollar value. The season generally runs from late in September or early in October through until the following March, with a short break at the Christmas period. Many of the boats used in catching herring are also used in salmon-fishing, and, generally speaking, the herring-fishery does not get into full swing until the boats have been released from fishing for salmon.

In 1956 thirteen herring-reduction plants were licensed to operate, producing herring-meal to the extent of 32,772 tons and 3,602,937 imperial gallons of oil. This production is compared with the year previous, when fifteen plants produced 47,097 tons of meal and 4,475,536 imperial gallons of oil.

Whale Reduction.—In British Columbia there is only one shore-based whaling-station. In 1956 operations from this station killed 375 whales, compared with 630 in 1955.

Miscellaneous Reduction.—Dogfish and fish-offal reduction plants are licensed by the Provincial Department of Fisheries under miscellaneous reduction licences. These plants operate on cannery-waste and the carcasses of dogfish and produce meal and oil for various purposes. The oil produced from the carcasses of dogfish should not be confused with the oil produced from dogfish-livers, the latter being a high-potency oil which is reported in another section of this Report.

In 1956 ten plants were licensed to operate, producing 1,925 tons of meal and 187,787 imperial gallons of oil. This production is compared with 1955, when nine plants were licensed and produced 1,993 tons of meal and 201,690 imperial gallons of oil.

NET-FISHING IN NON-TIDAL WATERS

Under section 73 of the British Columbia Fishery Regulations, fishing with nets in certain specified non-tidal waters within the Province is permissible under licence from the Provincial Minister of Fisheries. This fishery is confined almost exclusively to the residents living within reasonable distance of the lakes in question.

In the Appendix to this Report there again appears a table showing the name and number of lakes in which net-fishing has been permitted, together with the number and approximate weight of the various species of fish taken from each lake.

It will be noted that there are three different kinds of fishing licences issued for net-fishing in the non-tidal waters of the Province—namely, fur-farm, ordinary, and sturgeon. The fur-farm licences are issued to licensed fur-farmers, and the coarse fish taken under these licences are used for food for fur-bearing animals held in captivity. Ordinary fishing licences are issued for the capture of fish other than trout, salmon, or sturgeon, while licences issued for sturgeon-fishing are used exclusively for that fishery.

A detailed account of the fish taken by the licensed nets in the different waters of the Province is again carried in the table appearing in the Appendix to this Report.

CONDITION OF BRITISH COLUMBIA'S SALMON-SPAWNING GROUNDS

We are again indebted to the Chief Supervisor of the Department of Fisheries of Canada and the officers of his department, who conducted the investigation, for furnishing us with a copy of the Department's report on the salmon-spawning grounds of British Columbia and permitting it to be published in the Appendix to this Report. The Chief Supervisor's courtesy in supplying us with this information is gratefully acknowledged.

VALUE OF CANADIAN FISHERIES AND THE STANDING OF THE PROVINCES, 1955

The value of fisheries products of Canada for the year 1955 totalled $179,068,000. During that year British Columbia produced fisheries products to the value of $60,668,000, or 33 per cent of Canada's total. British Columbia, in 1955, led all of the Provinces of Canada in respect to the production of fisheries wealth. Her output exceeded that of Nova Scotia, second in rank, by $16,668,000.

The marketed value of the fisheries products of British Columbia in 1955 was $8,754,000 less than the year previous. The value of salmon amounted to $42,869,000.

The following statement gives the value of fisheries products of the Provinces of Canada for the years 1951 to 1955, inclusive:—

Province	1951	1952	1953	1954	1955
British Columbia	$83,812,704	$56,635,000[1]	$65,455,000[1]	$69,422,000[1]	$60,668,000[1]
Nova Scotia	40,296,367	42,435,000	40,012,200	41,000,000[2]	44,000,000[2]
New Brunswick	21,154,877	20,503,700	17,522,700	18,158,000[2]	21,200,000[2]
Quebec	5,511,379	6,113,000	5,804,000	5,423,000[2]	6,000,000[2]
Ontario	7,924,530	8,343,700	7,916,100	7,890,000	7,300,000
Manitoba	7,524,392	5,959,700	4,784,500	5,435,000	6,000,000
Prince Edward Island	3,212,629	3,758,700	4,048,900	4,000,000[2]	4,500,000[2]
Alberta	862,327	942,900	1,085,900	1,150,000	1,000,000
Saskatchewan	1,748,444	1,440,000	1,281,300	1,644,000	1,800,000
Northwest Territories	2,261,964	2,225,100	1,511,500	2,040,000	1,600,000
Newfoundland (estimated)	29,000,000	.....	.....	28,000,000[2]	25,000,000[2]
Totals	$203,309,613	$148,357,200	$149,422,100	$184,162,000	$179,068,000

[1] This figure does not include imported Japanese-caught tuna canned in British Columbia.
[2] Estimated figures.

SPECIES AND VALUE OF FISH CAUGHT IN BRITISH COLUMBIA

The total marketed value of each of the principal species of fish taken in British Columbia for the years 1952 to 1956, inclusive, is given in the following table:—

Species	1952	1953	1954	1955	1956
Salmon	$40,495,000	$47,936,000	$50,281,000	$42,869,000	$44,306,000
Halibut	5,531,000	5,552,702	5,965,000	3,924,000	6,636,000
Herring	4,235,000	6,518,000	7,340,000	7,323,000	10,660,000
Pilchard	.....	.....	.....	.....	.....
Grey cod	521,000	251,000	467,000	445,000	457,000
Ling cod	590,000	384,000	487,000	399,000	532,000
Clams	477,000	449,000	306,000	436,000	360,000
Black cod	310,000	313,000	257,000	265,000	139,000
Crabs	475,000	663,000	879,000	996,000	984,000
Soles	1,533,000	854,000	461,000	710,000	903,000
Shrimps	227,000[1]	361,000[1]	290,000[1]	281,000[1]	305,000[1]
Oysters	438,000	304,000	470,000	420,000	425,000
Abalones	3,000	6,000	4,000	.....	.....
Flounders	20,000	([3])	30,000	14,000	21,000
Red cod	75,000	29,000	41,000	35,000	33,000
Perch	.....	([2])	82,000	17,000	36,000
Smelts	15,000	7,000	4,000	1,000	1,000
Sturgeon	([2])	17,000	9,000	13,000	11,000
Octopus	.....	([2])	([2])	([2])	([2])
Skate	5,000	6,000	9,000	7,000	7,000
Eulachons	115,000	34,000	57,000	106,000	86,000
Sardines	.....	.....	.....	.....	.....
Vitamin oil	349,000	355,390	427,000	.....	.....
Whales	([2])	([2])	([2])	([2])	([2])
Fur-seals	([2])	([2])	([2])	([2])	([2])
Anchovies	26,000	13,000	1,000	.....	.....
Tuna	54,000	3,000	.....	.....	.....
Liver and viscera—					
Grey-fish Vitamin A	.....	.....	.....	132,000	42,000
Other vitamin oil	.....	.....	.....	254,000	158,000
Other liver and oil	.....	.....	.....	5,000	1,000
Miscellaneous	1,142,000	1,399,000	1,555,000	2,016,000	1,419,000
Totals	$56,635,000	$65,455,092[4]	$69,422,000[4]	$60,668,000[4]	$67,522,000[4]

[1] Shrimps and prawns.
[2] Included in miscellaneous.
[3] Skate and flounders.
[4] This figure does not include imported Japanese-caught tuna canned in British Columbia.
Miscellaneous includes octopus, whales, and fish products, meal and oil, which cannot be separated into species, with a value of $500 or less.

The above figures were supplied by the Federal Department of Fisheries, Vancouver, and are hereby gratefully acknowledged.

CONTRIBUTIONS TO THE LIFE-HISTORY OF THE SOCKEYE SALMON

PAPER NO. 42 (DIGEST)

This paper was prepared this year by D. R. Foskett, B.A., M.A., and D. W. Jenkinson, of the Pacific Biological Station of the Fisheries Research Board of Canada, Nanaimo, B.C. This is the forty-second consecutive paper in this series reporting on the sockeye salmon in the commercial catch in the main runs north of the Fraser River.

The samples of sockeye, from which the reported data are taken, were obtained from the commercial fishery in each area, which is mainly a drift gill-net fishery. The authors point out that since gill-nets are selective in removing salmon from a fish run—that is, they tend to select fish of certain sizes or sex—the samples taken may not be completely typical of the whole run of fish being sampled. The data of the sockeye catch were obtained from the Statistical Branch of the Department of Fisheries of Canada, Vancouver, B.C., and the pack figures were obtained from the Provincial Department of Fisheries, Victoria, B.C.

In commenting on the individual runs, it is pointed out that the pack of 22,505 cases of sockeye salmon on the Nass River was quite good for this area and above the average of 17,899 cases for the last ten years. The run in 1956 resulted from the spawning escapements of 1951 and 1952, which were reported as very satisfactory.

Commenting on the Skeena River, the authors point out that the effect of the Babine slide, which occurred in 1951, was noted in 1955 in the small proportion of 4-year-old fish in the catch sample, as was expected. In the 1956 sockeye-catch sample, the expected fall-off in the 5-year fish occurred as a direct effect of the slide. The catch sample consisted mainly of 4-year fish which came from the 1952 spawning escapement after the partial clearance of the Babine River.

The yield of 14,663 cases of sockeye in 1956 was a slight increase over the previous year's commercial catch, which represented the lowest on record for the Skeena River.

With respect to Rivers Inlet, the 1956 sockeye-catch produced 124,634 cases, which was nearly two and one-half times that of the previous year. It is pointed out that the catch was the result of the spawning escapement from the 1951 run which produced a pack well above the average. The 1951 spawning escapement, as reported in the Department of Fisheries of Canada's spawning report for 1951, was medium to heavy, and from this came 90 per cent of the 1956 run, according to the sample studied.

The Smith Inlet sockeye run of 1956, which yielded 36,898 cases, was 30 per cent above the ten-year average of 27,725 cases. The catch sample consisted mainly of 5-year-old fish, the result of heavy supplies of sockeye reaching the spawning-grounds in 1951.

For a more detailed analysis of the sizes making up the different runs, the reader is referred to the paper which appears in the Appendix to this Report.

HERRING INVESTIGATION

Research on Pacific herring (*Clupea pallasi*) in British Columbia was continued in 1956–57 by the Fisheries Research Board of Canada at the Biological Station, Nanaimo, B.C.

The purpose of herring research is to obtain the scientific basis for a management policy that would permit the maximum sustained yield from this resource. The research involves:—

(1) A general continuing study of all major British Columbia herring populations to provide information on the status of these populations and to indicate the general application of specific studies.

(2) Detailed studies, in certain populations, of problems in population dynamics at various life-history stages. The problems involved concern, in general, the relationship between the size of spawning stock and the strength of the resulting year-class, and the efficacy of catch quotas in preventing over-utilization and in stabilizing abundance at a high level.

General Studies of Adult Stocks of All Major Populations

Although tag returns in 1956–57 were fewer in number (1,708) and were attended by more uncertainty as to the most probable area of recovery than in previous years, they confirmed once again the relative discreteness of the populations as now defined. Emigration in 1956–57 followed a normal, average pattern in most populations.

Relative abundance in each of the major populations was assessed from the size of the catch made in the sub-district occupied by each population and from an estimate of the spawning population derived from information on the amount of spawn deposited. In 1956–57 the total catch was 177,087 tons, the lowest since 1947–48, a decrease of 29 per cent from the record catch of 1955–56. The amount of spawn deposited (131.1 miles) was 30 per cent less than in 1955–56. Thus herring were appreciably less abundant

in 1956–57 than in the previous season. The greatest decreases in relative abundance occurred in the upper and lower Queen Charlotte Islands and the lower west coast sub-districts. However, abundance was also appreciably lower in the lower central and middle east coast sub-districts. In the northern sub-district, there was a substantial increase in relative abundance from the low levels of the preceding three seasons. In the upper central sub-district abundance increased somewhat in 1956–57, but still remained below average. In the lower east coast sub-district there was little evidence of any change in abundance. Late inshore migration again apparently hindered the exploitation of the upper west coast population. However, the amount of spawn deposited there indicated that while abundance may have decreased from the 1955–56 level, it still remained above average.

The decreased relative abundance in most populations in 1956–57 resulted primarily from the weakness of the dominant year-classes contributing to the fishable stocks. In the upper and lower Queen Charlotte Islands populations the 1954, 1953, and 1952 year-classes (fish of ages III, IV, and V respectively) were weak. In the lower central sub-district also, the 1952 and 1953 year-classes (ages IV and V) were relatively weak, and had not the 1954 year-class (age III) been of at least average strength, abundance in this sub-district would have declined further. The powerful 1951 year-class, which as V-year fish contributed so strongly to the high 1955–56 catches in the lower Queen Charlotte Islands and lower central sub-districts, could not be expected as VI-year-old fish in 1956–57 to make again an appreciable contribution to these populations. In the northern sub-district, where abundance increased substantially in 1956–57, the 1953 and 1954 year-classes (ages IV and III respectively) were of at least average strength and were stronger than in other Northern British Columbian populations. In Southern British Columbia populations (District 3) relative abundance is dependent mainly on the contributions of the year-class providing fish of age III, and to a lesser extent on that providing fish of age IV. In the lower west coast sub-district the dominant year-class (the 1954, age III) was very weak, and the 1953 year-class (age IV), although it appeared of average strength in 1955–56, made a poor contribution in 1956–57. In the middle east coast population, the 1952 year-class appears to have been the last of a series of three strong year-classes. The 1953 year-class (age IV) was of below averge strength, and the 1954 year-class of only average strength. In the lower east coast population, the 1953 year-class (age IV) was relatively weaker than the 1952 and preceding recent year-classes, but the 1954 year-class (age III) was probably as strong as those year-classes.

Relative abundance in 1957–58 will depend principally on the contributions to the adult stock of the 1954 and 1955 year-classes. The 1954 year-class appears to be of average strength in most Southern British Columbia populations, but of below average strength in some northern populations. Present indications, on the basis of the proportion of II-year fish in the catches in 1956–57, suggest that the 1955 year-class may be of average strength in southern populations, but possibly of somewhat above average strength in some northern populations. No substantial change in total catch is, therefore, expected in 1957–58.

No significant differences were noted in the size of the fish at each age in the various populations in 1956–57, indicating that feeding conditions were probably normal.

In the summer of 1956 a fishery for reduction purposes occurred, taking 30,579 tons of the total catch of 177,087 tons. This summer fishery was more substantial and more widespread than those in previous years. While catches were made in all sub-districts except the upper west coast, 44 per cent came from the upper east coast sub-district, 28 per cent from the northern sub-district, and 13 per cent from the lower east coast sub-district. Tag-recoveries from these fisheries, although relatively few in number, suggested that in most areas the same stocks were fished in summer as in winter. However, the degree of intermingling with adjacent stocks was greater in summer than in

winter. In all areas the summer-fished stocks contained a smaller proportion of younger fish and a greater proportion of older fish than the equivalent winter-fished stocks. The differences in age composition between the summer- and winter-fished stocks suggest that new recruits do not join the fishable stocks until the time of the autumn pre-spawning migration. The summer-fished stocks appeared to consist mainly of fish recruited in previous years and were probably the residues of the previous season's spawning populations.

Investigations of Special Problems

The juvenile (I-year) herring research programme was terminated after the 1956 season. While this programme yielded valuable information on herring at this stage in their life-history, the effort involved in estimating the distribution and abundance of juveniles in a given area precluded the extension of this programme to other parts of the coast, or its continuation as a basis for the prediction of relative abundance at recruitment.

APPENDICES

CONTRIBUTIONS TO THE LIFE-HISTORY OF THE SOCKEYE SALMON (No. 42)

By D. R. Foskett,* B.A., M.A., and D. W. Jenkinson,
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INTRODUCTION

This is the forty-second report in a series which was begun in 1914 by the Commissioner of Fisheries for the Province of British Columbia and has since been continued without interruption since that time, the reports appearing each year in the Report of the Commissioner of Fisheries, latterly the Report of the Provincial Department of Fisheries. The reports give, for each year, pertinent information regarding the sizes, sex ratios, and age compositions of the sockeye caught in each of the major sockeye-salmon fishing areas of the British Columbia coast, with the exception of the Fraser River, which since 1937 has been within the jurisdiction of the International Pacific Salmon Fisheries Commission. The areas dealt with, therefore, include the Nass River, Skeena River, Rivers Inlet area, and Smith Inlet area.

The samples of sockeye, from which the reported data are taken, are obtained from the commercial fishery in each area, which is, in the main, a drift gill-net fishery. To the extent, therefore, that gill-nets are selective in removing salmon from a run of fish—that is, tend to select fish of certain sizes or sex—the samples taken may not be completely typical of the whole run of fish being sampled. It has already been shown, in No. 38 of this series, that at Rivers Inlet that portion of the run that escapes the fishery and reaches the spawning-grounds (termed the " spawning escapement ") may have a quite different size, sex, and age composition from that taken by the fishery.

The data herein reported pertain to the 1956 catches of sockeye. The numbers of sockeye caught in the four areas under review were taken from the statistical records of the Department of Fisheries, Vancouver. The sockeye-pack in numbers of cases given in the tables was supplied by the British Columbia Department of Recreation and Conservation, Victoria, B.C.

DESIGNATION OF AGE-GROUPS AND TREATMENT OF DATA

Two outstanding features in the life-history of the fish have been selected in designating the age-groups—namely, the age at maturity and the year of its life in which the fish migrated from fresh water. These are expressed symbolically by two numbers—one in large type, which indicates the age of maturity, and the other in small type, placed to the right and below, which signifies the year of life in which the fish left fresh water. The age-groups which are met most commonly are:—

3_1, 4_1—the " sea types " or fish which migrate seaward in their first year and mature in their third and fourth year respectively.

3_2—" the grilse," almost exclusively males and frequently called " jacks," which migrate seaward in their second year and mature in their third year.

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4_2, 5_2—fish which migrate seaward in their second year and mature in their fourth and fifth years respectively.

5_3, 6_3—fish which migrate seaward in their third year and mature in their fifth and sixth years respectively.

6_4, 7_4—fish which migrate seaward in their fourth year and mature in their sixth and seventh years respectively.

Fish were measured to the nearest quarter of an inch, but when averaged the average has been recorded to the nearest tenth of an inch to avoid using fractions of more than one decimal place. Weights were taken to the nearest tenth of a pound. This has resulted in an even-pound and half-pound bias when the data are grouped to the nearest quarter-pound.

1. THE NASS RIVER SOCKEYE RUN OF 1956

(1) General Characteristics

The pack of 22,505 cases of sockeye salmon (Table I) was quite good for the Nass area and above the average of 17,899 for the last ten years (1946–55).

The run in 1956 resulted from the spawning escapements of 1951 and 1952, which were reported as very satisfactory. In both these years the commercial fishery was good, packs of 24,405 and 29,492 cases respectively being made.

(2) Age-groups

The Nass River sockeye-catch sample contained 27 per cent 4-year fish, 59 per cent 5-year fish, and 14 per cent 6-year fish (Table I). Of these fish, 35.5 per cent had spent one year in fresh water, migrating seaward early in their second year; 63 per cent had spent two years in fresh water, migrating seaward early in their third year. The remainder of 1.5 per cent had migrated to sea as fry, returning as adults in their fourth year (Tables II and III).

(3) Lengths and Weights

The average weights for the main age-groups of the year's samples were slightly less than the previous ten-year average, though in most cases slightly greater than in 1955 (Tables IV and V).

(4) Distribution of Sexes

In the Nass River sockeye sample, 49.5 per cent were males and 50.5 per cent females. The percentage of males in the main age-groups was as follows: 4_2, 50 per cent; 5_2, 44 per cent; 5_3, 47 per cent, and 6_3, 61 per cent (Table VI).

2. THE SKEENA RIVER SOCKEYE RUN OF 1956

(1) General Characteristics

The effect of the Babine Rive slide, which occurred in 1951, was noted in 1955 in the small proportion of 4-year fish in the catch sample, as was expected. In the 1956 sockeye-catch sample, the expected fall-off in the 5-year fish occurred as a direct effect of the slide. The catch sample consisted mainly of 4-year fish, which came from the 1952 spawning escapement after the partial clearance of the Babine River.

The yield of 14,663 cases of sockeye in 1956 was a slight increase over the previous year's commercial catch, which represented the lowest on record from the Skeena River (Table VII).

(2) Age-groups

The 84 per cent of 4-year fish in the Skeena River sockeye-catch sample was the highest percentage of that age-group ever recorded for that area. Of the remainder, 15 per cent were 5-year fish and 1 per cent 6-year fish (Table VII).

(3) Lengths and Weights

From a consideration of Tables X and XI it can be seen that the size of the Skeena River sockeye caught in 1956, in all but the 6-year fish, was well above the average. The lengths and weights for the main age-groups were as follows: The male 4_2 fish averaged 23.6 inches and 6 pounds, and the female 4_2's, 22.9 inches and 5.3 pounds; the male 5_2 fish averaged 26.1 inches and 8.2 pounds, and the female 5_2's, 24.9 inches and 6.8 pounds; the male 5_3 fish averaged 23.9 inches and 6.6 pounds, and the female 5_3's, 23.5 inches and 6.2 pounds; the male 6_3 fish averaged 25.9 inches and 7.6 pounds, and the female 6_3's, 23.7 inches and 5.6 pounds (Tables VIII, IX, X, and XI).

(4) Distribution of Sexes

The distribution of sexes in the Skeena River sockeye-catch sample (Table XII) again shows two trends which are almost invariable. These are that the catch as a whole contains over 50 per cent females, and that the 5_2 age-group fish in the catch contains an even greater percentage of females.

3. RIVERS INLET SOCKEYE RUN OF 1956

(1) General Characteristics

The 1956 sockeye-catch, with a total of 124,634 cases, was nearly two and one-half times that of the previous year (Table XIII). In the main, the catch was resultant of the spawning escapement from the 1951 run which, itself, produced a pack well above the average. The 1951 spawning escapement, quoting from the Federal Department of Fisheries "Salmon Spawning Report, British Columbia 1951," was medium to heavy, and from this came 90 per cent of the 1956 run, according to the sample studied.

(2) Age-groups

Three age-groups were present in the 1956 catch sample: 5_2, 90 per cent, 4_2, 10 per cent; and two fish of the 5_3 age-group were noted. These proportions are quite normal for the area (Table XIII).

(3) Lengths and Weights

Lengths and weights were found to be quite normal and were well within the range recorded in previous years.

The average length for both the 4_2 male and female fish was 21.5 inches. The average length of the 5_2 male fish was 25.3 inches, and of the females, 24.3 inches (Tables XVI and XVII).

The average weights in both age-groups were slightly above the ten-year average, with the male and female 4_2 fish both at 4.7 pounds. The average weight of the 5_2 male fish was 8 pounds, and of the females, 6.9 pounds (Tables XIV and XV).

No escapement records are available this year.

(4) Distribution of Sexes

In the two age-groups, the usual relationship of a larger proportion of males amongst the 4-year-old fish sample, and a smaller proportion amongst the 5-year-old fish, again occurred (Table XVIII). The over-all proportion of male fish in the catch sample was 39 per cent.

4. THE SMITH INLET SOCKEYE RUN OF 1956

(1) General Characteristics

The yield of 36,898 cases of sockeye salmon from Smith Inlet was 30 per cent above the ten-year average of 27,725 cases. The catch sample consisted mainly of 5-year-old fish, the result of heavy supplies of sockeye reaching the spawning-grounds in 1951.

(2) Age-groups

The similarity of the Smith Inlet to the Rivers Inlet sockeye populations showed itself in the usual two main age-groups. Four per cent of the catch-sample were 4-year-old fish, and 96 per cent were 5-year-old fish (Table XIX). The three age-groups were 96 per cent 5_2 sockeye, 4 per cent 4_2 sockeye, and only one 5_3 fish was present in the sample.

(3) Lengths and Weights

The size of the Smith Inlet sockeye, as with those of Rivers Inlet, was well within the normal range over the last ten years (Tables XXII and XXIII).

The average length for the 4_2 male fish was 22.5 inches; weight, 5.6 pounds; for the female fish, 22.1 inches and 5.2 pounds. In the 5_2 age-group, the male fish averaged 24.9 inches and 7.6 pounds, and the female 5_2's, 24.3 inches and 6.9 pounds. The one male 5_3 fish in the catch sample was 22.2 inches in length and weighed 4.7 pounds (Tables XX and XXI).

(4) Sex Distribution

As in the Rivers Inlet sample, the Smith Inlet fish showed a predominance of males in the 4_2 age-group (65 per cent), while among the 5_2 age-group the females represented 62 per cent (Table XXIV). The over-all catch sample consisted only of 38 per cent male fish.

Table I.—Nass River Sockeyes, Percentages of Principal Age-groups in Runs of Successive Years and Packs

Year	Pack in Cases	Number of Sockeye[1]	Percentage of Individuals			
			4_2	5_2	5_3	6_3
1912	36,037	.....	8	27	63	2
1913	23,574	.....	15	12	71	2
1914	31,327	.....	4	41	45	10
1915	39,349	.....	19	14	59	8
1916	31,411	.....	9	17	66	8
1917	22,188	.....	10	15	71	4
1918	21,816	.....	30	16	45	9
1919	28,259	.....	7	22	65	6
1920	16,740	.....	8	14	72	6
1921	9,364	.....	10	7	75	8
1922	31,277	.....	6	2	91	1
1923	17,821	.....	11	6	77	6
1924	33,590	.....	4	3	91	2
1925	18,945	.....	23	8	67	2
1926	15,929	.....	12	12	63	13
1927	12,026	.....	8	7	81	4
1928	5,540	.....	30	6	61	3
1929	16,077	.....	25	9	60	6
1930	26,405	.....	28	15	54	3
1931	16,929	.....	10	17	67	6
1932	14,154	.....	28	4	61	7
1933	9,757	.....	35	7	55	3
1934	36,242	.....	13	9	74	4
1935	12,712	.....	11	10	73	6
1936	28,562	.....	16	7	67	10
1937	17,567	.....	22	4	68	6
1938	21,462	.....	21	4	70	5
1939	24,357	.....	14	13	66	7
1940	13,809	.....	23	8	59	10
1941	24,876	.....	37	7	52	4
1942	21,085	.....	22	7	66	5
1943	13,412	.....	5	13	67	15
1944	13,083	.....	15	15	32	38
1945	9,899	.....	46	11	37	6
1946	12,511	.....	13	12	72	3
1947	10,849	.....	15	12	56	17
1948	13,181	.....	12	16	60	12
1949	9,268	.....	39	6	48	7
1950	27,286	.....	3	19	71	6
1951	24,405	.....	41	9	31	13
1952	29,492	304,500	28	19	46	4
1953	18,163	198,400	23	22	46	9
1954	10,285	101,600	35	20	40	5
1955	13,654	154,904	12	15	70	2
1956	22,505	254,800	27	9	50	14

[1] To nearest hundred.

Table II.—Nass River Sockeyes, 1956, Grouped by Age, Sex, Length, and by Their Early History

Length in Inches	Number of Individuals												Total
	4_1		4_2		4_3		5_2		5_3		6_3		
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	
18¾	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
19	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
19¼	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	1
19½	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
19¾	.....	.....	1	1	.....	.....	.....	.....	.....	.....	.....	.....	2
20	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
20¼	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
20½	.....	.....	2	1	.....	.....	.....	.....	1	.....	1	.....	5
20¾	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
21	.....	.....	.....	5	.....	.....	.....	.....	.....	2	.....	.....	7
21¼	.....	1	.....	3	.....	.....	.....	1	1	2	.....	.....	8
21½	.....	.....	3	8	.....	.....	.....	.....	2	2	.....	.....	15
21¾	.....	.....	.....	4	.....	.....	.....	.....	1	3	.....	.....	8
22	.....	.....	3	8	.....	.....	.....	.....	1	7	.....	.....	19
22¼	.....	1	4	14	.....	.....	.....	.....	2	10	.....	.....	31
22½	.....	1	13	34	1	.....	.....	1	11	29	.....	.....	90
22¾	.....	1	7	10	.....	.....	.....	.....	4	13	1	.....	36
23	.....	2	15	11	.....	.....	.....	2	6	22	1	.....	59
23¼	.....	.....	8	6	.....	.....	.....	.....	10	22	.....	1	47
23½	.....	3	7	15	.....	.....	1	8	25	34	.....	.....	93
23¾	.....	.....	31	4	.....	.....	1	3	19	23	1	.....	82
24	.....	.....	10	2	.....	.....	.....	2	22	15	3	3	57
24¼	.....	.....	10	2	.....	.....	1	6	19	17	.....	3	58
24½	.....	.....	13	2	.....	.....	2	7	32	23	1	6	86
24¾	.....	.....	4	1	.....	.....	3	3	17	13	4	6	51
25	1	.....	1	.....	.....	.....	2	9	16	7	1	4	41
25¼	2	.....	2	.....	.....	.....	3	2	9	7	4	4	33
25½	.....	.....	.....	1	.....	.....	7	2	13	7	5	5	40
25¾	.....	.....	.....	.....	.....	.....	4	2	9	3	1	4	23
26	.....	.....	1	1	.....	.....	3	1	7	1	4	2	20
26¼	.....	.....	2	.....	.....	.....	4	.....	6	1	8	2	23
26½	.....	.....	1	1	.....	.....	2	.....	3	5	11	3	26
26¾	.....	.....	.....	1	.....	.....	1	.....	.....	.....	5	4	12
27	.....	.....	.....	1	.....	.....	3	.....	.....	.....	6	2	12
27¼	.....	.....	.....	.....	.....	.....	1	1	.....	.....	9	1	12
27½	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	3	.....	4
27¾	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	2	3
28	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	.....	4
28¼	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	7	.....	8
28½	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1	.....	2
28¾	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	1
Totals	5	9	138	136	2	.....	39	50	238	269	83	52	1,021
Average lengths	22.8	22.8	23.5	22.8	20.9	.....	25.6	24.4	24.3	23.6	26.4	25.4	24.0

Table III.—Nass River Sockeyes, 1956, Grouped by Age, Sex, Weight, and by Their Early History

Weight in Pounds	Number of Individuals												Total
	4_1		4_2		4_3		5_2		5_3		6_3		
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	
3	-----	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	1
3¼	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1
3½	1	-----	2	2	-----	-----	-----	-----	-----	-----	-----	-----	5
3¾	-----	-----	-----	3	-----	-----	-----	-----	-----	-----	-----	-----	3
4	-----	-----	-----	1	-----	-----	-----	-----	-----	3	-----	-----	4
4¼	-----	-----	2	6	-----	-----	-----	-----	2	5	-----	-----	15
4½	-----	1	3	28	-----	-----	-----	-----	1	13	-----	-----	46
4¾	-----	-----	5	14	-----	-----	-----	-----	2	17	-----	-----	38
5	-----	2	11	17	-----	-----	-----	-----	5	29	-----	-----	64
5¼	-----	-----	7	25	1	-----	-----	4	6	30	-----	1	74
5½	-----	4	23	28	-----	-----	-----	4	33	50	1	1	144
5¾	-----	1	21	3	-----	-----	-----	5	20	27	1	2	80
6	-----	-----	26	2	-----	-----	-----	4	22	25	-----	3	82
6¼	-----	1	13	2	-----	-----	1	4	21	20	3	6	71
6½	1	-----	15	5	-----	-----	5	10	44	26	4	8	118
6¾	1	-----	3	-----	-----	-----	-----	4	17	6	3	6	40
7	-----	-----	4	-----	-----	-----	4	6	12	3	4	2	35
7¼	-----	-----	1	-----	-----	-----	3	1	18	6	2	7	38
7½	1	-----	2	-----	-----	-----	12	6	17	6	11	7	62
7¾	-----	-----	-----	-----	-----	-----	2	2	6	2	3	1	16
8	-----	-----	-----	-----	-----	-----	2	-----	6	-----	5	3	16
8¼	-----	-----	-----	-----	-----	-----	1	-----	2	-----	9	-----	12
8½	-----	-----	-----	-----	-----	-----	5	-----	1	1	14	2	23
8¾	-----	-----	-----	-----	-----	-----	2	-----	1	-----	6	3	12
9	-----	-----	-----	-----	-----	-----	1	-----	-----	-----	3	-----	4
9¼	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2	-----	2
9½	-----	-----	-----	-----	-----	-----	-----	-----	1	-----	6	-----	7
9¾	-----	-----	-----	-----	-----	-----	1	-----	1	-----	2	-----	4
10	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2	-----	2
10¼	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2	-----	2
Totals	5	9	138	136	2	-----	39	50	238	269	83	52	1,021
Average weights	5.5	5.4	5.8	5.0	4.1	-----	7.6	6.4	6.4	5.7	8.1	7	6.1

Table IV.—Nass River Sockeyes, Average Lengths in Inches of Principal Age-groups, 1912 to 1956

Year	4_2		5_2		5_3		6_3	
	M.	F.	M.	F.	M.	F.	M.	F.
1912–41	24.5	23.7	26.3	25.2	26.1	25.3	27.7	26.4
1912–41 (conversion)	23.8	23.0	25.6	24.5	25.4	24.6	27.0	25.7
1942	23.9	23.2	26.1	24.9	24.9	24.3	26.9	26.0
1943	22.8	22.2	26.1	24.8	24.1	23.5	27.1	25.8
1944	23.5	22.7	25.7	24.6	24.8	23.8	26.8	25.8
1945	23.4	22.8	25.0	24.4	24.7	24.0	25.1	25.5
1946	23.4	22.4	26.3	24.9	24.9	23.9	28.1	26.0
1947	23.4	22.9	25.9	24.1	24.5	23.6	27.0	25.6
1948	23.3	22.6	26.2	25.3	25.0	24.1	27.7	26.7
1949	23.8	22.8	26.2	23.8	24.7	23.7	26.1	25.5
1950	23.6	23.1	26.0	24.7	24.5	23.7	26.7	25.6
1951	24.0	23.1	26.2	24.8	25.1	24.1	27.4	26.4
1952	23.9	23.1	26.8	25.3	24.8	23.9	27.6	26.3
1953	23.9	22.9	26.9	25.6	24.9	24.1	27.7	26.5
1954	24.1	23.1	26.5	25.3	25.3	24.5	27.7	26.0
1955	23.1	22.3	26.0	24.7	24.1	23.2	26.9	25.1
1956	23.5	22.8	25.6	24.4	24.3	23.6	26.4	25.4

Table V.—Nass River Sockeyes, Average Weights in Pounds of Principal Age-groups, 1914 to 1956

Year	4_2		5_2		5_3		6_3	
	M.	F.	M.	F.	M.	F.	M.	F.
1914–41	6.0	5.4	7.3	6.4	6.9	6.2	8.0	7.0
1942	5.8	5.1	7.1	6.3	6.2	5.6	7.5	6.7
1943	5.2	4.7	7.6	6.4	5.9	5.3	7.9	6.9
1944	5.7	5.0	7.7	6.5	6.7	5.7	8.2	7.1
1945	5.7	5.3	7.0	6.4	6.5	5.9	7.2	7.1
1946	5.6	4.9	8.1	6.7	6.5	5.4	8.9	7.0
1947	5.8	5.3	7.7	6.2	6.3	5.6	8.1	6.9
1948	5.8	5.3	8.1	7.1	7.0	6.0	9.1	7.9
1949	5.9	5.1	7.9	5.8	6.5	5.4	7.7	6.8
1950	5.9	5.2	7.9	6.6	6.4	5.5	8.2	7.1
1951	6.0	5.2	7.9	6.6	6.7	5.7	8.8	7.6
1952	6.0	5.2	8.4	6.9	6.7	5.7	8.7	7.5
1953	6.2	5.4	8.3	7.2	6.6	5.8	9.0	7.9
1954	6.4	5.5	8.8	7.4	7.4	6.3	9.5	7.8
1955	5.6	4.9	7.8	6.8	6.1	5.4	8.3	6.9
1956	5.8	5.0	7.5	6.4	6.4	5.7	8.1	7.0

Table VI.—Nass River Sockeyes, Percentages of Males and Females, 1915 to 1956

Year	4_2		5_2		5_3		6_3		Per Cent Total Males	Per Cent Total Females
	M.	F.	M.	F.	M.	F.	M.	F.		
1915–41 (average)	49	51	47	53	45	55	63	37	47	53
1942	42	58	48	52	44	56	70	30	45	55
1943	51	49	67	33	47	53	74	26	54	46
1944	53	47	45	55	39	61	60	40	50	50
1945	37	63	37	63	38	62	53	47	38	62
1946	62	38	59	41	45	55	75	25	50	50
1947	50	50	52	48	51	49	81	19	56	44
1948	45	55	54	46	52	48	66	34	53	47
1949	57	43	56	44	51	49	50	50	53	47
1950	41	59	42	58	43	57	58	42	44	56
1951	46	54	47	53	46	54	70	30	49	51
1952	49	51	56	44	49	51	59	41	50	50
1953	50	50	44	56	46	54	62	38	48	52
1954	42	58	44	56	44	56	45	55	43	57
1955	50	50	60	40	47	53	68	32	49	51
1956	50	50	44	56	47	53	61	39	50	50

Table VII.—Skeena River Sockeyes, Percentages of Age-groups in Runs of Successive Years and Packs

Year	Pack in Cases	Number of Sockeye[1]	Percentage of Individuals			
			4_2	5_2	5_3	6_3
1907	108,413	.....	---	---	---	---
1908	139,846	.....	---	---	---	---
1909	87,901	.....	---	---	---	---
1910	187,246	.....	---	---	---	---
1911	131,066	.....	---	---	---	---
1912	92,498	.....	57	43	---	---
1913	52,927	.....	50	50	---	---
1914	130,166	.....	25	75	---	---
1915	116,553	.....	36	64	---	---
1916	60,923	.....	34	38	13	18
1917	65,760	.....	57	29	9	5
1918	123,322	.....	51	34	9	6
1919	184,945	.....	27	60	9	4
1920	90,869	.....	15	71	6	8
1921	41,018	.....	69	22	6	3
1922	96,277	.....	70	16	12	2
1923	131,731	.....	56	29	8	7
1924	144,747	.....	23	69	7	1
1925	77,784	.....	51	45	3	1
1926	82,360	.....	62	26	9	3
1927	83,996	.....	62	28	9	1
1928	34,559	.....	51	39	7	3
1929	78,017	.....	62	30	6	2
1930	132,372	.....	39	52	8	1
1931	93,023	.....	40	30	28	2
1932	59,916	.....	44	37	7	12
1933	30,506	.....	57	36	5	2
1934	54,558	.....	58	34	7	1
1935	52,879	.....	49	31	18	2
1936	81,973	.....	67	20	11	2
1937	42,491	.....	45	40	11	4
1938	47,257	.....	64	15	16	5
1939	68,485	.....	50	35	11	4
1940	116,507	.....	80	15	4	1
1941	81,767	.....	39	52	8	1
1942	34,544	.....	36	54	7	3
1943	28,268	.....	39	39	16	6
1944	68,197	.....	37	52	7	4
1945	104,279	.....	20	63	12	5
1946	52,928	.....	13	70	8	9
1947	32,534	.....	14	82	3	1
1948	101,267	.....	80	13	6	1
1949	65,937	.....	17	76	4	3
1950	47,479	.....	21	72	4	3
1951	61,694	.....	33	61	4	1
1952	114,775	1,294,500	66	26	3	5
1953	65,003	659,200	48	43	6	3
1954	60,817	571,900	33	54	10	2
1955	14,649	157,362	15	59	14	11
1956	14,663	149,100	84	14	1	1

[1] To nearest hundred.

Table VIII.—Skeena River Sockeyes, 1956, Grouped by Age, Sex, Length, and by Their Early History

Length in Inches	Number of Individuals								Total
	4_2		5_2		5_3		6_3		
	M.	F.	M.	F.	M.	F.	M.	F.	
19¾	---	1	---	---	---	---	---	---	1
20	1	1	---	---	---	---	---	---	2
20¼	2	1	---	---	---	---	---	---	3
20½	2	---	---	---	---	---	---	---	2
20¾	2	3	---	---	---	---	---	---	5
21	---	---	---	---	---	---	---	---	---
21¼	5	10	---	---	---	---	---	---	15
21½	3	6	---	---	---	---	---	---	9
21¾	2	11	---	---	---	---	---	---	13
22	5	18	---	---	---	---	---	---	23
22¼	4	15	---	---	---	---	---	---	19
22½	6	16	---	---	1	---	---	---	23
22¾	8	18	---	1	---	---	---	---	27
23	24	38	---	---	---	---	---	1	63
23¼	16	16	---	---	---	---	---	1	33
23½	13	13	---	2	---	1	---	1	30
23¾	17	11	---	2	1	---	---	---	31
24	41	17	1	6	---	---	---	---	65
24¼	26	5	1	2	---	---	---	1	35
24½	15	1	---	2	---	---	---	---	18
24¾	25	3	---	12	---	---	---	1	41
25	4	---	---	2	---	---	---	---	6
25¼	3	---	---	4	---	---	---	---	7
25½	2	1	4	9	1	---	1	---	18
25¾	---	---	1	---	---	---	---	---	1
26	2	---	5	5	---	---	---	---	12
26¼	---	1	2	1	---	---	1	---	5
26½	---	1	4	2	---	---	---	---	7
26¾	2	---	---	---	---	---	---	---	2
27	---	---	1	---	---	---	---	---	1
27¼	---	---	---	---	---	---	---	---	---
27½	---	---	1	---	---	---	---	---	1
27¾	---	---	1	---	---	---	---	---	1
28	---	---	1	---	---	---	---	---	1
Totals	230	207	22	50	3	1	2	5	520
Average lengths	23.6	22.9	26.1	24.9	23.9	23.5	25.9	23.7	23.5

Table IX.—Skeena River Sockeyes, 1956, Grouped by Age, Sex, Weight, and by Their Early History

Weight in Pounds	Number of Individuals								Total
	4_2		5_2		5_3		6_3		
	M.	F.	M.	F.	M.	F.	M.	F.	
3	---	1	---	---	---	---	---	---	1
3¼	---	---	---	---	---	---	---	---	---
3½	5	1	---	---	---	---	---	---	6
3¾	2	4	---	---	---	---	---	---	6
4	4	6	---	---	---	---	---	---	10
4¼	---	8	---	---	---	---	---	---	8
4½	13	25	---	---	---	---	---	---	38
4¾	5	22	---	---	---	---	---	1	28
5	6	13	---	---	---	---	---	2	21
5¼	5	21	---	---	1	---	---	---	27
5½	31	50	---	2	---	---	---	---	83
5¾	17	14	---	2	---	---	---	---	33
6	20	22	---	5	---	---	---	1	48
6¼	23	5	---	7	---	1	---	---	36
6½	48	14	1	5	1	---	---	---	69
6¾	11	---	---	5	---	---	---	---	16
7	8	---	3	5	---	---	---	---	16
7¼	11	---	1	8	---	---	---	1	21
7½	8	1	1	5	---	---	1	---	16
7¾	9	---	1	4	---	---	---	---	14
8	1	---	4	---	1	---	1	---	7
8¼	1	---	5	---	---	---	---	---	6
8½	1	---	1	2	---	---	---	---	4
8¾	1	---	---	---	---	---	---	---	1
9	---	---	2	---	---	---	---	---	2
9¼	---	---	1	---	---	---	---	---	1
9½	---	---	---	---	---	---	---	---	---
9¾	---	---	---	---	---	---	---	---	---
10	---	---	---	---	---	---	---	---	---
10¼	---	---	1	---	---	---	---	---	1
10½	---	---	1	---	---	---	---	---	1
Totals	230	207	22	50	3	1	2	5	520
Average weights	6.0	5.3	8.2	6.8	6.6	6.2	7.6	5.6	5.9

Table X.—Skeena River Sockeyes, Average Lengths in Inches of Principal Age-groups, 1912 to 1956

Year	4_2		5_2		5_3		6_3	
	M.	F.	M.	F.	M.	F.	M.	F.
1912–41	23.7	23.1	25.8	24.9	24.2	23.4	25.8	24.8
1912–41 (conversion)	23.0	22.4	25.1	24.2	23.5	22.7	25.1	24.1
1942	22.6	22.3	25.2	24.3	24.1	23.7	26.3	24.9
1943	21.9	21.9	25.1	23.9	23.3	22.6	25.8	24.7
1944	22.4	21.7	24.8	23.9	22.5	21.7	25.0	23.7
1945	22.6	22.3	24.9	24.1	23.3	22.6	25.0	24.3
1946	22.7	22.0	25.4	24.3	23.9	23.2	25.5	24.4
1947	22.3	22.0	25.1	23.8	23.0	22.4	26.3	25.8
1948	23.0	22.3	25.3	24.1	23.0	22.1	26.0	24.5
1949	22.5	22.2	25.3	24.5	23.2	22.3	24.8	23.9
1950	22.8	22.3	25.7	24.4	23.9	23.4	25.5	24.3
1951	22.7	22.6	25.9	24.8	23.6	22.9	26.0	24.6
1952	23.3	22.6	25.8	24.7	23.2	22.8	26.1	24.6
1953	23.2	22.8	26.2	25.0	23.6	22.9	26.0	25.5
1954	22.2	22.4	26.6	25.2	23.9	22.9	26.4	24.9
1955	22.5	22.1	25.6	24.5	23.0	22.6	25.2	24.0
1956	23.6	22.9	26.1	24.9	23.9	23.5	25.9	23.7

Table XI.—Skeena River Sockeyes, Average Weights in Pounds of Principal Age-groups, 1914 to 1956

Year	4_2		5_2		5_3		6_3	
	M.	F.	M.	F.	M.	F.	M.	F.
1914–41	5.4	5.0	6.8	6.1	5.7	5.1	6.8	6.0
1942	4.9	4.7	6.7	6.0	5.8	5.4	7.2	6.6
1943	4.7	4.6	6.8	5.9	5.5	4.9	7.3	6.1
1944	5.1	4.6	7.0	6.1	5.3	4.6	7.1	5.8
1945	5.2	4.9	6.7	6.1	5.6	5.0	6.7	6.2
1946	4.7	4.2	6.9	5.8	5.8	5.1	7.0	6.1
1947	4.9	4.7	6.9	5.9	5.3	5.0	7.7	6.8
1948	5.5	4.9	7.3	6.1	5.4	4.7	7.7	6.4
1949	5.0	4.7	7.1	6.3	5.3	4.8	6.6	5.7
1950	4.8	4.3	7.2	5.9	5.8	5.1	6.8	5.6
1951	5.1	5.0	7.6	6.5	5.6	5.0	7.6	6.4
1952	5.6	5.0	7.5	6.4	5.6	5.0	7.4	6.0
1953	5.8	5.5	8.0	6.9	5.8	5.2	7.8	7.3
1954	4.9	4.9	8.8	7.2	6.2	5.2	8.6	7.2
1955	4.9	4.8	7.4	6.4	5.5	5.0	7.1	6.1
1956	6.0	5.3	8.2	6.8	6.6	6.2	7.6	5.6

Table XII.—Skeena River Sockeyes, Percentages of Males and Females, 1915 to 1956

Year	4_2		5_2		Per Cent Total Males	Per Cent Total Females
	M.	F.	M.	F.		
1915–41 (average)	48	52	43	57	46	54
1942	42	58	25	75	33	67
1943	50	50	31	69	43	57
1944	54	46	34	66	43	57
1945	41	59	35	65	38	62
1946	50	50	32	68	38	62
1947	50	50	29	71	33	67
1948	50	50	29	71	47	53
1949	54	46	30	70	36	64
1950	56	44	40	60	44	56
1951	41	59	37	63	39	61
1952	52	48	34	66	48	52
1953	40	60	34	66	39	61
1954	44	56	38	62	43	57
1955	57	43	42	58	47	53
1956	53	47	34	66	44	56

Table XIII.—Rivers Inlet Sockeyes, Percentages of Age-groups in Runs of Successive Years and Packs

Year	Pack in Cases	Number of Sockeye[1]	Percentage of Individuals			
			4_2	5_2	5_3	6_3
1907	87,874	.....	----	----	----	----
1908	64,652	.....	----	----	----	----
1909	89,027	.....	----	----	----	----
1910	126,921	.....	----	----	----	----
1911	88,763	.....	----	----	----	----
1912	112,884	.....	21	79	----	----
1913	61,745	.....	80	20	----	----
1914	89,890	.....	35	65	----	----
1915	130,350	.....	13	87	----	----
1916	44,936	.....	26	74	----	----
1917	61,195	.....	39	61	----	----
1918	53,401	.....	57	43	----	----
1919	56,258	.....	46	54	----	----
1920	121,254	.....	5	95	----	----
1921	46,300	.....	49	51	----	----
1922	60,700	.....	81	18	1	----
1923	107,174	.....	74	24	2	----
1924	94,891	.....	43	54	2	1
1925	159,554	.....	23	77	----	----
1926	65,581	.....	59	38	2	1
1927	64,461	.....	81	16	3	----
1928	60,044	.....	55	40	4	1
1929	70,260	.....	77	18	3	2
1930	119,170	.....	49	48	2	1
1931	76,428	.....	53	44	2	1
1932	69,732	.....	67	27	5	1
1933	83,507	.....	44	55	1	----
1934	76,923	.....	77	20	2	1
1935	135,038	.....	57	41	1	1
1936	46,351	.....	53	46	1	----
1937	84,832	.....	60	37	3	----
1938	87,942	.....	27	70	1	2
1939	54,143	.....	67	32	1	----
1940	63,469	.....	69	28	3	----
1941	93,378	.....	59	40	1	----
1942	79,199	.....	8	91	----	1
1943	47,602	.....	8	91	----	1
1944	36,852	.....	76	23	1	----
1945	89,735	.....	57	41	2	----
1946	73,320	.....	37	63	----	----
1947	140,087	.....	3	97	----	----
1948	37,665	.....	55	44	1	----
1949	39,495	.....	84	14	1	----
1950	142,710	.....	13	87	(2)	----
1951	102,565	.....	38	60	1	1
1952	84,298	938,700	41	58	1	(2)
1953	132,925	1,522,300	73	26	1	(2)
1954	50,640	575,700	60	39	1	(2)
1955	50,702	584,128	45	54	(2)	1
1956	124,634	1,072,300	10	90	(2)	----

[1] To nearest hundred.
[2] Age-class represented but less than 0.5 per cent.

Table XIV.—Rivers Inlet Sockeyes, 1956, Grouped by Age, Sex, Length, and by Their Early History

Length in Inches	Number of Individuals						Total
	4_2		5_2		5_3		
	M.	F.	M.	F.	M.	F.	
19¼	1	1	-----	1	-----	-----	3
19½	2	2	-----	-----	-----	-----	4
19¾	2	-----	-----	-----	-----	-----	2
20	5	4	-----	-----	-----	-----	9
20¼	8	2	2	-----	-----	-----	12
20½	7	2	-----	-----	-----	-----	9
20¾	3	2	-----	-----	-----	-----	5
21	2	6	1	1	-----	-----	10
21¼	4	3	1	3	-----	-----	11
21½	5	4	3	2	-----	-----	14
21¾	5	3	2	7	-----	-----	17
22	5	3	6	14	-----	1	29
22¼	1	3	3	15	-----	-----	22
22½	4	3	3	20	-----	-----	30
22¾	1	2	4	14	-----	-----	21
23	4	3	5	27	-----	-----	39
23¼	-----	-----	7	22	1	-----	30
23½	3	1	7	41	-----	-----	52
23¾	2	2	14	36	-----	-----	54
24	2	1	7	55	-----	-----	65
24¼	2	-----	11	49	-----	-----	62
24½	-----	-----	16	71	-----	-----	87
24¾	-----	-----	15	51	-----	-----	66
25	-----	-----	23	76	-----	-----	99
25¼	-----	-----	20	49	-----	-----	69
25½	-----	-----	45	42	-----	-----	87
25¾	-----	-----	27	20	-----	-----	47
26	-----	-----	43	20	-----	-----	63
26¼	-----	-----	23	10	-----	-----	33
26½	-----	-----	38	3	-----	-----	41
26¾	-----	-----	14	-----	-----	-----	14
27	-----	-----	14	-----	-----	-----	14
27¼	-----	-----	5	-----	-----	-----	5
27½	-----	-----	6	-----	-----	-----	6
27¾	-----	-----	2	-----	-----	-----	2
Totals	68	47	367	649	1	1	1,133
Average lengths	21.5	21.5	25.3	24.3	23.2	22	24.3

Table XV.—Rivers Inlet Sockeyes, 1956, Grouped by Age, Sex, Weight, and by Their Early History

Weight in Pounds	Number of Individuals						Total
	4_2		5_2		5_3		
	M.	F.	M.	F.	M.	F.	
3¼	----	1	----	----	----	----	1
3½	6	4	----	----	----	----	10
3¾	7	3	----	1	----	----	11
4	8	6	2	1	----	----	17
4¼	9	3	2	4	----	----	18
4½	6	7	1	6	----	----	20
4¾	6	----	4	11	----	1	22
5	3	7	7	19	----	----	36
5¼	2	4	1	20	----	----	37
5½	8	5	10	40	----	----	53
5¾	4	2	4	33	----	----	43
6	4	3	14	39	1	----	61
6¼	1	----	7	30	----	----	38
6½	2	2	12	61	----	----	77
6¾	----	----	8	33	----	----	41
7	1	----	15	73	----	----	89
7¼	1	----	12	46	----	----	59
7½	----	----	11	55	----	----	66
7¾	----	----	25	37	----	----	62
8	----	----	34	60	----	----	94
8¼	----	----	17	23	----	----	40
8½	----	----	48	24	----	----	72
8¾	----	----	25	14	----	----	39
9	----	----	28	13	----	----	41
9¼	----	----	24	1	----	----	25
9½	----	----	20	4	----	----	24
9¾	----	----	16	----	----	----	16
10	----	----	7	1	----	----	8
10¼	----	----	9	----	----	----	9
10½	----	----	2	----	----	----	2
10¾	----	----	----	----	----	----	----
11	----	----	2	----	----	----	2
Totals	68	47	367	649	1	1	1,133
Average weights	4.7	4.7	8.0	6.9	6	4.7	7.0

Table XVI.—Rivers Inlet Sockeyes, Average Lengths in Inches of the 4_2 and 5_2 Groups, 1912 to 1956

Year	4_2		5_2	
	M.	F.	M.	F.
1912–41	22.4	22.4	25.4	24.7
1912–41 (conversion)	21.6	21.6	24.6	23.9
1942	21.9	21.3	25.0	23.8
1943	20.5	21.1	24.3	23.7
1944	21.1	21.0	23.5	23.3
1945	20.9	21.2	24.2	23.9
1946	20.6	21.1	25.1	24.1
1947	20.6	20.7	24.0	23.5
1948	21.4	21.3	25.2	24.2
1949	20.9	21.4	23.8	22.8
1950	21.1	20.8	25.2	24.2
1951	21.9	21.9	25.8	24.8
1952	21.5	21.5	26.0	25.0
1953	21.6	21.8	26.5	25.3
1954	22.0	21.6	26.1	25.1
1955	21.2	21.0	25.4	24.5
1956	21.5	21.5	25.3	24.3

Table XVII.—Rivers Inlet Sockeyes, Average Weights in Pounds of the 4_2 and 5_2 Groups, 1914 to 1956

Year	4_2		5_2	
	M.	F.	M.	F.
1914–41	4.9	4.8	7.0	6.5
1942	5.1	4.6	7.2	6.4
1943	4.1	4.4	6.8	6.3
1944	4.6	4.4	6.2	6.0
1945	4.3	4.4	6.6	6.4
1946	3.9	3.9	7.2	6.2
1947	4.1	3.9	6.4	5.9
1948	4.7	4.6	7.9	7.0
1949	4.4	4.3	5.9	5.9
1950	4.2	3.9	7.5	6.4
1951	5.2	5.0	8.6	7.4
1952	4.9	4.7	8.7	7.4
1953	4.7	4.7	8.8	7.6
1954	5.2	4.8	8.9	7.6
1955	4.5	4.2	7.4	6.5
1956	4.7	4.7	8.0	6.9

Table XVIII.—Rivers Inlet Sockeyes, Percentages of Males and Females, 1915 to 1956

Year	4_1		4_2		5_2		Per Cent Total Males	Per Cent Total Females
	M.	F.	M.	F.	M.	F.		
1915–41 (average)	----	----	63	37	34	66	50	50
1942	----	----	61	39	35	65	38	62
1943	----	----	62	38	34	66	36	64
1944	----	----	67	33	33	67	59	41
1945	----	----	70	30	39	61	57	43
1946	----	----	79	21	37	63	53	47
1947	----	----	72	28	35	65	36	64
1948	----	----	50	50	38	62	45	55
1949	36	64	70	30	22	78	63	37
1950	50	50	75	25	36	64	41	59
1951	----	----	66	34	30	70	44	56
1952	----	----	58	42	34	66	44	56
1953	----	----	55	45	33	67	49	51
1954	50	50	67	33	29	71	52	48
1955	----	----	67	33	31	69	48	52
1956	----	----	59	41	36	64	39	61

Table XIX.—Smith Inlet Sockeyes, Percentages of Age-groups in Runs of Successive Years and Packs

Year	Pack in Cases	Number of Sockeye[1]	Percentage of Individuals				
			4_1	4_2	5_2	6_2	5_3
1925	33,764	.....	....	....	....	....	....
1926	17,921	.....	....	....	....	....	....
1927	22,682	.....	....	....	....	....	....
1928	33,442	.....	....	....	....	....	....
1929	9,683	.....	....	....	....	....	....
1930	32,057	.....	....	....	....	....	....
1931	12,867	.....	....	....	....	....	....
1932	25,488	.....	....	....	....	....	....
1933	37,369	.....	....	....	....	....	....
1934	14,607	.....	....	....	....	....	....
1935	31,648	.....	....	....	....	....	....
1936	12,788	.....	....	....	....	....	....
1937	25,258	.....	....	....	....	....	....
1938	33,894	.....	....	....	....	....	....
1939	17,833	.....	....	....	....	....	....
1940	25,947	.....	....	....	....	....	....
1941	21,495	.....	....	....	....	....	....
1942	15,939	.....	....	....	....	....	....
1943	15,010	.....	....	....	....	....	....
1944	3,165	.....	....	....	....	....	....
1945	15,014	.....	....	50	50	....	....
1946	14,318	.....	....	11	89	....	....
1947	36,800	.....	....	5	95	....	....
1948	10,456	.....	....	7	90	3	....
1949	13,189	.....	2	92	5	....	(2)
1950	42,435	.....	....	17	83	....	(2)
1951	49,473	.....	....	22	77	(2)	(2)
1952	34,834	342,200	....	8	91	(2)	1
1953	29,947	367,100	....	89	10	1	(2)
1954	18,937	190,800	1	61	38	....	1
1955	28,864	325,478	....	42	58	....	(2)
1956	36,898	442,300	....	4	96	(2)	....

[1] To nearest hundred.
[2] This age-class was represented by less than 0.5 per cent of the number of fish in the sample.

Table XX.—Smith Inlet Sockeyes, 1956, Grouped by Age, Sex, Length, and by Their Early History

Length in Inches	Number of Individuals						Total
	4_2		5_2		5_3		
	M.	F.	M.	F.	M.	F.	
20¼	1	-----	-----	-----	-----	-----	1
20½	-----	-----	-----	-----	-----	-----	-----
20¾	-----	1	-----	-----	-----	-----	1
21	-----	1	-----	-----	-----	-----	1
21¼	1	-----	-----	-----	-----	-----	1
21½	1	-----	-----	1	-----	-----	2
21¾	-----	2	1	-----	-----	-----	3
22	4	2	3	1	-----	-----	10
22¼	4	1	1	1	1	-----	8
22½	4	1	1	4	-----	-----	10
22¾	2	2	1	12	-----	-----	17
23	1	1	3	19	-----	-----	24
23¼	-----	-----	5	31	-----	-----	36
23½	-----	1	9	37	-----	-----	47
23¾	-----	-----	13	63	-----	-----	76
24	-----	-----	19	81	-----	-----	100
24¼	3	-----	26	68	-----	-----	97
24½	1	-----	40	78	-----	-----	119
24¾	-----	-----	34	66	-----	-----	100
25	-----	-----	46	56	-----	-----	102
25¼	-----	-----	39	38	-----	-----	77
25½	-----	-----	46	24	-----	-----	70
25¾	-----	-----	30	13	-----	-----	43
26	-----	-----	15	7	-----	-----	22
26¼	-----	-----	9	2	-----	-----	11
26½	-----	-----	10	-----	-----	-----	10
26¾	-----	-----	6	-----	-----	-----	6
27	-----	-----	1	-----	-----	-----	1
27¼	-----	-----	1	-----	-----	-----	1
27½	-----	-----	1	-----	-----	-----	1
Totals	22	12	360	602	1	-----	997
Average lengths	22.5	22.1	24.9	24.3	22.2	-----	24.5

Table XXI.—Smith Inlet Sockeyes, 1956, Grouped by Age, Sex, Weight, and by Their Early History

Weight in Pounds	Number of Individuals						Total
	4_2		5_2		5_3		
	M.	F.	M.	F.	M.	F.	
4	-----	1	-----	-----	-----	-----	1
4¼	1	-----	-----	-----	-----	-----	1
4½	1	2	-----	-----	-----	-----	3
4¾	2	-----	-----	2	1	-----	5
5	4	2	3	1	-----	-----	10
5¼	-----	3	1	6	-----	-----	10
5½	6	1	7	22	-----	-----	36
5¾	3	1	3	24	-----	-----	31
6	-----	2	6	28	-----	-----	36
6¼	-----	-----	9	33	-----	-----	42
6½	2	-----	25	117	-----	-----	144
6¾	1	-----	18	59	-----	-----	78
7	-----	-----	14	72	-----	-----	86
7¼	1	-----	38	61	-----	-----	100
7½	1	-----	63	87	-----	-----	151
7¾	-----	-----	25	30	-----	-----	55
8	-----	-----	37	15	-----	-----	52
8¼	-----	-----	34	19	-----	-----	53
8½	-----	-----	36	17	-----	-----	53
8¾	-----	-----	9	5	-----	-----	14
9	-----	-----	8	3	-----	-----	11
9¼	-----	-----	8	-----	-----	-----	8
9½	-----	-----	7	1	-----	-----	8
9¾	-----	-----	4	-----	-----	-----	4
10	-----	-----	2	-----	-----	-----	2
10¼	-----	-----	-----	-----	-----	-----	-----
10½	-----	-----	3	-----	-----	-----	3
Totals	22	12	360	602	1	-----	997
Average weights	5.6	5.2	7.6	6.9	4.7	-----	7.1

Table XXII.—Smith Inlet Sockeyes, Average Lengths in Inches of Age-groups, 1945 to 1956

Year	4_1		4_2		5_2		6_2		5_3	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
1945	-----	-----	22.2	22.0	25.1	24.4	-----	-----	-----	-----
1946	-----	-----	21.3	22.7	24.7	24.0	-----	-----	-----	-----
1947	-----	-----	23.2	23.4	25.2	24.3	-----	-----	-----	-----
1948	-----	-----	21.9	21.7	25.0	24.3	26.7	25.0	-----	-----
1949	25.4	23.5	21.4	21.7	24.6	24.3	-----	25.5	-----	-----
1950	-----	-----	21.6	21.7	24.8	24.0	-----	-----	20.5	-----
1951	-----	-----	22.8	22.0	25.6	24.8	-----	25.1	23.4	-----
1952	-----	-----	21.8	22.4	25.7	24.9	-----	25.1	22.9	23.1
1953	-----	24.3	22.9	22.3	25.9	25.2	-----	-----	22.8	23.3
1954	26.3	25.0	22.3	21.9	25.7	24.9	-----	-----	23.0	23.5
1955	-----	-----	21.8	21.6	25.3	24.6	-----	-----	-----	22.3
1956	-----	-----	22.5	22.1	24.9	24.3	-----	-----	22.2	-----

Table XXIII.—Smith Inlet Sockeyes, Average Weights in Pounds of Age-groups, 1945 to 1956

Year	4_1		4_2		5_2		6_2		5_3	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
1945	.....	.....	4.9	4.7	7.1	6.5	.....	.....	.....	.....
1946	.....	.....	4.6	5.8	7.3	6.6	.....	.....	.....	.....
1947	.....	.....	5.7	5.5	6.9	6.0	.....	.....	.....	.....
1948	.....	.....	5.1	5.4	7.6	6.9	10.3	7.5	.....	.....
1949	7.9	6.1	5.0	5.1	7.2	6.7	.....	7.3	.....	.....
1950	.....	.....	4.9	5.0	7.4	6.6	.....	.....	4.0	.....
1951	.....	.....	6.0	5.2	8.2	7.3	.....	7.2	6.4	.....
1952	.....	.....	4.8	5.2	8.0	7.1	.....	7.3	5.7	5.4
1953	.....	5.9	5.9	5.3	8.2	7.6	.....	.....	5.7	5.8
1954	8.0	7.1	5.2	4.7	7.9	7.0	.....	.....	5.8	5.8
1955	.....	.....	5.0	4.7	7.5	6.9	.....	.....	.....	4.8
1956	.....	.....	5.6	5.2	7.6	6.9	.....	.....	4.7	.....

Table XXIV.—Smith Inlet Sockeyes, Percentages of Males and Females, 1945 to 1956

Year	4_1		4_2		5_2		6_2		5_3		Per Cent Total Males	Per Cent Total Females
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.		
1945	....	....	73	27	49	51	....	....	....	....	61	39
1946	....	....	76	24	37	63	....	....	....	....	41	59
1947	....	....	38	62	47	53	....	....	....	....	46	54
1948	....	....	79	21	42	58	11	89	....	....	43	57
1949	36	64	80	20	40	60	....	100	....	....	77	23
1950	....	....	86	14	42	58	....	....	100	....	49	51
1951	....	....	72	28	41	59	....	100	100	....	48	52
1952	....	....	57	43	38	62	....	100	63	37	40	60
1953	....	100	60	40	36	64	....	....	71	29	58	42
1954	25	75	70	30	25	75	....	....	25	75	52	48
1955	....	....	76	24	37	63	....	....	....	100	54	46
1956	....	....	65	35	38	62	....	....	100	....	38	62

THE STATUS OF THE MAJOR HERRING STOCKS IN BRITISH COLUMBIA IN 1956–57

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INTRODUCTION

This report is the tenth of a series of annual reports on the results of herring research carried out at the Biological Station, Nanaimo, B.C., by the Fisheries Research Board of Canada. The various aspects of the research programme discussed in previous years were outlined in 1955–56 (Taylor, Hourston, and Outram, 1956). Continuing the policy of the past three years, the degree of integrity, present status, and level of abundance of each of the major British Columbia herring stocks in 1956–57 are discussed.

THE 1956–57 FISHERY

The total catch in the 1956–57 season (May 1st, 1956, to March 10th, 1957) amounted to 177,087 tons, the lowest since 1947–48; 30,579 tons were taken in the summer fishery lasting from the beginning of June* to the end of September, and 146,508 tons in the regular winter fishery.

The summer fishery in 1956 was more substantial and more widespread than in preceding years, with catches being made in all sub-districts except the upper west coast (Table I). In 1953, 10,600 tons were taken in the summer, 8,600 tons from the middle east coast sub-district and 2,000 tons from Swiftsure Bank (Area 21) in the lower west coast sub-district; in 1954, 4,868 tons were taken, entirely from the middle east coast sub-district; in 1955 there was no summer fishery. In 1956 the August fishery in Queen Charlotte Sound, in the upper east coast sub-district, provided 44 per cent of the total summer catch of 30,579 tons, the September fishery in Caamaño Sound in the northern sub-district 28 per cent, the lower east coast fishery (May to September) 13 per cent, and the September fishery on Swiftsure Bank 7 per cent. The remaining 8 per cent came from small fisheries in the upper and lower central, the middle east coast, and upper Queen Charlotte Islands sub-districts. In general, individual catches were small in comparison with those made in the winter fishery. Availability or catch per unit of effort (Table I) in nearly all sub-districts was much lower than in the subsequent winter fisheries.

In the regular winter fishery, catches (Table I) were below the average of the last five years in all sub-districts except the lower Queen Charlotte Islands and lower central, and, with one exception, were well below the 1955–56 catches. Only in the northern sub-district was the catch greater than in 1955–56, but still below the five-year average.

In the lower Queen Charlotte Islands, in Area 2BE, the catch was the second largest recorded, although it was only about one-third of the phenomenal catch of 85,609 tons made in 1955–56. The catch in Area 2AE of the upper Queen Charlotte Islands sub-district was sharply down in comparison to previous years and was the poorest since the area was first exploited in 1953–54. Catches were made on the west coast of the Queen Charlotte Islands for the first time in 1956–57; 117 tons were taken in one day's fishing in Renfell Sound in Area 2AW and 512 tons in Louscoone Inlet in Area 2BW during the first half of February.

In the northern sub-district, the quota was taken for the first time in three years, with the winter fishery accounting for 22,983 tons out of the season's total of 31,461

* In all sub-districts, except the lower east coast of Vancouver Island where the fishing season commences on May 1st.

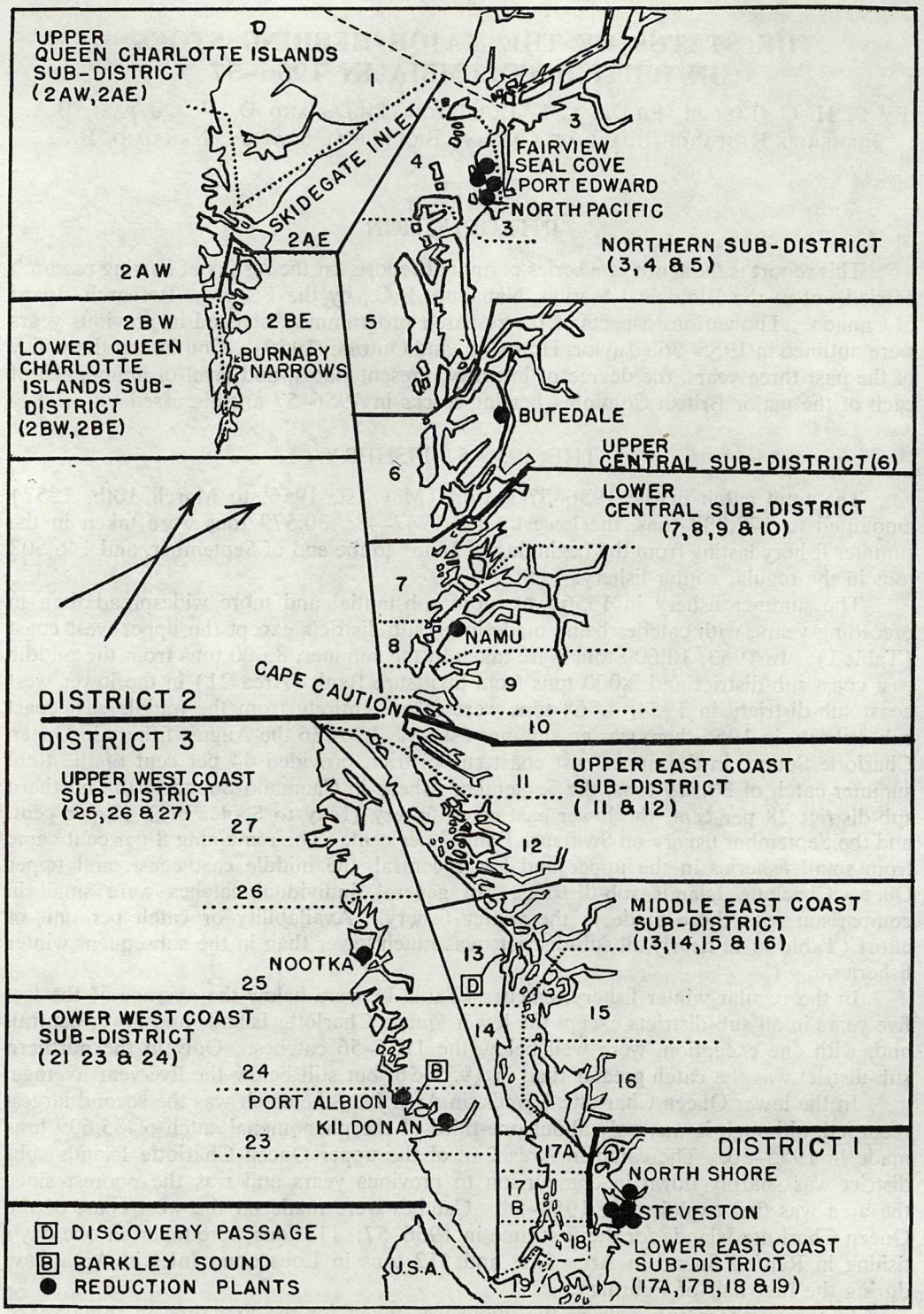

Fig. 1. Map showing the division of the British Columbia coast into districts, sub-districts, and areas.

tons. In contrast to the previous season when the fishery depended on populations (probably local) in Tuck Inlet and Morse Basin, the greater part of the 1956–57 catch was from the main migratory population fished in Hecate Strait off the southern tip of Porcher Island.

In the upper central sub-district (Area 6), the catch, although well below average, was considerably greater than in 1955–56. Meyers Pass and Green Inlet were the main fishing areas.

In the lower central sub-district (Areas 7 to 10), the catch, while slightly above the 1951–52 to 1956–57 average, was well below that of 1955–56. The main fishing-grounds were in Kildidt Sound and Kwakshua Passage, farther to the south than in the previous year.

In the middle east coast sub-district, the catch was 17,753 tons, almost double the normal quota of 10,000 tons, although only slightly more than one-half the record catch of the previous year. Almost the entire catch was made in the Deepwater Bay region of Area 13 during the first three weeks of December. In 1955–56 the main fishery occurred in January and early February, with approximately two-thirds of the catch being made in Area 13 and one-third in Area 14. Availability was higher in 1956–57 than in 1955–56.

In the lower east coast sub-district, while the quota was taken, the catch was about 20 per cent smaller than in 1955–56. Because of the delay in the start of the season due to price negotiations, this fishery, usually the first to occur, was about a month later than usual. It did not start until the first week in December, and for the first time in a number of years the quota was not taken before the Christmas closure. Availability was about the same as in 1955–56.

The catch in the lower west coast sub-district was the lowest recorded. Almost the entire catch was made in Barkley Sound, and represented the smallest catch from this area since 1941–42. The upper west coast sub-district produced only 541 tons of fish, almost all from Ououkinish Inlet. In spite of the low catch, the level of abundance in this sub-district, as indicated by the amount of spawn deposited, was probably above average.

TAGGING

The coastwise adult herring tagging programme was discontinued after 1954, when it was considered that the general relationship between most major populations was sufficiently well understood for the practical purposes of management, and that the annual variations in the extent of intermingling between populations were not large enough to warrant the continued expenditure entailed (Taylor, 1955). In 1955 and 1956 adult tagging was confined to the Strait of Georgia in an effort to determine more precisely the complex relationships between the middle and lower east coast populations. This programme was suspended after the 1956 season when it became apparent that no additional information was likely to be obtained because of difficulties in separating tags recovered from these populations when the fisheries occur, as is often the case, at approximately the same time. No adult herring were tagged, therefore, in the spring of 1957.

Juvenile herring also have been tagged to provide information on the juvenile stocks reared in certain areas and on the spawning stocks that support the fisheries in these and other areas (Taylor, Hourston, and Outram, 1956). From 1952 to 1954 this programme was confined to the lower west coast sub-district and in 1955 and 1956 to populations in the Strait of Georgia and adjacent San Juan Islands area. This programme was terminated after the 1956 season, when the entire juvenile herring research programme was discontinued. The data on the 1956 juvenile herring taggings are summarized below:—

Sub-district and Area of Tagging	Number Tagged in 1956
Middle East Coast—	
Area 13	3,130
Area 14	4,060
Area 15	7,253
Area 16	3,102
Lower East Coast—	
Area 17A	3,075
Area 17B	3,023
Area 18	6,058
Area 19	3,106
San Juan Islands	6,003
Total	38,810

TAG RECOVERY

In the 1956–57 season, tags were recovered only by magnets in reduction-plant meal-lines. No tag-detector was operated, even on an experimental basis, because the difficulties introduced by the increased use of electricity to operate plant machinery proved insurmountable (Taylor *et al.*, 1956).

For reasons discussed in previous reports (*see* Taylor *et al.*, 1956), the various reduction plants differ in their efficiency in recovering and submitting tags found on the magnets. Tests to determine the efficiency of the various plants in recovering tags were conducted in the same manner as in previous years (Stevenson, Hourston, Jackson, and Outram, 1952). The average efficiency of each plant in 1956–57, together with its average efficiency in 1955–56 in parentheses, is given below:—

Plant	Adult Tags		Juvenile Tags	
	Number of Tests	Average Efficiency	Number of Tests	Average Efficiency
West Coast of Vancouver Island				
Port Albion	1 (1)	92 (92)	1 (1)	60 (60)
Steveston and Vicinity				
Imperial	1 (3)	84 (84)	1 (3)	60 (53)
Gulf of Georgia	1 (3)	98 (94)	1 (3)	70 (80)
Colonial	1 (2)	68 (76)	1 (2)	30 (60)
Phoenix	1 (3)	96 (97)	1 (3)	70 (85)
North Shore	1 (2)	86 (89)	1 (2)	90 (75)
Average		87 (88)		64 (71)
North and Central British Columbia				
Namu	1 (2)	96 (91)	1 (2)	70 (65)
Butedale	1 (1)	92 (92)	1 (1)	70 (70)
Port Edward	2 (2)	68 (78)	2 (2)	55 (50)
Seal Cove	1 (2)	64 (79)	1 (2)	35 (35)
Fairview	2 (2)	90 (71)	2 (2)	80 (60)
North Pacific	1 (2)	90 (81)	1 (2)	30 (70)
Average		82 (82)		59 (58)

In 1956–57 there was little change in the general level of efficiency of adult tag recovery. Fairview and North Pacific plants in the Prince Rupert area showed increases in efficiency, while Colonial and Port Edward showed substantial decreases for the second year in succession. The Seal Cove plant has always been relatively inefficient in recovering tags. After an increase in 1955–56, the efficiency of this plant in 1956–57 fell to its normal level.

The average efficiency of the major plants in Northern British Columbia in recovering juvenile herring tags was about the same as in 1955–56, while the efficiency of plants in

Southern British Columbia was somewhat less. Again, there was considerable variation in efficiency among individual plants. The greatest changes were at Colonial and North Pacific, where sharp decreases occurred, and at North Shore and Fairview, where marked increases in efficiency were recorded. Over the past four seasons there has been a decrease in the relative efficiency of juvenile tag recovery. In 1956–57 the ratio of juvenile to adult efficiency was 0.74; in 1955–56, 0.77; in 1954–55, 0.78; and in 1953–54, 0.83.

A total of 1,708 tags, including nineteen State of Washington tags, were recovered in 1956–57 from the magnets in twelve reduction plants. Of these, 272 were recovered in the summer and early fall fishery, the remainder in the regular winter fishery.

Using the same methods as in previous years (Tester and Stevenson, 1948), the most probable area of recovery has been determined for each plant magnet return (Table II). The tendency for reduction plants to process fish simultaneously from a number of diffierent areas was accentuated in 1956–57 by the delay in the start of the regular winter fishery. As a result, only a small proportion, 516 out of 1,436,.or 36 per cent, of the tags recovered could be assigned with any certainty to a particular area of recovery. Recoveries from the middle and lower east coast sub-districts were the most seriously affected. Of 1,152 fish tagged and possibly recovered in these two sub-districts, the most probable area of recovery could be determined for only 239 or 21 per cent.

To assess movement between populations, the probable numbers of tags in the catches were calculated from the plant magnet returns (Table III). The method used was described by Taylor and Outram (1954). Tags recovered at Port Albion and Butedale reduction plants were omitted, as no magnet efficiency tests were carried out at these two plants. Because of the relatively small numbers of tags certain as to area of recovery (Table III, column 9), the estimates of movement between populations are considered generally less reliable in 1956–57 than in previous years. Certain other sources of error are also liable to affect these estimates:—

(1) The length of time the tagged fish have been at liberty. In 1955 and 1956 only the middle and lower east coast populations were tagged. The remaining populations have not been tagged since 1954. The majority of the recoveries from the middle and lower east coast populations in 1956–57, as in previous years, were mainly from fish that had been at liberty for one or two seasons.* From all other populations, recoveries were from fish that had been at liberty for three or more seasons. Because of the greater time at liberty, estimates of movement based on these recoveries may not be strictly comparable to estimates in previous years or to estimates for the middle and lower east coast populations. On the basis of recoveries in 1955–56, the tendency for the degree of dispersion from the sub-district of tagging to increase the longer the fish had been at liberty was not sufficiently marked to warrant the assessment of movement on the basis of recoveries from fish at liberty for the same number of years (Taylor, Hourston, and Outram, 1956). In 1956–57, because of the additional year of liberty, this tendency might be expected to be more pronounced. However, the number of recoveries certain as to area of recovery was insufficient to provide a reliable test of this possibility.

(2) Differences in the degree of exploitation of the various populations both in the same season and in different seasons. As the number of tags recovered varies with the size of the catch, differences in the amount of fish caught in the area of tagging and in areas receiving tags from it will affect estimates of the amount of movement between areas. Similarly, if the proportional sizes of the catches vary from year to year, comparisons of

* More exactly eight or twenty months, since herring are tagged in March and the fishery develops in November.

the degree of dispersion between years will also be affected. Errors of this type might be minimized if estimates of dispersion were based on calculations of the probable number of tags per ton in the various areas. However, because of the large and variable number of tags doubtful as to area of recovery, such calculations would not be reliable.

Since the catches in the lower Queen Charlotte Islands and northern sub-districts have varied widely in the last three seasons and since neither population has been tagged since 1954, estimates of the migration of fish from these two populations will be affected the most seriously by errors from the above two sources. Estimates of dispersion from the middle and lower east coast populations will be the least affected, since catches in each have varied little in the past three years and since both have been tagged every year.

Because of the relatively small number of tag returns certain as to area of recovery and because of the possibility of additional errors from the sources discussed above, estimates of movements between populations in 1956–57 should be accepted with caution.

(1) In 1956–57 most of the recoveries from the regular winter fishery were from the sub-district of tagging and confirm previous conclusions on the relative discreteness of the major populations. The " homing " tendency was apparently least pronounced in the upper Queen Charlotte Islands population (Area 2AE) and most pronounced in the lower east coast population.

(2) The apparent emigration of 44 per cent (14/32) from Area 2AE to the northern sub-district was very much greater in 1956–57 than in previous seasons. This estimate may be unreliable because of the small number of tags involved. It may reflect in part a greater degree of dispersion related to the longer period the tagged fish were at liberty, but more probably overestimates the true movement because of the great difference in the sizes of the catches in the two regions (Table I).

(3) Emigration from the lower Queen Charlotte Islands population (Area 2BE) amounted to 22 per cent (21/94) in 1956–57, compared to 3 per cent in 1955–56. The majority of the emigrants (17) were recovered in the northern sub-district, and the remainder in the lower central sub-district. Once again the apparent increase in emigration may be due to increased time at liberty, but more probably it is a reflection of the smaller relative difference in the sizes of the catches in the two regions (Table I). Eighty per cent (73/91) of the recoveries from the lower Queen Charlotte Islands region were from fish tagged there, 8 per cent (7/91) were from the northern sub-district, and 10 per cent (9/91) from the upper and lower central sub-districts.

(4) Of the recoveries of fish tagged in the northern sub-district, 8 per cent (7/97) were from the lower Queen Charlotte Islands area and 13 per cent (13/97) from the lower central sub-district. Emigration in 1956–57 was similar to the average emigration (23 per cent) between 1936 and 1952 (Stevenson, 1955) and very much less than the estimate in 1955–56. The apparently great emigration in 1955–56 may have been the result of the dependence of the fishery on the isolated untagged stocks of herring in Tuck Inlet and Morse Basin rather than on the main migratory northern sub-district population tagged in previous years (Taylor, Hourston, and Outram, 1956). Thus the number of returns from the northern sub-district from fish tagged there would be proportionately smaller than normal in comparison with the number of returns from other regions. In 1956–57 the fishery, although centred farther to seaward than in other years, again apparently depended on the main migratory northern popu-

lation. Sixty-eight per cent (76/112) of the recoveries made in the northern sub-district were of fish tagged there, 15 per cent (17/112) were from the lower Queen Charlotte Islands, and 12 per cent (14/112) from the upper Queen Charlotte Islands. The remaining 5 per cent were from the upper and lower central sub-districts.

(5) Emigration from the lower central sub-district amounted to 8 per cent (13/150) in 1956–57, with the major portion (5 per cent) again to the lower Queen Charlotte Islands sub-district. Limited movement occurred to the northern and middle east coast sub-districts. The pattern of emigration from the lower central sub-district was similar to that in previous years, in spite of the fact that the main centre of the fishery shifted southwards from the Thompson Channel-Seaforth Channel region to the Kildidt Sound-Kwakshua Passage region. Of the recoveries made in the lower central sub-district, 80 per cent (138/172) were from fish tagged there, 6 per cent from fish tagged in the upper central sub-district, 7 per cent from fish tagged in the northern sub-district, 4 per cent from the middle east coast, and 2 per cent from the lower Queen Charlotte Islands sub-district.

(6) The fishery in the upper central sub-district was again too small to be able to assign tag recoveries to it with any degree of certainty. About 77 per cent (10/13) of the recoveries from fish tagged in this sub-district were apparently recovered in the lower central sub-district. The remainder were recovered from the northern and lower Queen Charlotte Islands sub-districts.

(7) Movement from the middle east coast population amounted to 28 per cent (58/204) in 1956–57, considerably greater than in the previous two seasons (6 per cent in 1955–56 and 4 per cent in 1954–55) but less than the average of 45 per cent for the years 1936 to 1952 (Stevenson, 1955). The majority of the emigation (25 per cent) was to the lower east coast, as compared to 5 per cent in 1955–56 and 2 per cent in 1954–55. Emigration to the lower east coast was greatest from Area 14 and least from Area 13. Of recoveries made in the middle east coast sub-district, 97 per cent (146/150) were from fish tagged there, the remaining 3 per cent coming from the northern, lower central, and lower east coast populations.

(8) The apparent dispersion of lower east coast herring to other sub-districts (3 per cent) was less in 1956–57 than in 1955–56 (about 15 per cent). It was all to the middle east coast sub-district. Only 54 per cent (59/110) of the recoveries from the lower east coast sub-district were from fish tagged there, and 46 per cent were from the middle east coast. The remainder were fish tagged in the San Juan Islands.

(9) No tags certain as to area of recovery were obtained from the small west coast fishery.

In 1956–57 there was a substantial summer and early fall fishery with a total catch of 30,579 tons (Table I). Tags were recovered from the summer fisheries in the northern, upper east coast, middle east coast, lower east coast, and lower west coast sub-districts.

Of the eight tags from the northern sub-district landings, six were from fish tagged in that sub-district and the remaining two from fish tagged in the lower central sub-district.

The probable number of tags in the relatively large upper east coast fishery was seventeen—fifteen from fish tagged in the middle east coast sub-district and two from fish tagged in the lower central sub-district. The relatively small number of recoveries suggests that while the stocks contained some middle east coast and a few lower central

sub-district fish, the majority most probably were from the upper east coast population, which has only been very lightly tagged in the past five years, rather than from some previously unexploited stock.

The relatively small middle east coast summer fishery yielded sixty-two tags certain as to area of recovery. Of these, 74 per cent (46/62) were from the middle east coast sub-district, mainly from Area 14, and 25 per cent (15/62) from the lower east coast sub-district. Recoveries from the summer fishery in 1953–54 showed a similar distribution, with 73 per cent of the recoveries from taggings in the middle east coast sub-district and 22 per cent from the lower east coast sub-district. In the winter fisheries in the same two seasons in this sub-district, 88 and 97 per cent respectively of the recoveries were from middle east coast tagged fish and 8 and 2 per cent respectively from lower east coast tagged fish. In both the summer and winter fisheries in 1954–55, the percentages of middle east coast tagged fish were lower (47 and 60 per cent respectively) and the percentages of lower east coast tagged fish higher (44 and 15 per cent respectively). The 1954–55 results were, however, probably biased by the large number of recoveries in the summer and winter fisheries from a lower east coast tagging on the border between the two sub-districts.

In the summer of 1956 there was a substantial fishery for reduction purposes in the lower east coast sub-district for the first time. This fishery yielded 196 tags certain as to area of recovery. Of these, 57 per cent were from fish tagged in the lower east coast sub-district, and 43 per cent from fish tagged in the middle east coast sub-district, a pattern of recoveries similar to that obtained in the regular winter fishery.

A total of eleven tags were contained in the Area 21 catches—five, or 46 per cent, from fish tagged in the middle east coast sub-district and four, or 36 per cent, from the lower east coast sub-district. There was one recovery each from an American tagging in the San Juan Islands and from an upper west coast tagging. Because of the small number of recoveries and because of the lack of tagging in the lower west coast sub-district after the spring of 1954, these results cannot be considered reliable. In 1953–54 there was also a summer fishery in Area 21. In this fishery 46 per cent (17/37) of the recoveries were from fish tagged in the lower west coast sub-district, 43 per cent (16/37) from the lower east coast sub-district, and 8 per cent (3/37) from the middle east coast sub-district. In contrast, in the 1953–54 winter fishery 95 per cent of the recoveries were from lower west coast taggings, with only 1 per cent from the lower east coast.

In the middle and lower east coast sub-districts, tag recoveries suggest that, while in the summer there may be a greater degree of intermingling with adjacent populations, the stocks are the same as those fished in the winter. In Area 21 the stocks fished in summer probably consist predominantly of fish that spawn in the lower west coast and lower east coast sub-districts. Fish from the middle east coast sub-district are also present, and in some years, at least, may form an appreciable portion of the stock. The recoveries of fish from the upper east coast, lower east coast, and lower west coast fisheries which were tagged in the middle east coast sub-district tend to confirm the hypothesis that middle east coast herring migrate seaward both northward through Johnstone Strait and southward through the Strait of Juan de Fuca, but suggest that possibly the southward route in some years may be the dominant one.

However, because of the small numbers of recoveries from all summer fisheries, these conclusions on summer intermingling must be treated with caution.

RECOVERY OF JUVENILE HERRING TAGS

Three juvenile herring tags were recovered in 1956–57. Two were from fish tagged in Barkley Sound in 1953—one was recovered in the upper west coast sub-district, the other in either the middle or lower east coast sub-district. The third recovery, made in the lower east coast sub-district, was from fish tagged in Jervis Inlet (Area 16) in 1954.

SAMPLING

The objective of a sampling programme is to obtain a number of individuals from a population, the average and range of whose characteristics are representative of the entire population. Each fishing season, random samples of the herring-catch are taken at the reduction plants, and age, length, weight, sex, and degree of maturity are recorded for each of a standard number of fish from every sample. Practical difficulties preclude attaining a perfect representation of the fishable stocks, but examination of the sampling data from previous years has indicated two aspects of the programme in which improvement could be made within the scope of our present operations.

Firstly, the annual goal of a sample taken from every unit (that is, a certain number of tons) of fish caught seldom has been attained except at plants in the Vancouver area, where Biological Station personnel were established throughout the fishing season. Sampling at other plants is done by plant personnel who are subject to other demands on their time and who show varying degrees of conscientiousness. Since the Vancouver plants process mainly fish from the southern stocks (District 3, Fig. 1), information on the northern stocks has not been nearly so complete and reliable as that on the southern stocks. In an attempt to overcome this bias, a field station was established in Prince Rupert during the 1956–57 season to give comparable coverage on the fish landed in that area. Plants in the Prince Rupert and Vancouver areas, which handle 65 per cent of the total catch, process appreciable amounts from all sub-districts. To increase the coverage at other plants, the numbers of samples requested were increased to 50 per cent more than the number desired, and then these samples were sub-sampled to obtain a comparable catch-sample ratio.

Secondly, it has been noted in past sampling programmes that two or more samples taken from the same locality on the same day may differ appreciably in their composition. In order to increase the coverage of the catch by samples, the 1956–57 programme was set up to include double the number of samples. Because the mean and range of variation in the characters sampled are demonstrated almost equally well by the first fifty fish in a sample as by 100 fish, it was possible to double the number of samples without increasing the number of fish to be processed by reducing the size of the samples to fifty fish.

AGE COMPOSITION AND YEAR-CLASS STRENGTH

The age of a herring can be determined from the number of growth seasons shown on its scales. Age determinations were made for each of fifty fish in forty-five samples obtained from the summer fishery in 1956 and in 575 samples obtained during the 1956–57 winter fishing season. (In 1955–56, 288 samples of 100 fish were employed.) One sample was taken for every 680 tons of fish caught in the summer fishery and for every 250 tons caught in the regular winter fishery, as opposed to one sample for every 900 tons in the previous winter season. Percentage age composition was calculated from these data for the ten major British Columbia herring populations and for stocks on the west coast of the Queen Charlotte Islands in the regular winter fishery and for fish from various statistical areas by months for the summer fishery (Table IV). These data, along with data on the average weight of fish at each age in each population (Table VII) and the total catch taken from each population (Table I), give an estimate of the number of fish at each age taken by the summer and winter fisheries from each population (Table V). Data from Table IV show the relative contributions of the various year-classes to the stocks, while data from Table V show the relative importance of these year-classes in the catch from the various populations.

Data from the winter fishery indicate that the 1954 year-class dominated in most populations and appears to be somewhat stronger than the below-average 1953 year-class. A notable exception was the northern sub-district, where the 1953 year-class, of above-

average strength in that sub-district, dominated the catch. The 1955 year-class made a strong showing in the upper central and upper east coast sub-districts and may be stronger than the 1954 year-class in these populations. The strong 1951 year-class (VI-year fish) again made appreciable contributions to the lower Queen Charlotte Islands, lower central, upper east coast, and middle east coast populations, where it had dominated in the previous year's catch. However, after four successive years of supporting the fishery in most of these populations, its numbers have been reduced to a level where it can no longer be expected to make major contributions to future fisheries. On the basis of its contributions as II-year-old fish, the 1955 year-class appears to be above average in the District 2 and upper east coast populations but below average in those farther south.

Thus the general picture of recruitment in recent years along the coast is that of a very strong 1951 year-class followed by a weak 1952 year-class, a below-average 1953 year-class, an average 1954 year-class, and finally the 1955 year-class, which appears above average in the north but weak in the south. Abundance in most populations reached a high level when the strong 1951 year-class was recruited and then declined as this year-class moved through the fishery. The 1951 year-class held abundance at a fairly high level as the poor 1952 year-class moved through the fishery, and the decline was buffered somewhat as the 1953 and 1954 year-classes made somewhat stronger, although no more than average, contributions to the stocks. The apparently good 1955 year-class may hold abundance at is present level in the north, but further declines can be anticipated in the south.

The year-class newly recruited as III-year fish continued to dominate in the lower east coast and lower and upper west coast populations, indicating no major variation in year-class strength in these regions. The middle east coast and lower central populations have reverted to this pattern with the disappearance of the 1951 year-class as an important contributor to the catch. Fish of age III (the 1954 year-class) also dominated the stocks in both areas on the west coast of the Queen Charlotte Islands, forming a somewhat larger proportion of the catch in the northerly than in the southerly area. The more usual situation in the north of extended recruitment with several year-classes dominating the catch obtained in the upper and lower east coasts of the Queen Charlotte Islands and upper central populations. These populations were made up largely of III-, IV-, and VI-year fish, II-, III-, and VI-year fish, and II- and III-year fish respectively. The poor 1952 year-class (V-year fish) in all these populations and the poor 1953 year-class (IV-year fish) in the lower east coast of the Queen Charlotte Islands and upper central populations disrupted this pattern only slightly. The 1953 year-class (IV-year fish) appears to be the only one recruited to the northern population since 1951 which was not below average, and it alone dominated the population in 1956–57.

In the summer of 1956, in the lower east coast sub-district (Areas 17A, 17B, 18, and 19) the 1953 year-class as IV-year-old fish formed the greatest proportion of the population from June to August. In September and in the regular winter fishery, the 1954 year-class (age III) was the dominant contributor. In the middle east coast sub-district in September, the 1953 year-class contributed the largest number of fish, but in the regular winter fishery the 1954 year-class did. In the upper east coast sub-district in June the 1952 year-class was the largest contributor, in July and August the 1954 year-class was, and in the regular winter fishery the 1955 year-class (age II) provided the most fish. In the upper and lower central sub-districts the 1951 year-class (age VI) was dominant in September, while in the regular winter fishery the 1954 year-class was dominant in the lower central and the 1955 year-class (age II) in the upper central.

In all areas the stocks providing the summer fisheries contained a smaller proportion of younger fish and a larger proportion of older fish than the equivalent winter populations. In areas where samples were available for several summer months, there is an indication of a relatively small but progressive increase in the proportion of younger fish

as the summer progresses. In late summer or early fall before the winter fishery commences, a sharp increase occurs in the proportion of fish in those age-groups where recruitment is greatest. Thus, in all populations, the proportion of III-year-old fish increases in this interval. The increases are less marked in the middle east coast and the northern and central British Columbia populations, where a greater proportion of the recruitment occurs at older ages and hence where fish of age III generally form a smaller proportion of the population.

The differences in age composition between summer- and winter-fished stocks suggest that the new recruits do not join the fishable stocks until the time of the autumn pre-spawning migration. The summer stocks appear to consist mainly of fish recruited in previous years and are the residues of the previous season's spawning populations.

AVERAGE LENGTH AND WEIGHT

In six of the ten major herring populations, upper and lower east coast of the Queen Charlotte Islands, northern, upper central, upper east coast, and lower west coast fish of each age were larger, on the average, in the winter of 1956–57, than in the previous year and than the ten-year average for the seasons 1946–47 to 1955–56 (Tables VI and VII). In some of these populations, however, the II-year fish were smaller than average or than in 1955–56. In the lower central and upper west coast sub-districts the fish were smaller than average and the lower central fish were smaller than in the previous season. (No data were obtained for the upper west coast in 1955–56.) Fish taken from the other two sub-districts (lower and middle east coast) were similar in length to the previous year and to the ten-year average. Irregularities in the average length and weight patterns of fish younger than III years and older than VI years probably reflect the relatively small numbers of fish sampled from these age-groups.

In animal populations there is often an inverse relationship between the relative size of the population and the growth rate of individuals comprising it—that is, the population limits the amount of food available to the individual. This situation appears to apply roughly in 1956–57 to all but the northern population. Abundance in 1956–57 was generally low except for the upper west coast, lower central, and northern populations, and average size was greater except in the upper west coast and lower central populations. However, catch, spawn deposition, and average size were all high in the northern sub-district. This anomalous situation might be related to the fact than 97 per cent of the northern catch was taken on the offshore grounds fished intensively for the first time in 1956–57. If these fish were from other than the northern stock, abundance would be low in the northern population and size would consequently be greater. However, tag returns indicated that these were the northern stocks fished prior to 1955–56. The most probable explanation, therefore, appears to be that the abundance and (or) distribution of the planktonic food-supply of this population was unusually favourable in 1956 and in excess of the population requirements.

The somewhat erratic growth pattern presented by the average lengths and weights of herring from the summer fisheries may be due in part to sampling inadequacies. The number of samples from any area for any month is small and may not provide a reliable indication of the population average lengths and weights. The data (Tables VI and VII) suggest that the fish in summer are longer and heavier in all populations, except the lower central, where the summer fishery (in Area 8) may have depended on a slower-growing local population. Two possible explanations of the larger size of summer-caught herring are offered. Environmental conditions may be more suitable for growth in those localities where the summer fisheries occurred than in those where the fish caught in winter had spent the summer, or more probably, considering that the greatest differences occur among the younger fish, that the younger age-groups in the summer stocks contain a greater proportion of earlier-maturing, faster-growing fish than do the same age-groups

in the winter stocks. In the lower east coast sub-district there is also some indication of a progressive increase in average length and weight during the summer until September, when the fish appear intermediate in size between those taken earlier and winter-caught fish. The different size and age composition of fish taken in September may be the result of the first incursion of the winter stocks. In other sub-districts the trend in growth during the summer is less obvious and more erratic from age-group to age-group.

SEX RATIO

Females continued to slightly outnumber the males in the British Columbia herring stocks (Table VIII). The high sex ratios in the lower west of the Queen Charlotte Islands and the upper west coast populations probably reflect poor sampling as only two samples were obtained from each of these populations. The generally lower sex ratios in 1956–57 presumably result from the reduced number of older fish in the stocks as females tend to live longer and thus dominate the older age-groups. The only heavily sampled population (northern) which showed an increase in sex ratio over 1955–56 was also the only one to show a significant increase in average age.

EXTENT AND INTENSITY OF SPAWNING

Each year, officers of the Federal Department of Fisheries measure the extent and intensity of herring-spawn depositions along the entire British Columbia coast-line. Independent and more detailed surveys are also carried out by Biological Station personnel in certain regions. In 1955 and 1956, the lower and middle east coast sub-districts were surveyed, but in 1957, only the latter sub-district and the Boundary Bay region were searched for spawn.

Estimates of the extent and intensity of spawn depositions provide an index of the size of the relative spawning escapements, since natural mortality during the short period between the close of the fishery and the commencement of spawning can be considered negligible. A measure of the extent of spawn deposition also provides information on the initial size of the new year-class.

The length of each individual spawning-ground was measured by pacing along the beach or by reference to detailed charts. Compensation was made for width, only when this dimension was greater than 100 yards or less than 5 yards. In these cases the reported length was converted to an equivalent length at a standard width of 30 yards. The intensity on each spawning was estimated in terms of one of five categories—very light, light, medium, heavy, or very heavy—depending on the number of eggs per unit area of vegetation. The length of each spawning at the reported intensity was converted to an equivalent length in statutory miles at a standard intensity of medium, and the results totalled for each statistical area. By summing the area totals, an estimate of the amount of spawn deposited in 1957 in each sub-district and on the coast as a whole was obtained (Table IX).

A total of 131.5 miles of herring spawn at standard intensity was deposited in British Columbia coastal waters in 1957, the lowest amount ever recorded, and a reduction of 30 per cent from the 1956 level. The number of miles of spawn deposited in 1957 decreased markedly in six sub-districts, increased slightly in two sub-districts, and substantially in one.

Sub-district	Per Cent Reduction	Per Cent Increase
Upper Queen Charlotte Islands	(1)	(1)
Lower Queen Charlotte Islands	71	------
Northern	------	56
Upper central	------	200[2]

[1] No change.

[2] Although the per cent increase in the upper central sub-district is very large, the actual increase in miles of spawn is small; deposition in 1957 was less than a mile for the second successive year.

Sub-district	Per Cent Reduction	Per Cent Increase
Lower central	39	-----
Upper east coast	38	-----
Middle east coast	56	-----
Lower east coast	-----	6
Lower west coast	33	-----
Upper west coast	55	-----

In the upper Queen Charlotte Islands sub-district, spawning in Area 2AE was almost negligible for the third successive year. A small spawning of 0.11 mile was located in Seal Inlet in Area 2AW. This is one of the few reports ever received from the west coast of the Queen Charlotte Islands. In the lower Queen Charlotte Islands sub-district (Area 2BE), spawning was drastically reduced. Only one spawning of any consequence (at Burnaby Narrows) was reported from this sub-district.

In the northern sub-district, the above-average spawn deposition was due primarily to a record spawning in Area 3, principally in the vicinity of Port Simpson. The extent of spawn also showed an increase in Area 4 for the second successive year. In both the upper and lower central sub-districts, the amounts of spawn found were well below average for the second successive year. The absence of any spawnings in the usually productive Myers Pass-Kitasu Bay region (Area 6) for the second year in a row were primarily responsible for the low level of spawning in the upper central sub-district. In the lower central sub-district, a small increase in spawn deposition in Area 8 was more than offset by substantial reduction in Area 7. The lack of spawning along the north and south-west coast of Campbell Island (Area 7) caused the reduction in the lower central sub-district.

In the upper east coast sub-district, spawning was well below the average for the last twenty years. Although spawn deposition occurred on all the usual spawning-grounds, the individual spawnings were reduced in size and intensity from 1956. A small spawning occurred at Nugent Sound (Area 11) for the first time since 1954.

In the middle east coast sub-district, the extent of spawn was less than one-half of the previous year. Marked reduction in the number of spawnings in Area 14, particularly in the Comox Harbour vicinity, were primarily responsible for the decrease. While no spawn was observed in Area 15 in 1956, 3.2 miles were found there in 1957.

In the lower east coast sub-district, spawn deposition increased slightly in 1957. Exceptionally heavy and extensive spawnings in Nanoose Bay in Area 17A more than offset the very reduced spawnings in Area 17B, where, following four years of progressive reduction, spawning in 1957 for the first time on record was negligible.

In the lower west coast sub-district, spawning was below average. The absence of the usual spawnings in Useless Inlet (Area 23) was mainly responsible for the reduced 1957 level of spawn deposition in this sub-district. The reduction in deposition in Area 23 was partly compensated for by a small increase in the extent of deposition in Area 24.

In the upper west coast sub-district, spawn deposition in 1957, while less than one-half of that of the previous year, was still about average. The decrease in spawn deposition in 1957 was due primarily to a reduction in the size of the usually large spawning at Nuchatlitz (Area 25). In 1956 this locality accounted for about 80 per cent of the total spawn deposition in this sub-district, but in 1957 it produced only about 40 per cent of the total. A small increase in deposition occurred in Area 26. In Area 27 no spawning was reported in 1956; however, in 1957 a small amount again was found.

In the Boundary Bay region, 2.1 miles of spawn were located in 1957, considerably less than the 15.6 miles found in 1955, the only other year in which spawning was reported there.

DISCUSSION

The status of the major B.C. herring stocks will now be discussed in the light of information derived from data in the previous sections.

In 1956–57, herring in British Columbia were generally less numerous than in the previous season and below the average for the past five years. The total catch was only 70 per cent of the record 1955–56 catch and 90 per cent of the average catch for 1951–52 to 1956–57. Catches in all sub-districts were below average except in the northern, lower Queen Charlotte Islands, and lower central sub-districts, where they were slightly above average. The greatest declines in catch occurred in the lower west coast and upper Queen Charlotte Islands sub-districts. Spawn deposition in 1957 was only 74 per cent of the 1956 deposition, well below average. Marked decreases in the amount of spawn deposited occurred in all sub-districts except the northern, upper and lower east coast sub-districts. In the first of these, spawn deposition increased considerably in 1957, but in the other two only slightly.

In the upper Queen Charlotte Islands sub-district there was a marked decline in catch for the second successive year; no spawning was reported for the third year in succession. In 1953–54, the first year this area was fished, the catch amounted to 26,600 tons and availability was very high; in 1954–55, while the catch (21,800 tons) was almost as large as in the previous year, considerably greater effort was required to take it; in 1955–56 the catch was sharply reduced to 6,458 tons, and was accompanied by a further decline in availability; in 1956–57 the catch was again markedly reduced, amounting to only 1,276 tons, and availability also was very sharply down. In 1954, 1.4 miles of spawn were reported, but in succeeding years only insignificant amounts of spawn were found. Thus, assuming the same proportion of the population was available to the fishery each year, it appears that a sharp decline in abundance has occurred in this area in the last four years.

One reason for the decline undoubtedly lies in the relative strengths of the year-classes which contributed to these fisheries. In 1953–54 the 1949 year-class as V-year-old fish contributed almost one-half the catch; its contribution was over twice as large as that made by the 1951 year-class as III-year fish, the 1950 class as IV-year fish, or the 1948 year-class as VI-year fish. In 1954–55, catch was maintained at a high level by the strong entry of the 1951 year-class which, as IV-year fish, provided over one-third of the catch, and almost twice as many fish as either the 1950 year-class or the 1949 year-class, which for VI-year-old fish made a relatively substantial contribution. The catch of the 1952 year-class as III-year-olds was only one-third the size of the catch provided by the 1951 year-class the previous year. In 1955–56 the 1951 year-class, as V-year fish, provided about one-third of the season's reduced catch; its contribution was about twice that provided by the 1953, 1952, or the 1950 year-classes. The contribution of the 1953 year-class as III-year fish was only about one-fifth of the contribution made by the 1951 year-class at the same age. In 1956–57 the 1951 year-class, now at age VI, was again the dominant contributor to the very reduced catch. The 1954 year-class as III-year fish made a very poor showing, contributing about one-twentieth the amount the 1951 year-class did at age III.

Thus it would appear that the 1949 year-class was very strong and the 1951 year-class of above average strength. The 1952 and 1953 year-classes were weak, and the 1954 year-class very weak. Thus the good catches of 1953–54 and 1954–55 were the result of large contributions by two strong year-classes—the 1949 and the 1951. The sharply declining catches of the next two seasons, although partially sustained by the remnants of the 1951 year-class, resulted from the successive recruitment of three weak year-classes.

In the lower Queen Charlotte Islands sub-district, the catch, although slightly above average, was only a little over one-third the phenomenally large catch of the preceding

season. Spawn deposition was sharply reduced. The very large catch of 1955–56 resulted from the extremely large contribution of the very strong 1951 year-class as V-year-old fish. This year-class provided almost two-thirds of the catch. In 1956–57 this year-class contributed over one-third of the catch, over two to three times as much as any of the younger year-classes. The recent decrease in abundance in this population is explained by the appearance of three relatively weak year-classes, those of 1952, 1953, and 1954. The decline in catch would have been greater had it not been for the large contribution for VI-year-old fish of the strong 1951 year-class. As this year-class cannot be expected to make a substantial contribution as VII-year-old fish, a further sharp decline will probably occur in 1957–58.

The catch in the northern sub-district reached the level of the quota for the first time in three years. Spawn deposition also showed a substantial increase in this region. The increase in abundance appears to be due to the above-average strength of the 1953 year-class (IV-year fish). The strong 1951 year-class also made a good contribution as VI-year-olds. The increase in catch may also have been influenced by the change in fishing-grounds. In 1955–56 the fishery centred in Tuck Inlet and Morse Basin and may have been dependent more on local populations. In 1956–57, on the other hand, the fishery centred in Hecate Strait, and tag returns suggest that it was dependent on the major northern population normally fished around Porcher Island.

In the upper central sub-district, while catch increased considerably over 1955–56, it still remained well below average. Spawn deposition, although slightly greater than in 1956, remained at a very low level. It would appear, therefore, that although abundance has increased slightly, it is still well below average. The increase in abundance may be traced to the strength of the 1954 year-class. This year-class may be of average strength in contrast to the two preceding year-classes, which were weak. This year-class, while probably not as strong as the 1951 year-class and definitely not as strong as the 1947 year-class, appears stronger than any of the remaining recent year-classes. The 1955 year-class, which made a strong contribution as II-year fish in 1956–57, may possibly turn out to be as strong as the 1954 year-class.

In the lower central sub-district, the catch, although about average for the last five years, was only about two-thirds as large as in 1955–56. Spawn deposition showed a marked decline for the second year in succession and was about 40 per cent less than in 1956. The strong 1951 year-class, although it made a contribution above average for VI-year fish, was too old to sustain the level of abundance. The 1952 and 1953 year-classes, V- and IV-year-old fish, were relatively weak. The 1954 year-class, as in the upper central sub-district, appears relatively strong, although probably not as strong as the 1951 year-class. The 1955 year-class made an excellent showing as II-year-old fish, particularly in the more southern areas of the sub-district. There is the possibility, therefore, that abundance may increase in 1957–58.

The catch in the upper east coast sub-district was the largest recorded for this region. A substantial summer fishery (13,584 tons) occurred in 1956 off the entrance to Queen Charlotte Strait. The regular winter fishery, however, contributed only about another 1,300 tons, well below average. Spawn deposition decreased fairly sharply from the 1955–56 level, but was probably not greatly below average. As the available evidence suggests that the summer-fished stocks were of upper east coast origin, it would appear that the level of abundance in this population was fairly high in 1956–57. The strong 1951 year-class, while it by no means dominated the summer or winter fisheries, made very strong contributions to both. The 1952 year-class appears to be stronger in this population than the 1953 year-class. The 1954 year-class made a relatively good contribution to both the summer and winter fisheries and appears to be stronger than the 1953 year-class, although probably not as strong as either the 1952 or 1951 year-classes. As the 1955 year-class shows prospects of being of average strength, abundance may remain at a reasonably high level in 1957–58.

In the middle east coast sub-district, the catch, although almost double the 10,000-ton quota, was well below the 1955–56 catch, and slightly below the average catch for the past five years. Spawn deposition was only a little more than 50 per cent of the 1956 deposition. Abundance in 1956–57 declined from the high level of the past few years and now is probably not above average. The 1952 year-class appears to have been the last of a succession of three strong year-classes. The 1953 year-class was below average in strength and the 1954 year-class of probably average strength. No great increase in abundance is expected in 1957–58.

In the lower east coast sub-district, while the quota was again exceeded, the catch was the smallest for the past five seasons. Spawn deposition was about average, approximately the same as in 1955–56. The suggested moderate decline in abundance has probably resulted from the below-average contribution of the relatively weak 1953 year-class as IV-year-old fish. The 1954 year-class appears to be of at least average strength. No marked change in abundance is foreseen in this population.

Both catch and spawn deposition were at a low level in the lower west coast sub-district in 1956–57. The catch was the smallest ever recorded from this region. Spawn deposition, while below average, was greater than in some past years. The newly recruited 1954 year-class appeared to be weak, and the 1953 year-class, although it made at least an average contribution as III-year fish in 1955–56, made a poor showing as IV-year fish this past season. Little increase is looked for in 1957–58 unless the 1955 year-class is stronger than expected.

In the upper west coast sub-district there was again no appreciable fishery. Spawn deposition, while less than in 1956, was still above average. Abundance would appear to be at a relatively high level in this population, but the fish have not become available to the fishermen because of late inshore movement.

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SUMMARY

Although the 1956–57 tag returns were fewer in number and were attended by more uncertainty as to the most probable area of recovery, they confirmed once again the relative discreteness of the populations as now defined.

Fish from the upper Queen Charlotte Islands population, as in 1955–56 but in contrast to 1954–55, showed the greatest tendency to wander from the sub-district of tagging. Fish from the northern population, in contrast to 1955–56 but as in 1954–55, showed a relatively high " homing " tendency. The 1956–57 returns from fish tagged in this sub-district provide some confirmation of the assumption that the 1956–57 fishery, although centred in Hecate Strait, was dependent on the main northern stock, while the 1955–56 fishery centred in Tuck Inlet and Morse Basin depended to a larger degree on local untagged stocks. In all other populations from which adequate tag returns were available, the proportion of recoveries from the area of tagging followed the average pattern.

The tag recoveries from summer fisheries in 1956–57 and in two previous seasons, although relatively few in number, suggest that in most areas the same stocks are fished in summer as in winter. However, the degree of intermingling with adjacent stocks is greater in summer than in winter.

The total catch in 1956–57 was 177,087 tons, the lowest since 1947–48. Of this total, 30,579 tons were taken in a summer fishery. In the summer fishery, 44 per cent of the catch came from the upper east coast sub-district, 28 per cent from the northern sub-district, and 13 per cent from the lower east coast sub-district. The remaining 15 per cent came from small fisheries in the lower west coast, upper and lower central, middle east coast, and upper Queen Charlotte Islands sub-districts. In the regular winter fishery, catches were below average in all sub-districts, except the northern, lower Queen Charlotte Islands, and lower central. The greatest declines occurred in the lower west coast and upper Queen Charlotte Islands sub-districts. Spawn deposition in 1957 was the lowest recorded, and represented a reduction of 30 per cent from the 1956 level. The greatest decreases occurred in the lower Queen Charlotte Islands, middle east coast, upper west coast, lower central, upper east coast, and lower west coast sub-districts. A substantial increase in spawn deposition occurred in the northern sub-district, and slight increases in the lower east coast and upper central sub-districts.

In 1956–57, herring were relatively less abundant than in 1955–56 in the upper and lower Queen Charlotte Islands, lower central, middle and lower east coast, and upper and lower west coast sub-districts.

In 1956–57 the strong 1951 year-class, although it made relatively substantial contributions for the VI-year-old fish to the catches in some sub-districts, was too old to sustain the level of abundance in any population. In the upper and lower Queen Charlotte Islands sub-districts, the low level of abundance is associated with the weakness of the year-classes providing fish of ages III, IV, and V (the 1954, the 1953, and the 1952 year-classes respectively). In the lower central sub-district the 1952 and 1953 year-classes were relatively weak, and had the 1954 year-class not been of at least average strength, abundance would have been lower. In the middle east coast sub-district, the 1952 year-class appears to have been the last of a succession of three strong year-classes. The 1953 year-class (IV-year fish in 1956–57) was of below average strength, but the 1954 year-class (age III) may be of average strength. In the lower east coast sub-district the decrease in abundance was relatively slight and may be traced to the below-average strength of the 1953 year-class (IV-year-old fish). The 1954 year-class was probably of average strength. In the lower west coast sub-district, in common with other Southern British Columbia populations, newly recruited fish of age III formed the bulk of the population. In 1956–57 the dominant year-class (that of 1954) was very weak. The 1953 year-class (age IV) made a poor contribution, although it had appeared to be of average strength the previous season.

Only in the northern sub-district did fish appear to be definitely more abundant than in 1955–56. In this sub-district the 1953 year-class (age IV) appeared to be of about average strength and the 1954 year-class (age III) of probably average strength.

In the upper central sub-district, although abundance showed probably a slight increase over the 1955–56 level, it still remained well below average. In this sub-district the 1954 year-class was probably of average strength, while the two preceding year-classes were weak.

In 1956–57, fish of each age were somewhat larger than in 1955–56 and larger than the average for the last ten years in the upper and lower Queen Charlotte Islands, northern, upper east coast, and lower west coast populations. In the lower central and the upper west coast sub-districts, the fish were smaller than average, and the lower central fish were smaller than in 1955–56. Fish in the lower and middle east coast sub-

districts were similar in size to those of the previous year and close to the ten-year average. Females continued to outnumber males in all populations.

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* Reprints were published in year following the date of publication of report.

Table I.—Catch and Availability by Sub-district for the 1956–57 and 1955–56 Seasons

Sub-district	Season	Catch, 1956–57	Catch, 1955–56	Average Catch, 1951–52 to 1956–57[1]	Catch per Unit of Effort, 1956–57	Catch per Unit of Effort, 1955–56
Upper Queen Charlotte Islands—						
Area 1	Summer[2]	344	.....	.....	35	...
Area 2AE	Winter[3]	1,276	6,458	14,033	15	58
Area 2AW	Winter	117	.....	.....	...	...
Lower Queen Charlotte Islands—						
Area 2BE	Winter	25,626	85,609	24,987	33	138
Area 2BW	Winter	512	.....	.....	19	...
Northern	Summer	8,478	.....	.....	58	...
	Winter	22,983	11,429	28,306	52	22
Upper central—Area 6	Summer	355	.....	.....	14	...
	Winter	5,043	1,869	8,382	38	...
Lower central—Areas 7 to 10	Summer	792	.....	.....	...	...
	Winter	29,323	46,391	27,962	30	98
Upper east coast	Summer	13,584	.....	.....	45	...
	Winter	1,312	920	5,266	24	46
Middle east coast	Summer	906	.....	.....	14	...
	Winter	17,753	29,652	20,401	73	47
Lower east coast	Summer	4,007	.....	.....	13	...
	Winter	39,164	48,709	46,567	56	59
Lower west coast	Summer	2,114	.....	.....	19	...
	Winter	2,858	18,847	13,837	42	88
Upper west coast	Winter	541	560	7,249	44	62
Total (tons)	Summer	30,579	.....	.....	...	...
	Winter	146,508	250,444	196,486	...	...

[1] Catches in 1952–53 omitted.

[2] Summer fishery, June 1st to September 30th, except in lower east coast sub-district where the opening date is May 1st.

[3] Winter fishery, October 1st to February 5th, in District 3 and to March 10th in District 2. Because of a delay in reaching a price agreement, the season started on December 4th in 1956–57.

Table II.—Number of Tags Recovered by Plant Crews, according to Area of Tagging and Probable Sub-district of Recovery, for the 1956–57 Fishing Season

SUMMER FISHERY, 1956–57

Sub-district and Area of Tagging	Tagging Code	Year of Tagging	Probable Sub-district of Recovery														Total
			Upper Queen Charlotte Islands	Lower Queen Charlotte Islands	Northern	Upper Central	Lower Central	Upper East Coast	Middle East Coast	Lower East Coast	Lower West Coast	Upper West Coast	Northern B.C. (District 2)	Middle and Lower East Coast	?		
Lower Queen Charlotte Islands																	
Area 2BE	18S	1954	----	----	----	----	----	----	----	----	----	----	----	----	1		1
Northern																	
Area 4	16AA	1952	----	----	1	----	----	----	----	----	----	----	----	----	----		1
	18Q	1954	----	----	1	----	----	----	----	----	----	----	----	----	----		1
Area 5	18N	1954	----	----	1	----	----	----	----	----	----	----	----	----	----		1
Lower Central																	
Area 7	16X	1952	----	----	----	----	----	----	1	----	----	----	----	----	----		1
	17FF	1953	----	----	----	----	----	1	----	----	----	----	----	----	----		1
	17HH	1953	----	----	1	----	----	----	----	----	----	----	----	----	----		1
	17KK	1953	----	----	----	----	----	1	----	----	----	----	----	----	----		1
Middle East Coast																	
Area 13	19A	1955	----	----	----	----	----	4	1	4	----	----	----	----	----		9
	20A	1956	----	----	----	----	----	2	2	1	1	----	----	1	----		7
Area 14	19B	1955	----	----	----	----	----	2	2	----	----	----	----	----	----		4
	19C	1955	----	----	----	----	----	----	1	----	----	----	----	----	----		1
	20B	1956	----	----	----	----	----	----	3	7	1	----	----	2	----		13
	20C	1956	----	----	----	----	----	1	9	8	----	----	----	4	----		22
	20D	1956	----	----	----	----	----	----	1	3	1	----	----	----	----		4
	20E	1956	----	----	----	----	----	----	11	16	1	----	----	4	----		32
	20F	1956	----	----	----	----	----	2	4	26	1	----	----	5	----		38
Area 15	18A	1954	----	----	----	----	----	----	2	2	----	----	----	----	----		4
	19D	1955	----	----	----	----	----	2	2	5	----	----	----	1	----		10
	19E	1955	----	----	----	----	----	1	1	----	----	----	----	----	----		2
Lower East Coast																	
Area 17A	17E	1953	----	----	----	----	----	----	1	----	----	----	----	----	----		1
	18C	1954	----	----	----	----	----	----	----	2	----	----	----	----	----		2
	19G	1955	----	----	----	----	----	----	----	1	----	----	----	1	----		2
	20H	1956	----	----	----	----	----	----	6	15	----	----	----	4	----		25
Area 17B	18B	1954	----	----	----	----	----	----	----	2	----	----	----	----	----		2
	19H	1955	----	----	----	----	----	----	1	1	----	----	----	----	----		2
	19K	1955	----	----	----	----	----	----	----	2	----	----	----	----	----		2
	20J	1956	----	----	----	----	----	----	1	24	----	----	----	----	----		25
	20K	1956	----	----	----	----	----	----	3	42	4	----	----	2	----		51
Area 18	15F	1951	----	----	----	----	----	----	----	1	----	----	----	----	----		1
	17J	1953	----	----	----	----	----	----	1	1	----	----	----	----	----		2
	18E	1954	----	----	----	----	----	----	----	1	----	----	----	----	----		1
	19M	1955	----	----	----	----	----	----	----	1	----	----	----	----	----		1
Upper West Coast																	
Area 25	----------	-------	----	----	----	----	----	----	----	----	1	----	----	----	----		1
San Juan Islands, U.S.A.																	
Quilcene Bay	----------	1956	----	----	----	----	----	----	----	1	1	----	----	----	----		2

Table II.—Number of Tags Recovered by Plant Crews, according to Area of Tagging and Probable Sub-district of Recovery, for the 1956–57 Fishing Season—Continued

WINTER FISHERY, 1956–57

Sub-district and Area of Tagging	Tagging Code	Year of Tagging	Probable Sub-district of Recovery														Total
			Upper Queen Charlotte Islands	Lower Queen Charlotte Islands	Northern	Upper Central	Lower Central	Upper East Coast	Middle East Coast	Lower East Coast	Lower West Coast	Upper West Coast	Northern B.C. (District 2)	Middle and Lower East Coast	?	
Upper Queen Charlotte Islands																	
Area 2AE	18T	1954	4	—	2	—	—	—	—	—	—	—	—	—	—	6
	18U	1954	13	1	8	—	—	—	—	—	—	—	—	—	—	22
	18W	1954	1	—	1	—	—	—	—	—	—	—	—	—	—	2
Lower Queen Charlotte Islands																	
Area 2BE	16CC	1952	—	10	2	—	—	—	—	—	—	—	1	1	—	14
	17QQ	1953	—	13	3	—	1	—	—	—	—	—	1	—	—	18
	17RR	1953	—	10	1	—	1	—	—	—	—	—	—	—	—	12
	18S	1954	—	29	7	—	2	—	—	—	—	—	3	—	—	41
Northern																	
Area 4	16Z	1952	—	—	1	—	—	—	—	—	—	—	1	—	—	2
	16AA	1952	—	—	1	—	—	—	—	—	—	—	—	—	—	1
	17MM	1953	—	1	6	—	1	—	—	—	—	—	—	—	—	8
	17NN	1953	—	1	2	—	—	—	—	—	—	—	1	—	1	5
	17PP	1953	—	—	1	—	1	—	—	—	—	—	—	—	—	2
	18P	1954	—	—	1	—	—	—	—	—	—	—	—	—	—	1
	18Q	1954	—	1	10	—	—	—	—	—	—	—	—	—	—	11
	18R	1954	—	1	24	—	2	—	—	—	—	—	—	—	—	28
Area 5	18N	1954	—	1	13	—	6	—	1	—	—	—	2	—	—	23
Upper Central																	
Area 6	14BB	1950	—	—	—	1	—	—	—	—	—	—	—	—	—	1
	15V	1951	—	—	1	—	—	—	—	—	—	—	—	—	—	1
	17LL	1953	—	—	—	—	4	—	—	—	—	—	—	—	—	4
	18M	1954	—	2	—	—	5	—	—	—	—	—	1	1	—	9
Lower Central																	
Area 7	15AA	1951	—	—	—	—	2	—	—	—	—	—	—	—	—	2
	15BB	1951	—	—	—	—	4	—	—	—	—	—	2	1	—	7
	16U	1952	—	1	—	—	3	—	—	—	—	—	—	—	—	4
	16W	1952	—	—	—	—	10	—	—	—	—	—	1	—	—	11
	16X	1952	—	—	—	—	3	—	—	—	—	—	—	—	1	4
	16Y	1952	—	—	—	—	13	—	—	—	—	—	1	—	—	14
	17EE	1953	—	1	3	—	15	—	—	—	—	—	2	—	—	21
	17FF	1953	—	—	—	—	23	—	—	—	—	—	1	—	—	24
	17GG	1953	—	1	—	—	11	—	—	—	—	—	1	—	—	13
	17HH	1953	—	—	—	—	4	—	—	—	—	—	—	—	—	4
	17II	1953	—	—	—	—	4	—	—	—	—	—	—	—	—	4
	17KK	1953	—	—	—	—	5	—	—	—	—	—	—	—	—	5
	18J	1954	—	—	—	—	13	—	—	—	—	—	1	—	—	14
	18K	1954	—	—	—	—	15	—	—	—	—	—	1	1	—	17
	18L	1954	—	3	—	—	9	—	1	—	—	—	1	1	—	15
Area 10	15CC	1951	—	—	—	—	1	—	—	—	—	—	—	—	—	1
Upper East Coast																	
Area 12	17DD	1953	—	—	—	—	—	14	—	—	—	—	—	—	4	18
Middle East Coast																	
Area 13	19A	1955	—	—	—	—	—	—	6	2	—	—	1	57	6	72
	20A	1956	—	—	—	—	1	—	45	6	—	—	—	206	16	274
Area 14	14A	1950	—	—	—	—	—	—	—	—	—	—	—	1		1
	16A	1952	—	—	—	—	—	—	2	1	—	—	—	2	1	6
	17B	1953	—	—	—	—	—	—	—	—	—	—	—	1	—	1
	18B	1954	—	—	—	—	—	—	—	—	—	—	—	1	—	1
	19B	1955	—	—	—	—	—	—	—	1	—	—	—	24	1	26
	19C	1955	—	—	—	—	—	—	1	2	—	—	—	5	1	9

Table II.—Number of Tags Recovered by Plant Crews, according to Area of Tagging and Probable Sub-district of Recovery, for the 1956–57 Fishing Season—Continued

WINTER FISHERY, 1956–57—*Continued*

Sub-district and Area of Tagging	Tagging Code	Year of Tagging	Probable Sub-district of Recovery														Total
			Upper Queen Charlotte Islands	Lower Queen Charlotte Islands	Northern	Upper Central	Lower Central	Upper East Coast	Middle East Coast	Lower East Coast	Lower West Coast	Upper West Coast	Northern B.C. (District 2)	Middle and Lower East Coast	?	
Area 14	20B	1956	—	—	—	—	—	—	1	1	—	—	—	10	—	12
	20C	1956	—	—	—	—	—	—	20	7	—	—	—	113	5	145
	20D	1956	—	—	—	—	—	—	13	1	—	—	—	53	5	72
	20E	1956	—	—	—	—	1	—	10	6	—	—	—	77	4	98
	20F	1956	—	—	—	—	1	—	13	9	1	—	—	88	6	118
Area 15	14B	1950	—	—	—	—	—	—	—	—	—	—	—	1	—	1
	14C	1950	—	—	—	—	—	—	—	—	—	—	—	1	—	1
	15A	1951	—	—	—	—	—	—	1	—	—	—	—	3	—	4
	15B	1951	—	—	—	—	—	—	—	—	—	—	—	3	—	3
	17A	1953	—	—	—	—	—	—	2	—	—	—	—	5	—	7
	18A	1954	—	—	—	—	—	—	2	2	—	—	—	12	1	17
	19D	1955	—	—	—	—	2	—	11	2	—	—	—	52	3	71
	19E	1955	—	—	—	—	—	—	14	4	—	—	—	55	3	73
Area 16	20G	1956	—	—	—	—	—	—	—	—	—	—	—	1	—	1
Lower East Coast																
Area 17A	18C	1954	—	—	—	—	—	—	1	—	—	—	—	2	—	3
	19F	1955	—	—	—	—	—	—	1	2	—	—	—	5	—	8
	19G	1955	—	—	—	—	—	—	—	3	—	—	—	2	—	5
	20H	1956	—	—	—	—	—	—	—	7	—	—	—	23	2	32
Area 17B	18D	1954	—	—	—	—	—	—	—	—	—	—	—	1	—	1
	19H	1955	—	—	—	—	—	—	—	2	—	—	—	4	—	6
	19K	1955	—	—	—	—	—	—	—	—	—	—	—	—	1	1
	20J	1956	—	—	—	—	—	—	—	22	—	—	—	11	—	33
	20K	1956	—	—	—	—	1	—	—	15	—	—	—	27	2	45
Area 18	15F	1951	—	—	—	—	—	—	—	—	—	—	—	1	—	1
	18E	1954	—	—	—	—	—	—	—	1	—	—	—	1	—	2
	18F	1954	—	—	—	—	—	—	—	—	—	—	—	4	—	4
	19L	1955	—	—	—	—	—	—	—	—	—	—	—	2	—	2
	19M	1955	—	—	—	—	—	—	—	—	—	—	—	2	—	2
Lower West Coast																
Area 24	16K	1952	—	—	—	—	—	—	—	—	—	—	—	1	—	1
	17T	1953	—	—	—	—	—	—	—	—	1	—	—	—	—	1
Upper West Coast																
Area 25	18H	1954	—	1	—	—	—	—	—	—	—	—	—	—	—	1
Area 26	16T	1952	—	1	—	—	—	—	—	—	—	—	—	—	—	1
	17AA	1953	—	—	—	—	—	—	—	—	—	1	—	1	—	2
	17BB	1953	—	—	—	—	—	—	—	—	—	1	—	—	—	1
San Juan Islands, U.S.A.																
Holmes Harbor	.....	1955	—	—	—	—	—	—	—	1	—	—	—	1	1	3
Holmes Harbor	.....	1956	—	—	—	—	—	—	—	—	—	—	—	3	—	3
Quilcene Bay	.....	1956	—	—	—	—	—	—	—	1	—	1	—	5	1	8
Waldron Island	.....	1956	—	—	—	—	—	—	—	—	—	—	—	1	—	1
Locality Unknown	.....	.....	—	—	—	—	—	—	—	—	—	—	—	2	—	2

JUVENILE HERRING TAG RECOVERIES

Middle East Coast																	
Area 16	19B	1955	—	—	—	—	—	—	—	1	—	—	—	—	—	1
Lower West Coast																	
Area 23	17YY	1953	—	—	—	—	—	—	—	—	—	—	—	1	—	1
	17BBB	1953	—	—	—	—	—	—	—	—	—	1	—	—	—	1

Table III.—Probable Numbers of Tags in the Catches during the 1956–57 Season, Based on Magnet Recoveries, Shown by Area of Tagging and Probable Sub-district of Recovery, with Actual Number of Tags[1] in Parentheses.

SUMMER FISHERY, 1956–57

Sub-district and Area of Tagging	Probable Sub-district of Recovery												Grand Total
	Upper Queen Charlotte Islands	Lower Queen Charlotte Islands	Northern	Lower Central	Upper East Coast	Middle East Coast	Lower East Coast	Lower West Coast	Total "Certain"	Northern B.C. (District 2)	Middle and Lower East Coast	?	
Lower Queen Charlotte Islands													
Area 2BE												1	1
												(1)	(1)
Northern													
Area 4			4						4				4
			(2)						(2)				(2)
Area 5			2						2				2
			(1)						(1)				(1)
Lower Central													
Area 7			2		2	1			5				5
			(1)		(2)	(1)			(4)				(4)
Middle East Coast													
Area 13					7	3	7	1	18		1		19
					(6)	(3)	(5)	(1)	(15)		(1)		(16)
Area 14					5	37	69	4	115		17		132
					(5)	(31)	(59)	(4)	(99)		(15)		(114)
Area 15					3	6	8		17		1		18
					(3)	(5)	(7)		(15)		(1)		(16)
Lower East Coast													
Area 17A						8	22		30		6		36
						(7)	(18)		(25)		(5)		(30)
Area 17B						6	84	4	94		2		96
						(5)	(71)	(4)	(80)		(2)		(82)
Area 18						1	5		6				6
						(1)	(4)		(5)				(5)
Upper West Coast													
Area 25								1	1				1
								(1)	(1)				(1)
United States of America													
San Juan Islands							1	1	2				2
							(1)	(1)	(2)				(2)

WINTER FISHERY, 1956–57

Upper Queen Charlotte Islands													
Area 2AE	16	2	14						32				32
	(6)	(1)	(8)						(15)				(15)
Lower Queen Charlotte Islands													
Area 2BE		73	17	4					94	6	1		101
		(47)	(11)	(3)					(61)	(5)	(1)		(67)
Northern													
Area 4		6	58	4					68	1		2	71
		(4)	(34)	(3)					(41)	(1)		(2)	(44)
Area 5		1	18	9		1			29	3			32
		(1)	(13)	(6)		(1)			(21)	(2)			(23)

[1] No magnet efficiency tests were carried out at the Butedale or Port Albion plants. Therefore, in calculating the probable number of tags, recoveries at these plants were omitted. Hence the actual number of recoveries in Table III will not agree in all cases with those in Table II.

Table III.—Probable Numbers of Tags in the Catches during the 1956–57 Season, Based on Magnet Recoveries, Shown by Area of Tagging and Probable Sub-district of Recovery, with Actual Number of Tags[1] in Parentheses—Continued.

WINTER FISHERY, 1956–57—*Continued*

Sub-district and Area of Tagging	Probable Sub-district of Recovery												
	Upper Queen Charlotte Islands	Lower Queen Charlotte Islands	Northern	Lower Central	Upper East Coast	Middle East Coast	Lower East Coast	Lower West Coast	Total "Certain"	Northern B.C. (District 2)	Middle and Lower East Coast	?	Grand Total
Upper Central													
Area 6		1	2	10					13	1	2		16
		(1)	(1)	(8)					(10)	(1)	(1)		(12)
Lower Central													
Area 7		8	3	137		1			149	13	4	1	167
		(6)	(2)	(105)		(1)			(114)	(11)	(3)	(1)	(129)
Area 10				1					1				1
				(1)					(1)				(1)
Upper East Coast													
Area 12					16				16			4	20
					(14)				(14)			(4)	(18)
Middle East Coast													
Area 13				1		53	9		63	1	310	17	391
				(1)		(51)	(8)		(60)	(1)	(251)	(15)	(327)
Area 14				3		62	32		97		446	15	558
				(2)		(59)	(27)		(88)		(363)	(14)	(465)
Area 15				3		31	10		44	1	157	4	206
				(2)		(30)	(8)		(40)	(1)	(129)	(4)	(174)
Area 16											1		1
											(1)		(1)
Lower East Coast													
Area 17A						2	13		15		37	1	53
						(2)	(12)		(14)		(31)	(1)	(46)
Area 17B							45		45		52	2	99
							(39)		(39)		(42)	(2)	(83)
Area 18							1		1		13		14
							(1)		(1)		(12)		(13)
Lower West Coast													
Area 24											1		1
											(1)		(1)
Upper West Coast													
Area 26											1		1
											(1)		(1)
United States of America													
San Juan Islands							2		2		15	2	19
							(2)		(2)		(12)	(2)	(16)

JUVENILE HERRING TAG RECOVERIES

Middle East Coast													
Area 16							1		1				1
							(1)		(1)				(1)
Lower West Coast													
Area 23											3		3
											(1)		(1)

Table IV.—The Average Percentage Age Composition of Herring Sampled from Each Major Population or Sub-district during the 1956–57 Winter Fishing Season and by Months for Each Statistical Area during the 1956 Summer Fishing Season.

(Comparable data for the previous four seasons are also shown together with the ten-year average for the seasons 1946–47 to 1955–56, inclusive. Dominant year-classes are given in italics.)

WINTER FISHERY

Population and Fishing Season	In Year of Age								
	I	II	III	IV	V	VI	VII	VIII	IX+
West Coast, Queen Charlotte Islands									
Area 2AW—1956–57[1]	.....	.....	*63.41*	31.71	2.44	2.44	.....	.....	.....
Area 2BW—1956–57[1]	.....	1.11	*40.60*	17.63	13.22	15.34	9.92	2.18	.....
Upper East Coast, Queen Charlotte Islands[2]									
1952–53[3]	.....	.....	.....	.....	.....	.....	.....	.....	.....
1953–54	0.05	2.42	*27.18*	21.27	*35.10*	10.66	2.33	0.68	0.29
1954–55	.....	7.81	13.77	*40.90*	18.07	14.81	4.18	0.29	0.10
1955–56	0.10	13.81	*24.71*	*20.49*	*23.85*	9.92	5.22	1.34	0.56
1956–57	.....	6.04	*24.94*	*21.39*	15.88	*22.26*	5.94	2.94	0.63
Lower East Coast, Queen Charlotte Islands[4]									
1952–53[3]	.....	.....	.....	.....	.....	.....	.....	.....	.....
1953–54	.....	.....	*38.24*	*38.24*	8.82	11.76	.....	2.94	.....
1954–55[5]	.....	.....	.....	.....	.....	.....	.....	.....	.....
1955–56	.....	0.16	15.39	9.82	*62.25*	8.62	2.89	0.70	0.17
1956–57	0.20	*20.47*	*23.42*	15.71	9.71	*27.60*	2.35	0.39	0.14
Northern									
Ten-year average	0.02	5.57	26.27	35.80	23.18	6.77	1.93	0.38	0.08
1952–53	.....	1.27	*34.34*	*23.58*	*25.72*	11.03	0.98	0.08	.....
1953–54	.....	1.96	*28.35*	*29.37*	*23.80*	13.33	2.54	0.58	0.06
1954–55	.....	2.78	4.90	*70.78*	15.32	5.02	1.04	0.15	.....
1955–56	.....	8.85	*56.30*	9.77	20.84	3.28	0.62	0.19	0.14
1956–57	.....	11.31	18.39	*39.96*	12.88	15.85	1.31	0.28	0.03
Upper Central									
Ten-year average	0.22	19.81	31.04	23.47	18.01	6.01	1.11	0.24	0.10
1952–53	0.70	6.94	*24.74*	*24.39*	*28.49*	14.06	0.68	.....	.....
1953–54	0.42	5.12	*74.47*	14.11	4.93	0.94	.....	.....	.....
1954–55	0.06	12.53	18.82	*63.43*	4.08	0.87	0.21	.....	.....
1955–56	.....	*84.74*	12.72	1.26	1.14	0.15	.....	.....	.....
1956–57	.....	*55.14*	*35.11*	6.76	1.88	1.06	0.05	.....	.....
Lower Central									
Ten-year average	0.34	7.46	29.89	33.37	23.59	4.29	0.82	0.19	0.05
1952–53	0.40	9.14	*28.13*	*24.04*	*26.69*	9.70	1.42	0.48	.....
1953–54	0.18	5.52	*70.41*	18.00	4.39	1.32	0.13	.....	0.04
1954–55	0.39	5.74	10.20	*69.83*	10.86	2.65	0.33	.....	.....
1955–56	0.03	7.64	13.76	9.96	*64.71*	3.46	0.38	0.03	0.02
1956–57	0.01	19.61	*47.97*	13.11	7.04	11.56	0.63	0.07	.....
Upper East Coast									
Ten-year average	10.49	24.13	33.88	19.34	7.22	3.09	1.12	0.45	0.28
1952–53	.....	.....	1.14	20.45	*36.36*	28.41	9.09	2.27	2.27
1953–54	0.16	9.31	*65.87*	15.20	6.61	2.32	0.45	0.08	.....
1954–55	0.17	4.66	*34.37*	*45.23*	10.10	3.36	1.58	0.54	.....
1955–56	.....	16.84	17.15	19.45	*41.16*	5.40	.....	.....	.....
1956–57	.....	*41.60*	26.10	7.57	7.75	15.41	1.43	0.14	.....
Middle East Coast									
Ten-year average	0.29	9.93	38.03	31.17	15.18	4.25	0.91	0.20	0.04
1952–53	0.60	*30.99*	*41.18*	17.00	6.30	3.16	0.66	0.10	.....
1953–54	.....	2.48	28.59	*40.98*	18.82	6.77	1.91	0.39	0.05
1954–55	.....	6.02	*37.71*	*45.88*	8.25	2.01	0.12	.....	.....
1955–56	.....	9.39	13.08	28.68	*39.14*	7.78	1.37	0.40	0.16
1956–57	.....	1.22	*42.31*	18.74	23.76	12.43	1.41	0.11	.....

[1] No catch in previous seasons.
[2] No samples were obtained prior to the 1952–53 season.
[3] No fishery.
[4] No samples were obtained prior to the 1950–51 season.
[5] No samples obtained.

Table IV.—The Average Percentage Age Composition of Herring Sampled from Each Major Population or Sub-district during the 1956–57 Winter Fishing Season and by Months for Each Statistical Area during the 1956 Summer Fishing Season—Cont'd.

WINTER FISHERY—*Continued*

Population and Fishing Season	In Year of Age								
	I	II	III	IV	V	VI	VII	VIII	IX+
Lower East Coast									
Ten-year average	0.28	3.48	58.25	30.30	6.38	1.07	0.19	0.04	0.01
1952–53	0.12	2.65	*60.53*	32.83	3.25	0.54	0.05	0.03	.....
1953–54	.....	0.79	*57.98*	34.23	6.18	0.62	0.14	0.04	0.01
1954–55	.....	2.81	*57.18*	33.37	6.05	0.50	0.10	.....	.....
1955–56	.....	4.37	*53.07*	29.86	10.70	1.71	0.24	0.05	.....
1956–57	0.02	1.12	*74.91*	19.36	2.98	1.37	0.18	0.04	0.02
Lower West Coast									
Ten-year average	0.04	7.71	58.47	26.69	5.74	1.07	0.20	0.06	0.02
1952–53	0.07	8.88	*55.66*	32.86	1.95	0.54	0.04	.....	.....
1953–54	0.03	2.72	*64.29*	26.71	5.47	0.53	0.04	.....	.....
1954–55	0.03	16.82	*59.39*	19.81	3.32	0.59	0.03	.....	.....
1955–56	.....	11.89	*63.70*	15.86	7.04	1.29	0.14	0.04	0.05
1956–57	.....	2.55	*72.11*	24.83	0.34	0.17	.....	.....	.....
Upper West Coast									
Ten-year average	0.02	3.32	43.44	31.64	15.90	3.83	1.25	0.45	0.15
1952–53	0.26	22.57	*60.74*	14.60	1.35	0.40	0.07	.....	.....
1953–54	.....	.....	*46.14*	*41.85*	9.04	2.04	0.94	.....	.....
1954–55	.....	6.24	34.57	*50.40*	6.78	1.68	0.26	0.07	.....
1955–56[5]	.....	.....	.....	.....	.....	.....	.....	.....	.....
1956–57	.....	.....	*51.55*	28.87	*15.46*	4.12	.....	.....	.....

[5] No samples obtained.

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Population and Fishing Season	In Year of Age									
	I	II	III	IV	V	VI	VII	VIII	IX	X
Upper Central										
Area 6—September, 1956	.....	.....	13.65	21.19	*29.53*	*30.81*	2.05	2.76	.....	.....
Lower Central										
Area 8—September, 1956	.....	.....	14.29	14.29	*26.19*	*40.48*	4.76	.....	.....	.....
Upper East Coast										
Area 12—										
June, 1956	.....	.....	13.95	23.26	*53.49*	9.30	.....	.....	.....	.....
August, 1956	.....	3.70	*43.11*	19.66	17.99	13.92	1.62	.....	.....	.....
September, 1956	.....	20.41	*44.90*	14.29	12.24	8.16	.....	.....	.....	.....
Middle East Coast										
Area 14—										
July, 1953	.....	0.86	15.79	*36.89*	*32.19*	11.31	2.96	.....	.....	.....
August, 1953	.....	0.90	22.76	*35.78*	*29.71*	8.08	2.42	0.11	0.23	.....
September, 1953	.....	3.23	23.02	*37.35*	*23.57*	8.40	3.25	1.18	.....	.....
Area 16—										
June, 1953	0.33	18.73	*39.85*	*30.93*	8.29	2.06	.....	.....	.....	.....
July, 1953	.....	6.18	*77.32*	15.46	1.03	.....	.....	.....	.....	.....
Area 14—										
July, 1954	.....	0.28	19.48	*52.89*	20.31	6.76	0.28	.....	.....	.....
September, 1956	.....	.....	2.11	*46.81*	*37.09*	12.36	1.62	.....	.....	.....
Lower East Coast										
Area 17A—										
May, 1956	.....	3.63	*39.54*	*28.36*	24.36	4.12	.....	.....	.....	.....
June, 1956	.....	.....	9.57	*44.88*	27.25	16.92	0.67	.....	.....	0.72
September, 1956	.....	.....	24.47	*47.34*	20.49	7.70	.....	.....	.....	.....
Area 17B—July, 1956	.....	0.58	*36.05*	*41.28*	13.37	7.56	0.58	0.58	.....	.....
Area 18—										
June, 1956	.....	0.22	10.92	*43.38*	25.71	16.60	2.27	0.90	.....	.....
July, 1956	.....	15.38	12.74	*38.91*	19.85	10.65	1.74	.....	0.37	0.37
September, 1956	.....	.....	*65.91*	25.00	9.09	.....	.....	.....	.....	.....
Area 19—September, 1956	.....	.....	*87.50*	12.50	.....	.....	.....	.....	.....	.....
Lower West Coast										
Area 21—July, 1953	.....	.....	36.34	*47.25*	13.74	1.57	0.96	.....	0.14	.....

Table V.—Number of Fish of Each Age (in Millions) in the Catch from Each Population during the 1956–57 Winter Fishing Season and by Months for Each Statistical Area during the 1956 Summer Fishing Season.

(Comparable data for the previous four seasons are also shown. Dominant year-classes are given in italics.)

WINTER FISHERY

Population and Fishing Season	In Year of Age										Total
	I	II	III	IV	V	VI	VII	VIII	IX	X	
West Coast Queen Charlotte Islands											
Area 2AW—1956–57[1]	.....	.....	*0.77*	0.39	0.03	0.03	.....	.....	.....	.....	1.22
Area 2BW—1956–57[1]	.....	0.05	*1.65*	0.72	0.54	0.63	0.40	0.09	.....	.....	4.08
Upper East Coast, Queen Charlotte Islands											
1952–53[2]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1953–54	0.12	7.43	*83.61*	65.44	*107.98*	32.78	7.17	2.08	0.89	.....	307.50
1954–55	.....	16.32	28.74	*85.36*	37.71	30.91	8.72	0.60	0.38	.....	208.74
1955–56	0.07	9.59	*17.16*	*14.23*	*16.57*	6.89	3.62	0.93	0.39	.....	69.45
1956–57	.....	0.71	*2.92*	*2.51*	1.86	*2.61*	0.70	0.34	0.07	.....	11.72
Lower East Coast, Queen Charlotte Islands											
1952–53[3]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1953–54	.....	.....	*7.23*	*7.23*	1.67	2.22	.....	0.56	.....	.....	18.91
1954–55[4]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1955–56	.....	1.05	100.91	64.39	*408.15*	56.52	18.95	4.59	1.11	.....	655.67
1956–57	0.44	*45.40*	*51.94*	34.84	21.53	*61.21*	5.21	0.86	0.31	.....	221.74
Northern											
1952–53	.....	0.23	*6.87*	*4.34*	*4.73*	2.02	0.18	0.02	.....	.....	18.39
1953–54	.....	4.87	*70.77*	*73.33*	*59.42*	33.28	6.34	1.45	0.14	.....	249.60
1954–55	.....	5.09	8.98	*129.86*	28.11	9.21	1.91	0.27	.....	.....	183.43
1955–56	.....	10.78	*68.57*	11.90	25.38	4.00	0.76	0.23	0.17	.....	121.79
1956–57	.....	13.93	39.05	*81.70*	25.48	35.37	3.39	0.72	0.08	.....	199.72
Upper Central											
1952–53	0.01	0.06	*0.21*	*0.21*	*0.24*	0.12	0.01	.....	.....	.....	0.86
1953–54	0.44	5.30	*77.14*	14.14	5.11	0.97	.....	.....	.....	.....	103.10
1954–55	0.63	14.53	21.81	*73.50*	4.73	1.01	0.24	.....	.....	.....	116.45
1955–56	.....	*32.12*	4.82	0.48	0.43	0.06	.....	.....	.....	.....	37.91
1956–57	.....	*42.44*	*27.02*	5.20	1.45	0.82	0.04	.....	.....	.....	76.97
Lower Central											
1952–53	0.04	0.99	*2.66*	*2.14*	*2.17*	0.78	0.09	0.03	.....	.....	8.90
1953–54	0.41	13.94	*234.14*	66.51	15.85	3.49	0.48	.....	0.16	.....	334.98
1954–55	0.72	14.26	25.86	*125.38*	19.85	4.63	0.48	.....	.....	.....	191.18
1955–56	0.14	20.74	47.11	36.91	*242.67*	12.59	1.35	0.14	0.11	.....	361.76
1956–57	0.05	61.28	*164.24*	45.12	24.76	45.40	2.37	0.20	.....	.....	343.42
Upper East Coast											
1952–53[5]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1953–54	0.13	8.60	*60.90*	14.05	6.11	2.15	0.41	0.07	.....	.....	92.42
1954–55	0.24	9.06	*49.67*	*75.13*	18.15	3.24	0.64	0.22	.....	.....	156.35
1955–56	.....	1.87	1.90	2.16	*4.57*	0.60	.....	.....	.....	.....	11.10
1956–57	.....	*6.02*	3.78	1.10	1.12	2.23	0.21	0.02	.....	.....	14.48
Middle East Coast											
1952–53[6]	+	*0.18*	*0.24*	0.10	0.04	0.02	+	+	.....	.....	0.58
1953–54	.....	4.40	*50.42*	*70.08*	27.55	10.47	2.78	0.59	0.07	.....	166.36
1954–55	.....	15.44	*95.15*	*112.83*	20.03	5.04	0.21	.....	.....	.....	248.70
1955–56	.....	28.97	36.00	*73.94*	*96.90*	18.92	3.25	0.91	0.34	.....	259.23
1956–57	.....	1.78	*61.58*	27.28	34.58	18.09	2.05	0.16	.....	.....	145.52

[1] No catch in previous seasons.
[2] No catch.
[3] One hundred and eighty-five tons caught; no samples obtained.
[4] Five hundred and fifty tons caught; no samples obtained.
[5] One hundred and three tons caught; samples inadequate.
[6] Eighty-three tons caught; 45 tons by seine shown here but not in previous Reports.

Table V.—Number of Fish of Each Age (in Millions) in the Catch from Each Population during the 1956–57 Winter Fishing Season and by Months for Each Statistical Area during the 1956 Summer Fishing Season—Continued.

WINTER FISHERY—*Continued*

Population and Fishing Season	In Year of Age										Total
	I	II	III	IV	V	VI	VII	VIII	IX	X	
Lower East Coast											
1952–53	0.12	2.00	*51.59*	30.51	2.98	0.51	0.06	0.03	.....	.....	87.80
1953–54	.....	3.54	*283.14*	167.41	29.55	3.02	0.67	0.20	0.09	.....	487.62
1954–55	.....	13.55	*261.95*	151.56	26.41	2.22	0.31	.....	.....	.....	456.00
1955–56	.....	20.75	*246.47*	137.66	48.26	7.36	1.07	0.16	.....	.....	461.73
1956–57	0.08	4.45	*297.91*	76.99	11.85	5.45	0.72	0.16	0.08	.....	397.69
Lower West Coast											
1952–53[7]	.....	0.04	*0.12*	0.07	+	+	+	.....	.....	.....	0.23
1953–54	0.27	7.92	*194.15*	86.22	18.36	1.98	0.58	0.21	0.12	.....	309.81
1954–55	0.02	11.86	*41.89*	13.97	2.34	0.42	0.02	.....	.....	.....	70.52
1955–56	.....	25.00	*129.16*	30.65	8.36	1.47	0.27	0.07	0.03	.....	195.01
1956–57	.....	0.63	*17.75*	6.11	0.08	0.04	.....	.....	.....	.....	24.61
Upper West Coast											
1952–53[2]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1953–54	.....	.....	*42.42*	*39.80*	9.03	2.19	1.02	.....	.....	.....	94.46
1954–55	.....	3.95	21.62	*31.07*	4.32	0.92	0.17	0.04	.....	.....	62.09
1955–56[8]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1956–57	.....	.....	*2.44*	1.37	0.73	0.20	.....	.....	.....	.....	4.74

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Upper Central											
Area 6—September, 1956	.....	.....	0.10	0.15	*0.21*	*0.22*	0.01	0.02	.....	.....	0.71
Lower Central											
Area 8—September, 1956	.....	.....	0.41	0.41	*0.76*	*1.17*	0.14	.....	.....	.....	2.89
Upper East Coast											
Area 12—											
June, 1956	.....	.....	0.98	1.63	*3.75*	0.65	.....	.....	.....	.....	7.01
August, 1956	.....	3.64	*42.40*	19.34	17.70	13.69	1.59	.....	.....	.....	98.37
September, 1956	.....	1.00	*2.19*	0.70	0.60	0.40	.....	.....	.....	.....	4.89
Middle East Coast											
Area 14—											
July, 1953	.....	0.03	0.53	*1.23*	*1.07*	0.38	0.10	.....	.....	.....	3.34
August, 1953	.....	0.11	2.76	*4.34*	*3.60*	0.98	0.29	0.01	0.03	.....	12.12
September, 1953	.....	1.40	10.00	*16.22*	*10.23*	3.65	1.41	0.51	.....	.....	43.42
Area 16—											
June, 1953	0.01	0.65	*1.39*	*1.08*	0.29	0.07	.....	.....	.....	.....	3.49
July, 1953	.....	0.19	*2.42*	0.48	0.03	.....	.....	.....	.....	.....	3.12
Area 14—											
July, 1954	.....	0.08	5.28	*14.34*	5.51	1.83	0.08	.....	.....	.....	27.12
September, 1956	.....	.....	0.12	*2.56*	*2.03*	0.68	0.09	.....	.....	.....	5.48
Lower East Coast											
Area 17A—											
May, 1956	.....	0.01	*0.13*	*0.09*	0.08	0.01	.....	.....	.....	.....	0.32
June, 1956	.....	.....	0.44	*2.06*	1.25	0.78	0.03	.....	.....	.....	4.56
September, 1956	.....	.....	0.33	*0.64*	0.28	0.10	.....	.....	.....	.....	1.35
Area 17B—July, 1956	.....	0.04	*2.34*	*2.68*	0.87	0.49	0.04	0.04	.....	.....	6.50
Area 18—											
June, 1956	.....	0.01	0.72	*2.86*	1.69	1.09	0.15	0.06	.....	.....	6.58
July, 1956	.....	0.40	0.33	*1.02*	0.52	0.28	0.05	.....	0.01	0.01	2.62
September, 1956	.....	.....	*2.71*	1.03	0.37	.....	.....	.....	.....	.....	4.11
Area 19—September, 1956	.....	.....	*1.89*	0.27	.....	.....	.....	.....	.....	.....	2.16
Lower West Coast											
Area 21—July, 1953	.....	.....	6.52	*8.48*	2.47	0.28	0.17	.....	0.03	.....	17.95

[2] No catch.
[7] Twenty-three tons caught; not shown in previous Reports.
[8] Five hundred and sixty tons caught; no samples obtained.

Table VI.—The Average Length in Millimetres of Herring Sampled from Each Major Population or Sub-district during the 1956–57 Winter Fishing Season and by Months for Each Statistical Area during the 1956 Summer Fishing Season.

(Comparable data for the previous four seasons are also shown together with the ten-year average for the seasons 1946–47 to 1955–56, inclusive.)

WINTER FISHERY

Population and Fishing Season	In Year of Age									
	I	II	III	IV	V	VI	VII	VIII	IX	X+
West Coast Queen Charlotte Islands										
Area 2AW—1956–57[1]	.....	.....	191.42	204.15	215.00	227.00	.....	.....	.....	.....
Area 2BW—1956–57[1]	.....	144.00	191.03	206.25	211.58	221.58	230.89	228.50	.....	.....
Upper East Coast, Queen Charlotte Islands										
Ten-year average	109.50	140.58	161.47	179.48	198.92	211.81	223.81	232.70	235.00	253.33
1952–53[2]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1953–54	122.00	132.53	165.58	175.69	197.14	208.13	216.68	231.09	236.33	262.00
1954–55	.....	147.28	162.59	184.32	201.68	214.50	228.87	243.67	237.00	244.00
1955–56	97.00	139.06	159.54	176.27	200.62	213.52	223.70	231.54	236.50	254.00
1956–57	.....	146.59	171.13	186.59	200.30	214.55	226.67	236.00	243.50	.....
Lower East Coast, Queen Charlotte Islands										
Ten-year average	101.41	151.03	181.05	192.43	202.32	210.70	216.51	223.10	210.00	.....
1952–53[3]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1953–54	.....	.....	178.85	197.23	204.67	221.25	.....	228.00	.....	.....
1954–55[3]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1955–56	.....	160.50	186.19	197.74	203.16	215.06	221.92	224.50	.....	.....
1956–57	101.44	153.83	189.83	204.45	211.89	215.04	223.82	226.89	227.17	.....
Northern										
Ten-year average	117.43	145.24	173.78	190.70	202.46	208.69	211.18	217.60	219.35	241.00
1952–53	.....	149.41	182.72	200.95	210.98	215.87	222.00	217.00	.....	.....
1953–54	.....	144.30	177.12	200.98	215.88	223.45	232.42	238.88	230.00	250.00
1954–55	.....	155.58	181.53	193.91	205.37	218.03	222.23	229.00	.....	.....
1955–56	.....	145.40	176.76	190.39	200.03	211.48	217.89	230.67	237.50	.....
1956–57	.....	138.00	179.79	198.26	208.88	216.07	230.02	237.17	247.00	.....
Upper Central										
Ten-year average	109.39	143.43	172.93	188.19	203.16	204.82	210.79	215.12	216.73	.....
1952–53	105.50	149.50	192.96	208.01	215.63	223.44	228.00	.....	.....	.....
1953–54	122.00	146.96	165.24	182.90	198.12	214.00	.....	.....	.....	.....
1954–55	128.00	145.76	162.18	179.17	193.65	188.23	219.33	.....	.....	.....
1955–56	.....	147.11	161.38	170.43	200.29	235.00	.....	.....	.....	.....
1956–57	.....	148.05	177.81	196.08	207.56	217.77	223.00	.....	.....	.....
Lower Central										
Ten-year average	111.38	139.36	170.96	187.39	201.93	208.96	210.79	216.58	220.70	.....
1952–53	119.18	148.11	185.36	200.22	210.70	219.58	226.59	232.62	.....	.....
1953–54	112.22	126.59	158.15	184.06	195.62	203.75	211.67	.....	222.00	.....
1954–55	103.24	132.66	161.46	180.63	194.64	201.68	207.08	.....	.....	.....
1955–56	114.00	143.07	180.16	196.47	205.18	212.24	217.56	208.50	.....	235.00
1956–57	95.00	135.39	171.30	182.81	193.76	206.51	214.60	202.40	.....	.....
Upper East Coast										
Ten-year average	100.06	137.22	160.43	179.28	198.27	213.39	216.69	211.36	252.63	192.25
1952–53[3]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1953–54	114.25	132.35	154.67	179.24	202.62	224.82	231.91	237.50	.....	.....
1954–55	101.00	135.61	159.13	165.32	178.41	207.92	225.85	227.71	.....	.....
1955–56	.....	115.79	135.67	162.90	198.98	207.37	.....	.....	.....	.....
1956–57	.....	134.39	168.97	189.57	200.62	207.23	214.90	219.00	.....	.....
Middle East Coast										
Ten-year average	103.89	146.68	181.38	197.68	209.86	221.00	228.72	232.57	246.37	246.00
1952–53	107.75	138.73	177.93	199.05	215.77	224.58	228.62	229.00	.....	.....
1953–54	.....	148.32	174.03	196.28	213.68	224.26	230.88	236.33	269.00	.....
1954–55	.....	150.12	176.53	190.15	204.99	215.95	227.67	.....	.....	.....
1955–56	.....	147.03	181.72	198.00	206.06	217.56	226.83	234.36	238.20	246.00
1956–57	.....	153.10	180.62	200.90	209.22	214.66	222.79	240.00	.....	.....

[1] No catch in previous seasons.
[2] No fishing.
[3] No samples obtained.

Table VI.—The Average Length in Millimetres of Herring Sampled from Each Major Population or Sub-district during the 1956–57 Winter Fishing Season and by Months for Each Statistical Area during the 1956 Summer Fishing Season—Continued.

WINTER FISHERY—*Continued*

Population and Fishing Season	In Year of Age									
	I	II	III	IV	V	VI	VII	VIII	IX	X+
Lower East Coast										
Ten-year average	99.51	155.00	187.16	198.63	210.29	218.74	226.13	227.81	232.75	.....
1952–53	106.50	155.94	183.81	195.96	208.64	214.45	222.80	233.33	.....	.....
1953–54	.....	151.97	187.22	199.49	210.70	222.89	226.70	227.33	237.00	.....
1954–55	.....	163.09	188.88	199.58	210.63	225.25	238.33	.....	.....	.....
1955–56	.....	160.16	186.44	198.36	208.26	215.85	224.08	230.50	.....	.....
1956–57	99.00	158.67	185.57	197.89	210.98	216.84	223.22	235.50	.....	244.00
Lower West Coast										
Ten-year average	107.06	162.65	186.55	200.61	209.68	219.24	224.87	232.23	236.14	278.00
1952–53	97.00	162.12	184.02	197.83	209.41	219.20	211.00	.....	.....	.....
1953–54	90.50	160.53	185.34	199.81	211.16	222.52	241.38	239.50	271.00	278.00
1954–55	140.00	164.34	182.31	198.64	210.38	221.81	220.00	.....	.....	.....
1955–56	.....	165.12	185.74	197.71	204.18	216.46	227.71	233.00	221.00	.....
1956–57	.....	157.40	187.72	200.97	215.00	232.00	.....	.....	.....	.....
Upper West Coast										
Ten-year average	100.60	153.72	188.45	201.91	215.35	223.02	229.51	233.91	238.57	230.75
1952–53	99.50	145.86	187.81	199.25	207.10	228.50	233.00	.....	.....	.....
1953–54	.....	.....	181.01	198.05	210.71	222.64	231.83	.....	.....	.....
1954–55	.....	153.97	180.52	194.96	210.04	216.21	230.75	236.00	.....	.....
1955–56[3]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1956–57	.....	.....	183.68	199.96	211.73	213.25	.....	.....	.....	.....
SUMMER FISHERY										
Upper Central										
Area 6—September, 1956	.....	.....	181.60	198.94	210.74	213.96	225.33	229.75	.....	.....
Lower Central										
Area 8—September, 1956	.....	.....	148.67	167.50	174.27	179.76	184.00	.....	.....	.....
Upper East Coast										
Area 12—										
June, 1956	.....	.....	181.50	192.20	198.70	207.75	.....	.....	.....	.....
August, 1956	.....	143.60	175.65	192.67	206.95	210.56	220.50	.....	.....	.....
September, 1956	.....	146.20	174.73	192.00	191.33	197.25	.....	.....	.....	.....
Middle East Coast										
Area 14—										
July, 1953	.....	140.50	179.72	201.35	215.01	223.83	234.67	.....	.....	.....
August, 1953	.....	136.00	182.54	202.61	215.47	225.76	230.95	240.00	269.00	.....
September, 1953	.....	147.80	177.54	200.26	214.92	224.06	230.06	237.54	.....	.....
Area 16—										
June, 1953	109.00	130.46	171.42	195.55	211.65	223.00	.....	.....	.....	.....
July, 1953	.....	140.17	165.57	191.33	212.00	.....	.....	.....	.....	.....
Area 14—										
July, 1954	.....	173.00	191.83	204.07	213.29	224.18	231.00	.....	.....	.....
September, 1956	.....	.....	187.00	205.28	212.98	217.48	227.50	.....	.....	.....
Lower East Coast										
Area 17A—										
May, 1956	.....	162.83	187.09	197.50	206.98	213.00	.....	.....	.....	.....
June, 1956	.....	.....	171.93	198.14	206.78	212.06	211.00	.....	.....	229.00
September, 1956	.....	.....	186.26	205.03	212.21	218.18	.....	.....	.....	.....
Area 17B—July, 1956	.....	160.00	176.02	196.24	209.83	221.85	214.00	244.00	.....	.....
Area 18—										
June, 1956	.....	163.00	182.19	195.76	203.80	214.30	223.00	222.00	.....	.....
July, 1956	.....	130.41	182.74	200.35	209.96	214.87	221.00	.....	227.00	222.00
September, 1956	.....	.....	184.48	200.09	205.50	.....	.....	.....	.....	.....
Area 19—September, 1956	.....	.....	183.36	194.67	.....	.....	.....	.....	.....	.....

[3] No samples obtained.

Table VII.—The Average Weight in Grams of Herring Sampled from Each Major Population or Sub-district during the 1956–57 Winter Fishing Season and by Months for Each Statistical Area during the 1956 Summer Fishing Season.

(Comparable data for the previous four seasons are also shown together with the ten-year average for the seasons 1946–47 to 1955–56, inclusive.)

WINTER FISHERY

Population and Fishing Season	In Year of Age									
	I	II	III	IV	V	VI	VII	VIII	IX	X+
West Coast Queen Charlotte Islands										
Area 2AW—1956–57[1]	.....	.....	78.50	100.85	104.00	129.00	.....	.....	.....	.....
Area 2BW—1956–57[1]	.....	28.00	82.51	113.25	128.67	148.64	168.00	158.00	.....	.....
Upper East Coast, Queen Charlotte Islands										
Ten-year average	16.50	33.39	53.03	76.54	103.12	126.24	152.20	165.78	157.50	198.00
1952–53[2]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1953–54	20.00	25.09	50.84	67.00	95.17	110.89	131.87	154.36	143.33	145.00
1954–55	.....	39.93	57.78	85.52	114.52	135.16	163.38	174.33	215.00	200.00
1955–56	13.00	32.03	54.12	74.38	111.42	137.12	154.60	173.46	155.00	249.00
1956–57	.....	34.06	64.44	85.58	106.90	131.36	159.11	189.44	201.50	.....
Lower East Coast, Queen Charlotte Islands										
Ten-year average	9.11	38.65	77.70	93.82	116.29	129.84	142.11	156.48	129.00	.....
1952–53[3]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1953–54	.....	.....	68.00	93.08	105.33	150.75	.....	170.00	.....	.....
1954–55[3]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1955–56	.....	43.00	87.54	109.14	121.15	147.42	163.11	166.30	.....	.....
1956–57	11.44	41.11	87.00	119.22	135.13	143.34	164.36	168.67	180.17	.....
Northern										
Ten-year average	31.22	42.26	67.33	89.69	112.95	121.26	124.96	135.83	145.15	156.50
1952–53	.....	38.82	80.31	110.76	130.68	143.32	157.22	.....	.....	.....
1953–54	.....	35.98	71.76	105.91	130.77	145.19	164.32	182.62	193.00	181.00
1954–55	.....	40.36	79.53	95.62	114.41	138.24	147.00	154.00	.....	.....
1955–56	.....	37.13	76.33	94.38	113.70	140.48	151.78	170.00	199.00	.....
1956–57	.....	28.88	74.37	103.36	122.74	136.99	170.56	185.33	200.00	.....
Upper Central										
Ten-year average	15.19	38.12	72.28	95.35	117.64	122.24	136.60	148.82	156.87	.....
1952–53	10.50	35.05	91.93	118.41	135.96	153.41	169.00	.....	.....	.....
1953–54	20.50	41.83	60.22	85.68	108.21	138.80	.....	.....	.....	.....
1954–55	28.00	41.27	64.10	84.16	105.14	97.15	156.67	.....	.....	.....
1955–56	.....	40.95	60.03	70.57	112.29	155.00	.....	.....	.....	.....
1956–57	.....	40.46	77.07	99.06	116.31	132.55	130.00	.....	.....	.....
Lower Central										
Ten-year average	16.15	33.89	68.35	94.23	117.84	131.56	136.41	175.03	144.15	.....
1952–53	18.00	35.72	82.37	106.57	126.10	146.07	160.91	169.86	.....	.....
1953–54	17.44	26.74	53.09	84.18	101.66	115.69	125.50	.....	131.00	.....
1954–55	14.06	30.49	60.02	85.31	108.54	124.25	126.23	.....	.....	.....
1955–56	15.50	36.03	83.16	110.31	126.40	141.15	155.83	122.00	.....	180.00
1956–57	9.00	30.23	69.00	85.34	102.30	125.97	143.81	118.80	.....	.....
Upper East Coast										
Ten-year average	12.68	40.93	64.42	84.03	115.98	146.95	162.36	157.11	146.44	109.33
1952–53[3]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1953–54	17.50	34.90	56.37	85.03	117.04	154.40	157.45	183.00	.....	.....
1954–55	14.00	32.84	61.17	66.78	86.25	134.53	170.05	186.29	.....	.....
1955–56	.....	17.89	32.97	62.38	116.10	127.16	.....	.....	.....	.....
1956–57	.....	54.13	70.48	105.69	125.39	139.27	153.70	144.00	.....	.....
Middle East Coast										
Ten-year average	36.71	49.50	79.71	106.97	130.17	152.43	171.03	184.30	180.25	186.50
1952–53	11.91	29.84	69.59	103.04	134.00	161.45	165.00	156.00	.....	.....
1953–54	.....	42.59	70.65	104.41	142.57	166.83	183.69	195.94	185.00	.....
1954–55	.....	45.24	79.54	94.34	124.42	144.78	167.00	.....	.....	.....
1955–56	.....	42.84	79.54	105.58	120.02	141.82	160.66	177.89	174.80	186.50
1956–57	.....	47.19	79.61	117.70	136.98	150.94	171.08	210.00	.....	.....

[1] No catch in previous season.
[2] No fishing.
[3] No samples obtained.

Table VII.—The Average Weight in Grams of Herring Sampled from Each Major Population or Sub-district during the 1956–57 Winter Fishing Season and by Months for Each Statistical Area during the 1956 Summer Fishing Season—Continued.

WINTER FISHERY—*Continued*

Population and Fishing Season	In Year of Age									
	I	II	III	IV	V	VI	VII	VIII	IX	X+
Lower East Coast										
Ten-year average	11.03	47.58	87.74	107.67	130.68	147.89	167.56	176.95	179.67	.....
1952–53	12.83	44.89	76.78	93.56	118.66	135.30	146.40	185.00	.....	.....
1953–54	.....	46.36	88.41	107.69	127.25	148.66	157.50	181.00	186.00	.....
1954–55	.....	56.64	94.08	113.45	131.96	163.44	178.33	.....	.....	.....
1955–56	.....	51.36	85.16	105.53	124.75	140.22	161.92	173.00	.....	.....
1956–57	10.00	48.80	83.08	104.41	135.27	149.87	162.56	167.50	.....	197.00
Lower West Coast										
Ten-year average	15.61	53.33	87.67	109.65	129.55	146.17	157.29	171.68	164.75	.....
1952–53	8.50	51.67	78.83	100.06	121.18	143.60	123.00	.....	.....	.....
1953–54	8.50	53.72	85.55	106.65	126.75	148.35	165.75	155.00	.....	.....
1954–55	37.00	57.83	83.06	107.68	124.91	151.40	131.00	.....	.....	.....
1955–56	.....	57.40	85.99	106.64	119.25	138.89	144.00	.....	140.00	.....
1956–57[4]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Upper West Coast										
Ten-year average	10.20	43.52	88.74	111.98	137.25	156.11	171.60	184.14	185.80	180.00
1952–53	9.75	36.23	82.27	100.25	114.70	158.50	168.00	.....	.....	.....
1953–54	.....	.....	77.41	98.51	123.85	143.25	145.00	.....	.....	.....
1954–55	.....	46.44	84.59	104.91	134.67	141.86	180.67	174.00	.....	.....
1955–56[3]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1956–57	.....	.....	83.48	109.93	135.73	131.75	.....	.....	.....	.....
SUMMER FISHERY										
Upper Central										
Area 6—September, 1956	.....	.....	86.80	122.00	153.51	161.42	195.33	203.00	.....	.....
Lower Central										
Area 8—September, 1956	.....	.....	44.50	64.33	69.09	76.35	79.00	.....	.....	.....
Upper East Coast										
Area 12—										
June, 1956	.....	.....	85.50	107.40	115.61	137.00	.....	.....	.....	.....
August, 1956	.....	42.20	81.25	110.88	136.18	146.50	157.50	.....	.....	.....
September, 1956	.....	40.80	80.23	111.71	118.50	125.00	.....	.....	.....	.....
Middle East Coast										
Area 14—										
July, 1953	.....	34.00	77.03	112.91	139.65	160.21	176.17	.....	.....	.....
August, 1953	.....	31.89	83.33	117.53	146.40	168.75	180.82	210.00	185.00	.....
September, 1953	.....	40.67	78.14	117.00	151.80	175.33	192.45	209.54	.....	.....
Area 16—										
June, 1953	14.00	26.64	74.34	111.66	140.56	165.17	.....	.....	.....	.....
July, 1953	.....	72.00	60.44	93.60	158.00	.....	.....	.....	.....	.....
Area 14—										
July, 1954	.....	.....	101.00	124.56	144.23	163.38	.....	.....	.....	.....
September, 1956	.....	.....	92.25	133.89	151.32	167.78	195.17	.....	.....	.....
Lower East Coast										
Area 17A—										
May, 1956	.....	60.17	87.69	103.27	122.98	129.00	.....	.....	.....	.....
June, 1956	.....	.....	83.21	131.58	149.98	169.76	174.00	.....	.....	230.00
September, 1956	.....	.....	100.83	136.06	154.45	171.72	.....	.....	.....	.....
Area 17B—July, 1956	.....	59.00	84.81	121.54	146.52	174.92	136.00	216.00	.....	.....
Area 18—										
June, 1956	.....	59.00	93.80	120.59	137.65	160.14	190.20	185.50	.....	.....
July, 1956	.....	34.81	93.11	126.65	147.54	166.13	172.20	.....	194.00	192.00
September, 1956	.....	.....	91.93	122.36	152.00	.....	.....	.....	.....	.....
Area 19—September, 1956	.....	.....	91.83	118.83	.....	.....	.....	.....	.....	.....
Lower West Coast										
Area 21—July, 1953	.....	.....	86.68	103.41	122.48	138.00	164.33	.....	208.00	.....

[3] No samples obtained.
[4] Salted—no weights taken.

Table VIII.—Average Sex Ratio (Females/Males) in Populations of Herring on the British Columbia Coast during the Past Five Fishing Seasons.

Population	Fishing Season				
	1952–53	1953–54	1954–55	1955–56	1956–57
Upper west coast, Queen Charlotte Islands	-----	-----	-----	-----	1.00
Lower west coast, Queen Charlotte Islands	-----	-----	-----	-----	1.91
Upper east coast, Queen Charlotte Islands	-----	1.05	1.05	1.18	1.01
Lower east coast, Queen Charlotte Islands	-----	0.48[1]	-----	1.00	1.07
Northern	0.88	1.12	1.12	1.04	1.09
Upper central	1.13	1.02	1.15	1.23	1.03
Lower central	1.37	0.96	1.16	1.15	1.02
Upper east coast	1.00	1.07	1.12	1.10	1.08
Middle east coast	1.02	1.01	1.24	1.15	0.92
Lower east coast	0.84	0.81	0.92	1.04	0.98
Lower west coast	1.06	1.07	1.07	0.93	1.97
Upper west coast	1.24	1.08	1.15	-----	1.04

[1] Based on only thirty-four fish and so omitted from averages.

Table IX.—Number of Statutory Miles of Herring Spawn, Adjusted to Medium Intensity, Deposited in British Columbia Waters and at Boundary Bay in 1957, by Area and Year.

(Comparable data are also given for the preceding four years. Figures in parentheses include surveys carried out by Biological Station personnel.)

Sub-district and Area	Statutory Miles of Spawn of Medium Intensity				
	1953	1954	1955	1956	1957
Upper Queen Charlotte Islands					
Area 2AE (Skidegate Inlet)	3.2	1.9	-----	-----	-----
Area 2AW (Rennell Sound)	-----	-----	-----	-----	0.1
Totals	3.2	1.9	-----	-----	0.1
Lower Queen Charlotte Islands					
Area 2BE (Skincuttle Inlet)	10.2	20.2	11.3	9.7	2.8
Northern					
Area 3 (Nass)	0.9	0.5	-----	2.6	11.1
Area 4 (Skeena)	16.1	5.4	4.3	5.8	9.8
Area 5 (Grenville)	3.3	10.5	18.8	11.9	10.8
Totals	20.3	16.4	23.1	20.3	31.7
Upper Central					
Area 6 (Butedale)	6.8	4.7	4.0	0.3	0.9
Lower Central					
Area 7 (Bella Bella)	29.4	28.0	28.2	18.8	11.4
Area 8 (Bella Coola)	0.2	2.7	8.9	1.4	1.6
Area 9 (Rivers Inlet)	4.2	0.4	1.1	0.1	0.1
Area 10 (Smith Inlet)	9.2	5.8	1.6	4.1	1.7
Totals	43.0	36.9	39.8	24.4	14.8
Upper East Coast					
Area 11 (Seymour Inlet)	-----	0.4	-----	-----	0.1
Area 12 (Alert Bay)	24.7	14.0	9.2	15.9	9.8
Totals	24.7	14.4	9.2	15.9	9.9
Middle East Coast					
Area 13 (Campbell River)	5.8	3.2	12.2 (13.8)	----- (5.3)	2.8 (2.0)
Area 14 (Comox)	23.7	11.4	19.0 (21.0)	21.7 (22.6)	6.1
Area 15 (Powell River)	3.0	2.4	1.4 (1.6)	----- (-----)	2.8 (3.2)
Area 16 (Pender Harbour)	3.2	4.8	4.0 (4.0)	2.0 (-----)	1.1 (1.1)
Totals	35.7	21.8	36.6 (40.4)	23.8 (27.9)	12.8 (12.4)
Lower East Coast					
Area 17A (Nanaimo)	17.6	0.8	9.0 (9.4)	3.0 (4.2)	16.9
Area 17B (Ladysmith)	82.4	61.5	6.5 (28.8)	9.4 (7.7)	0.5
Area 18 (Ganges Harbour)	2.5	1.9	1.4 (5.2)	1.8 (9.1)	4.9
Area 19 (Victoria)	-----	-----	-----	----- (-----)	-----
Totals	102.5	64.2	16.9 (43.4)	14.2 (21.0)	22.3
Lower West Coast					
Area 23 (Barkley Sound)	7.8 (13.1)	4.6 (11.0)	5.6	13.4	7.9
Area 24 (Clayoquot Sound)	7.0 (7.8)	4.2 (4.5)	4.7	1.1	1.8
Totals	14.8 (20.9)	8.8 (15.5)	10.3	14.5	9.7
Upper West Coast					
Area 25 (Esperanza Inlet)	11.4 (36.4)	7.1 (17.5)	6.9	53.2	22.0
Area 26 (Kyuquot Sound)	4.4 (8.0)	3.2 (4.8)	8.6	0.9	1.6
Area 27 (Quatsino Sound)	10.8 (11.5)	7.2 (7.3)	2.6	-----	0.8
Totals	26.6 (55.9)	17.5 (29.6)	18.1	54.1	24.4
United States of America					
Boundary Bay	-----	-----	----- (15.6)	-----	2.1 (2.1)
Grand totals, all areas	287.8 (323.2)	206.8 (225.6)	169.3 (215.2)	177.2 (188.1)	131.5 (131.1)

REPORT OF THE INTERNATIONAL PACIFIC SALMON FISHERIES COMMISSION FOR 1956

The International Pacific Salmon Fisheries Commission was appointed under a convention ratified in 1937 between Canada and the United States for the protection, preservation, and extension of the sockeye-salmon fisheries in the Fraser River system. For nineteen years the Commission has been conducting scientific investigations of these sockeye runs in order to successfully perform its obligations under the terms of this convention. Since 1946 the Commission has been recommending, to the two national governments, fishing regulations considered necessary to the fulfilment of the convention. Such regulations must provide, in so far as is practicable, equal division of the allowable catch of Fraser River sockeye between the fishermen of the two nations. The investigations carried on by the Commission deal with practically all phases of the life-cycle of the sockeye salmon as they may affect or assist in the fulfilment of the Commission's duties. In addition, an increasing amount of time is being devoted to protection of the fishery from possible adverse effects of general water-use development resulting from population and industrial growth in the Fraser River watershed.

Among the most important factors arising from the researches is the basic evidence of the intimate relations of the sockeye salmon throughout its whole life-history with its environment. Their life-cycles are on strictly hereditary time schedules which are set by the unvarying cycle of the run. Throughout their lives their reproductive functions, growth, and migrations coincide with the environmental conditions, and this precise interrelation is absolutely essential to their survival. The appreciation of this general fact of hereditary sensitivity is of practical importance in the programmes for the rehabilitation and extension of the runs of sockeye salmon, and is extremely pertinent in relation to considerations of the possible adverse effects of industrial and other water-use developments on the river system.

Recommendations for regulations governing the 1956 sockeye-fishery in convention waters were adopted by the Commission on April 13th, 1956, as the orders and regulations controlling the taking of sockeye in convention waters during 1956.

In the high seas convention waters, the Commission recommended that the taking of sockeye be permitted from June 28th until August 5th by troll-fishing only, with no restrictions in hours of fishing. In Canadian convention waters it was recommended that there be ninety-six-hour weekly closed periods from June 28th to August 14th, 120-hour weekly closed periods from August 15th to September 13th, and that there be no fishing from 7 a.m., September 13th, to 7 a.m., September 19th. In United States convention waters it was recommended that there be seventy-two-hour weekly closed periods from June 28th to September 2nd.

Three modifications were made to these regulations, as adopted by the respective authorities of the two governments.

The first modification in the regulations was a twenty-four-hour extension of the weekly close time in Canadian convention waters commencing Friday, August 3rd, and extending to Wednesday, August 8th. This action was deemed necessary to provide escapement and to obtain division of the catch between the two countries.

The second amendment to the orders and regulations affecting Canadian convention waters was issued on September 7th. This amendment closed Canadian waters to linen gill-nets of less than 8 inches extension measure and nylon gill-nets of less than 8¾ inches extension measure during the period commencing at 7 a.m., September 10th, and extending to 7 a.m., September 14th, in order that the run of white spring salmon might be reasonably exploited.

Upon termination of the closure of Canadian convention waters from September 14th to 19th for the protection of sockeye, the statutory weekly close times of the Depart-

ment of Fisheries were in effect until October 12th, when an additional twenty-four hours per week was imposed for the protection of chum-salmon stocks.

A special closure to allow for spawning escapement of species other than sockeye was imposed by the Department of Fisheries from 8 a.m., October 29th, to 8 a.m., November 12th. All salmon net-fishing closed for the balance of the season at 8 a.m., November 15th.

By August 6th the extremely heavy concentration of fishing-gear in United States convention waters made it evident that a stringent curtailment of fishing time was necessary if the Commission was to fulfil its terms of reference under the convention. Consequently the orders and regulations of April 13th were amended to add thirty-nine hours to the weekly closed time for the second week in August, making it extend from 5 a.m., August 8th, to 8 p.m., August 12th. Also at this time the weekly closed time for the period August 12th to September 2nd was increased from forty-eight hours to seventy-two hours. After September 2nd the United States fishery reverted to a forty-eight-hour weekly closed time under regulations issued by the Director of the Washington State Department of Fisheries.

In recent years each annual report of the Commission has emphasized the serious effect of increasing gear efficiency and the increasing numbers of fishing units on the regulations affecting the United States fishery. It has become obvious that the change-over from linen to nylon gill-nets in 1951, the addition of the power-block to the purse-seine in 1955, and the increasing numbers of gill-nets can only result in less fishing time. Fishing efficiency in United States waters is becoming so high that the fishing period is too short for sound economic operation and stable administration. The following table effectively demonstrates the necessity of the short fishing periods and the rapid rise in the ability of the United States fishing fleet to take its share of the cyclical run:—

Year	United States Catch	United States Gear			Fishing-days per Week	Percentage Escapement
		R.N.	P.S.	G.N.		
1956	906,872	85	164	491	3[1]	32.05
1952	1,113,475	66	207	195	5	26.59
1948	1,089,041	71	185	130	6	34.11

[1] Although fishing in 1956 was permitted for four days a week for most of the season, fishing in one week was reduced to two days during the peak of the run. It is calculated that a three-day week in 1956 without adjustment would have provided a better-balanced escapement to all areas and the same total season catch.

A detailed record of the cycle-year catches of sockeye in United States convention waters is presented in Tables I and II.

In respect to the excessive gear efficiency in United States waters, it should be emphasized that the Commission is specifically restricted from controlling gear in any manner except in regard to fishing time. Partial-day fishing would be advantageous to the proper management of the fishery since it would reduce the daily catch, balance the catch more evenly throughout the fishing area, and increase the number of days during which fishing would be conducted. Partial-day fishing involves serious patrol problems since gill-net fishing would of necessity have to start or stop during the hours of darkness. Such a measure also would not be the answer to the whole problem created by increased efficiency of gear. For these reasons the Commission has been reticent to recommend partial-day fishing, but would do so if such action were acceptable to the national enforcement agencies and the industry in general. In any event either control of gear or partial-day fishing, or both, is essential to the solution of a problem which currently is being solved by the unsatisfactory three-day fishing-week.

Table I.—Sockeye-catch by Gear

UNITED STATES TREATY WATERS

Year	Purse-seines			Gill-nets			Reef-nets			Total Catch
	Units	Catch	Percentage	Units	Catch	Percentage	Units	Catch	Percentage	
1944	57	335,172	76.97	45	40,620	9.33	31	59,651	13.70	435,443
1948	185	940,415	86.35	130	70,991	6.52	71	77,685	7.13	1,089,091
1952	207	826.304	74.21	195	175,064	15.72	66	112,107	10.07	1,113,475
1956	164	428,562	47.26	491	371,729	40.99	85	106,581	11.75	906,872

CANADIAN TREATY WATERS

Year	Purse-seines			Gill-nets			Traps			Total Catch
	Units	Catch	Percentage	Units	Catch	Percentage	Units	Catch	Percentage	
1944	----	-------	-----	1,580	974,529	98.08	4	29,297	2.92	1,003,826
1948	14	14,511	1.93	1,067	663,635	88.17	5	74,545	9.90	752,691
1952	41	122,114	10.58	1,470	966,852	83.75	5	65,417	5.67	1,154,383
1956	50	216,388	24.18	1,335	678,074	75.78	----	----------	-------	894,836[1]

[1] Includes 374 troll-caught sockeye.

NOTE.—Gear counts represent the maximum number of units delivering on any single day.

Table II.—Cyclic Landings and Packs of Sockeye

	United States	Canada	Total
1956—[1]			
Total landings (No. sockeye)	906,872	894,836	1,801,708
Share in fish (per cent)	50.33	49.67	----------
Total pack (48-lb. cases)	84,052	84,296	168,348
Share in pack (per cent)	49.93	50.07	----------
1953–56—			
Total landings (No. sockeye)	8,752,177	8,717,722	17,469,899
Share in fish (per cent)	50.10	49.90	----------
Total pack (48-lb. cases)	849,007	842,575	1,691,582
Share in pack (per cent)	50.19	49.81	----------
1949–52—			
Total landings (No. sockeye)	4,527,955	4,357,813	8,885,768
Share in fish (per cent)	50.96	49.04	----------
Total pack (48-lb. cases)	429,794	412,353	842,147
Share in pack (per cent)	51.04	48.96	----------
Cyclic Packs	Cases	Cases	Cases
1956	84,052	84,296	168,348
1952	114,638	115,814	230,452
1948	90,441	61,650	152,091
1944	37,379	88,150	125,529
1940	59,354	93,361	152,715
1936[2]	59,505	184,854	244,359
1932	81,188	65,769	146,957
1928	61,044	29,299	90,343
1924	69,369	39,743	109,112
1920	62,654	48,399	111,053
1916	84,637	32,146	116,783
1912	184,680	123,879	308,559
1908	170,951	74,574	245,525
1904	123,419	72,688	196,107

[1] Fourteen canneries in the United States and ten canneries in Canada received the sockeye caught in convention waters.

[2] 1904 to 1936 from Pacific Fisherman, 1948 Year Book Number, p. 139.

The basic problem in gear regulation in Canadian convention waters has been created by the addition of Juan de Fuca Strait as an effective gill-net and purse-seine fishing area. The historic Fraser River gill-net fishery for many years has been capable of taking an estimated 98 per cent of the fish available to it when operating. In addition to this high efficiency, there has been a super-saturation of gear which allows a substantial reduction in the number of units of gear normally operating without any measurable reduction in fishing efficiency.

A large fleet of gill-net boats can leave the Fraser River area for Juan de Fuca Strait without reducing the 98-per-cent fishing efficiency of the residual Fraser River fishing fleet. The catch of the gill-net fleet in Juan de Fuca Strait is now reaching substantial proportions, and when combined with the increasing catch of purse-seines in the same area, it is obvious that a substantial reduction must be made in the fishing time of both areas if adequate escapement is to be secured.

The changing distribution of the catch by fishing area in Canadian convention waters is best illustrated by the following table. It should be noted that a substantial percentage of the catch in Juan de Fuca Strait was taken by traps in 1944, 1948, and 1952. The traps did not operate in 1956, hence the entire catch for that year in the latter area was taken by the rapidly expanding gill-net and purse-seine fisheries.

Cycle-year	Per Cent of Catch Taken in Fraser River Area	Per Cent of Catch Taken in Juan de Fuca Strait
1956	65.36	34.64
1952	84.00	16.00
1948	89.50	10.50
1944	97.10	2.90

In 1956, when quality of the catch in the Fraser River area was not a factor and the expected size of the total season's run was relatively small, the Commission approved recommendations for closing the San Juan fishery as being in the best interests of proper management of the entire fishery. Although generally supported by the fishing industry, these recommendations were not approved since they were beyond the regulatory powers as specified by the Sockeye Fisheries Convention.

The Commission, under the proposed Pink Salmon Protocol presented for the approval of the two governments at the end of 1956, would have the power to recommend area restrictions to fishing in the convention waters of the United States and Canada. The approval of the protocol would permit the design of a new fishing policy in Canadian waters which would eliminate the conflict between the two major fishing areas.

Under the provisions of the present convention, which require uniform regulations for both Juan de Fuca Strait and the Fraser River, the increasing fishing fleet in Juan de Fuca Strait can only result eventually in a two-day fishing-week throughout the Canadian fishery. Such a fishing-week is entirely impractical both to the industry and to the management agency.

A detailed record of the cycle-year catches of sockeye in the convention waters of Canada is presented in Tables I and II.

The total 1956 run of sockeye to the Fraser River system, including the commercial catch, Indian catch, and the escapement, was 2,743,000 fish, representing a decline of 14.4 per cent over the run of the previous cycle in 1952. In spite of substantial increases in fishing efficiency, the fishing regulations were so designed that the total escapement of 879,000 to all spawning areas actually increased by 3.2 per cent over the escapement in 1952.

The 1956 escapement is considered to be satisfactory in spite of the fact that the number of spawners were below those recorded in most areas in the previous cycle-year. The Chilko run is now the principal supporter of the cycle run, and the escapement to

this area was actually estimated at 147,000 fish more than is believed to be required to produce a maximum returning run. Substantial numbers of fish were found spawning in non-productive areas, which is a positive indication over and above spawning density studies that some surplus escapement occurred.

The excess escapement to Chilko which resulted from emergency closures in the fishery is direct evidence of the serious management problem involved in an increasing fishery having an increasing efficiency. Fishing time is so restricted and the open period of fishing in the several major fishing areas so effective that a minor change in fishing time for the purpose of either providing the desired escapement or equal division of the allowable share of the catch has a major effect on the catch, escapement, and division of the catch. Post-season calculations indicate that the escapement would have been better distributed if a three-day fishing-week had prevailed throughout the season instead of the permitted four-day week, with a two-day special closure during the main part of the Chilko run.

Increased fishing time through the reduction of the fishing fleet, fishing efficiency, or fishing area, depending upon which method or methods are most practical, is essential to eliminating the danger of underfishing, overfishing, or unbalanced catch between the fishermen of Canada and the United States.

The decline in the 1956 run as well as the decline in the 1955 run is believed to be caused by poor ocean survival. Proof that ocean survival has been below that of the previous two years may be found in the following data, obtained during certain stages in the life-history of the Chilko run:—

Spawning Year	Survival from Egg to Fry	Survival from Fry to Migrant	Adult Survival
	Per Cent	Per Cent	Per Cent
1949	6.71	.....	19.00[1]
1950	10.27	.....	14.00[1]
1951	13.12	56.65	5.50
1952	6.04	52.02	7.52

[1] Estimated.

Rehabilitation of barren streams continued to play an important part in the Commission's activities. Investigation continued of the possible use of artificial spawning-grounds adjacent to suitable lake rearing areas lacking in natural spawning-grounds. Results of the 1955 experiment at Horsefly Lake indicated survival from eggs to fry of 40 to 71 per cent for various conditions of egg deposition, gravel type, and flow of water. A total of 264,000 fry were released to Horsefly Lake in the spring of 1956. The migration of these fish from the lake will be checked in the spring of 1957. In the fall of 1956 the artificial spawning-ground was modified slightly to give better control of the flow of water, and 247 adult sockeye and 1,098,000 green fertilized eggs were introduced to provide a measure of survival for heavy seeding conditions. Transplantations of eyed eggs were again made to the Upper Adams River. Such transplants have now been made in three out of four cycle-years. Transplants were also made to the Barriere River, in which obstructing dams have now been removed, and in a tributary of Nadina Lake, which does not at present have a sockeye run.

The protection of the Fraser River sockeye and the river which forms their freshwater environment becomes increasingly a more complex problem each year and requires the careful attention of the Commission's staff. The Department of Fisheries is vested with the legal authority to obtain fish protection in the case of water-use development, and the Commission acts as technical advisers to the Department in dealing with those projects affecting sockeye in the Fraser River system. During 1956 much interest was directed by public and private power companies to the possibility of development of

hydro-electric power on the Fraser River and its tributaries. The British Columbia Electric Company made a grant of $50,000 to the University of British Columbia for a survey of existing knowledge and research on salmon-fishery problems related to hydro-electric power developments on the Fraser River. The Moran Power Development Limited made a proposal for the construction of a 720-foot dam on the Fraser River at Moran. This structure would affect from 40 to 60 per cent of the production of Fraser River sockeye, and the proposal has required the careful and continuing attention of the Commission. The British Columbia Power Commission proposed the development of power based on the diversion of water from the Chilko and Taseko Lakes. This proposal was a modified version of the original plans prepared by the Water Rights Branch, which it was hoped would satisfy fishery requirements for the preservation of the Chilko sockeye run. The Commission, after careful consideration, reaffirmed the conclusions previously reached in the Interim Report on the Chilko River Watershed, in which it was opposed to any alteration to the natural inflow of Chilko Lake. Negotiations are continuing with the Power Commission with the object of determining a mutually acceptable method of power development based on a diversion from Taseko Lake.

Research continued on methods for guiding down-stream migrant sockeye away from hazardous paths at large hydro-electric dams. This research has been under way since 1953, and although small-scale experiments have given promising results, the same principles applied to full-scale tests have been entirely without success. Research also continued on the characteristics of sockeye-spawning nests and the hydraulics of flow of water through these nests. This work is directed toward understanding the causes of the low natural survival in nests as compared with survival in hatcheries or artificial spawning-grounds, and determining if corrective measures are possible. Prevention of pollution in the Fraser River and its estuarial waters presented an ever-increasing problem. During 1956, discussions were held with ten new industries regarding pollution-prevention measures, and eleven applications for disposal of raw or settled domestic sewage were reviewed. Following the discovery of a high water block to the early Stuart sockeye run in 1955 at a rapids near Yale, a survey was made of the block-site in the spring of 1956, and remedial measures were planned for completion by the spring of 1957 in order to prevent a recurrence of the blockade during the dominant-cycle early Stuart run in 1957. It is estimated that the blockade in 1955 will result in a loss of over $400,000 to the industry before the affected run can be rehabilitated.

The Commission held six meetings during the year, at Seattle, Wash.; Vancouver, B.C.; Bellingham, Wash.; and New Westminster, B.C. Senator Thomas Reid, H. R. MacMillan, and A. J. Whitmore, Chief Supervisor of Fisheries, Pacific Area, represented Canada on the Commission. The Chairman for 1956–57 was Robert J. Schoettler, Director of the Washington State Department of Fisheries. Other United States Commissioners were Elton B. Jones and Arnie J. Suomela.

INTERNATIONAL PACIFIC HALIBUT COMMISSION, 1956

During the year the Commission completed its twenty-fifth year of regulation of the halibut-fishery and carried forward the broad programme of statistical and biological research required by the Halibut Convention of 1953.

The members of the Commission from Canada in 1956 were S. V. Ozere, Ottawa (elected Vice-Chairman); Harold S. Helland, Prince Rupert; and Richard Nelson, Vancouver. The United States members were Seton H. Thompson, Washington, D.C. (elected Chairman); Mattias Madsen, Seattle, Wash.; and J. W. Mendenhall, recently of Ketchikan, Alaska.

The annual meeting of the Commission was held at the Commission's research headquarters in Seattle, Wash., from January 20th to 26th, inclusive. The results of investigations and regulations in 1955 were reviewed in conferences with representatives of halibut-fishermen's, vessel-owners', and wholesale dealers' organizations, and industry proposals regarding regulation in 1956 were discussed. Thereafter, the Commission approved a research programme and adopted regulations for the ensuing fishing season.

The regulations adopted for 1956 and recommended to the two governments were not materially different from those of 1955. Abnormal fishing conditions during the 1955 season had obscured the effectiveness of the multiple seasons inaugurated in 1954. Consequently the Commission decided against any change in the regulations which would significantly alter either the amount or the disposition of fishing during 1956.

The halibut regulations were approved by the Governor-General of Canada in Council on April 12th and by the President of the United States on April 18th, and became effective on the latter date.

The five regulatory areas of 1955 were continued in 1956, as follows: Area 1A, the waters off the Northern California and Southern Oregon coasts, south of Heceta Head, Oregon; Area 1B, the waters off the Oregon and Washington coasts between Heceta Head and Willapa Bay, Washington; Area 2, the waters between Willapa Bay and Cape Spencer, Alaska; Area 3A, the waters between Cape Spencer and Kupreanof Point near the Shumagin Islands; Area 3B, all convention waters west of Area 3A, including those of the Bering Sea.

Catch-limits of 26,500,000 pounds for the first season in Area 2 and of 28,000,000 pounds for the first season in Area 3A were continued in the regulations. Control of fishing in other areas and for other seasons, in which the total catch of halibut is comparatively small, was again accomplished by limiting the lengths of the fishing seasons. Closed nursery areas, minimum size-limits, prohibition of the use of nets for the capture of halibut, and provision for the landing of a limited amount of halibut caught incidentally by set-line vessels in areas closed to halibut-fishing were also continued without significant change.

All areas were opened to halibut-fishing on May 12th. Area 1A was closed on October 23rd. The first season in Areas 1B and 2 closed on June 27th, and the first season in Areas 3A and 3B closed on August 24th, at which dates it was deemed that the catch-limits set for Areas 2 and 3A respectively would be attained. Second seasons of seven days in Areas 1B and 2 and of nine days in Areas 3A and 3B commenced on September 9th. A third season of twenty-three days in Area 3B commenced on September 30th and terminated on October 23rd.

The catch landed from Areas 1A and 1B combined was approximately 600,000 pounds, somewhat below the total for 1955.

The total catch from Area 2 in 1956 was 35,200,000 pounds, approximately 6,500,000 pounds more than in 1955. The catch during the first season amounted to 26,800,000 pounds, approximately the catch-limit set in the regulations. The first season lasted thirty-eight days, two weeks longer than in 1955, due primarily to an eight-day

voluntary delay in the start of fishing and a voluntary seven-day lay-in between trips on the part of the Canadian and United States fleets.

The catch in Area 2 during the seven-day second season, commencing on September 9th, amounted to 7,400,000 pounds, compared to 9,400,000 and 5,300,000 pounds during the second seasons in 1954 and 1955 respectively.

Landings of halibut caught incidentally to fishing for other species under permit in Area 2 after the area was closed to halibut-fishing amounted to 756,000 pounds. The amount was below the levels of 1954 and 1955. Permit fishing in September, normally a very active period of black-cod fishing, was reduced in 1956 by the occurrence of the second halibut-fishing season in that month.

The combined total catch from Areas 3A and 3B amounted to 31,600,000 pounds, compared to 29,700,000 pounds in 1955 and 33,800,000 pounds in 1954. The catch in Area 3A during the first season, which lasted ninety-six days, was approximately 29,300,000 pounds, about 1,300,000 pounds over the 28,000,000-pound catch-limit provided in the regulations for that season. The first season was prolonged by almost continuously bad weather, the voluntary delay in commencing fishing, and the voluntary between-trip lay-in programme adopted by the fleets.

During the second season of nine days in Area 3A, a catch of 1,500,000 pounds was taken. This was about the same as during the second season in 1955 but considerably below the 3,400,000 pounds taken in 1954.

In Area 3B during the first and second seasons, only about 479,000 pounds were taken, including 294,000 pounds of dead fish retained by the Commission's tagging-vessel. The fleet largely remained to the eastward of the area as in 1954 and 1955.

During the third fishing season in Area 3B, commencing on September 30th and lasting twenty-three days, the catch amounted to 264,000 pounds, compared to 934,000 pounds in 1955 and 611,000 pounds in 1954 when the third season occurred in September. The decline in 1956 resulted from the prolongation of the first season in Area 3A, which had the effect of delaying the third season in Area 3B until October, an unattractive fishing month due to weather conditions. Part of Area 3B catch was taken in Bering Sea.

United States and Canadian landings from all areas amounted to 67,400,000 pounds in 1956, compared to 59,100,000 pounds in 1955 and to 71,200,000 pounds in 1954. The lower amount in 1955 resulted chiefly from a 6,000,000-pound reduction in yield from the second fishing seasons in Areas 2 and 3A and deficits in the first-season catch-limit landings taken in the two areas. The higher catch in 1954 was due chiefly to the fact than 1954 was the first year of multiple seasons, and that the second fishing season was conducted to a considerable degree upon accumulated stocks which had been subjected to relatively little fishing for a number of years.

The availability of halibut, as indicated by the catch in pounds per unit of fishing effort, was higher in each major section of Areas 2 and 3A than during 1955, in which prolonged bad weather interfered with effective fishing. During the second seasons the catch per unit effort was higher in Area 2 and lower in Area 3A than in their first seasons. Due to poor weather conditions and the lateness of the fishing season in Area 3B, the catch per unit of effort was not comparable to that of 1955.

A few individual grounds in Area 2, such as Cape Scott and Goose Island, which are very important to the Vancouver and Seattle fleets, failed to show any recovery from the low level of 1955. In the important section of Area 3A between Cape St. Elias and the Trinity Islands there was a decline in the second season from 1955 to 1956. The trends on the former grounds and in the latter region suggested strongly that the heavy removals from them since 1953 had reached, if not exceeded, the current productive capacity of their stocks.

Size-composition studies showed that, despite the increased entry of young noted in Area 2 in 1955, the numbers of chicken halibut (5 to 10 pounds) declined and the

numbers of large (over 60 pounds) increased in the very important section of Area 2 between Goose Island and northern Hecate Strait. Similar changes were observed in the Portlock-Albatross section of Area 3A.

The age composition of landings from the Goose Island section of Area 2 showed that the 6- and 7-year-olds which entered the fishery strongly in 1955 were dominant in numbers in 1956. However, the older age-classes, and particularly those over 12 years of age, were dominant in weight and largely maintained the catch.

In Area 3A the strong 1944 brood was still dominant, and the catch in that area continued to depend mainly on 11- to 16-year-olds. Eight- and ten-year-olds made a strong entry into the fishery. Individuals of the 8-year group were more abundant than in any of the preceding thirteen years.

In Area 3B, on the Shumagin and Makushin Bay grounds, the same strong year-classes were present as on grounds to the eastward in Area 3A.

An interesting catch was made by the Commission's tagging-vessel on a spot on the Bering Sea edge in 1956. It showed the same strong age-classes as were found south of the Alaska Peninsula. It also contained numerous older fish, some up to 31 years of age, whose average weight at each age was well below that found elsewere in Area 3B. The composition of the catch suggested that the spot might contain a semi-isolated segment of stock, such as has been discovered from time to time elsewhere on the coast during the past history of the fishery.

Studies of growth, begun in 1955, were intensified. Preliminary results showed that profound changes had occurred in growth from early to recent years on various grounds, and particularly in Areas 3A and 3B. These seemed to be associated with changes in the density of the halibut stocks.

Additional tagging experiments were begun in 1956 to further the study of the effects of the multiple seasons on availability and utilization. Tagging was done in Area 3B during the spring and summer and on the spawning-grounds in Area 3A during the winter.

The halibut vessel "Polaris" was chartered and operated from mid-April to mid-September in Area 3B. Seven trips were made near the Shumagin Islands, Unalaska Island, and in Bering Sea. A total of 4,674 fish, weighing approximately 194,000 pounds, were tagged.

Three experiments were begun near the Shumagin Islands, two on the Bering Sea side of Unalaska Island, and two on the "edge" between Unimak Pass and the Pribilof Islands. The experiments in each location were separated by sufficient time to permit the use of tag recoveries in subsequent years for study of seasonal differences in availability.

Fishing was conducted as far north as Cape Newenham and the Pribilof Islands during the tagging operations and indicated a virtual absence of halibut in that section of Bering Sea. Halibut were found in reasonable abundance along the north side of Unalaska Island and in considerable abundance on the previously mentioned spot upon the "edge" north-west of Umnak Pass. A large number were tagged in two experiments in the latter location and should help to explain the peculiar character of the fish encountered there.

The halibut vessel " Pacific " was operated for six weeks in November and December on the Yakutat and " W " spawning-grounds. Halibut were difficult to locate, and only 588 fish, weighing 23,000 pounds, were tagged.

The operations of the " Pacific " were so hampered by bad weather that there was doubt as to whether the fish had been late in reaching the spawning-grounds or the abundance of spawners had been below that of earlier years. To resolve these questions, arrangements were made for resumption of the " Pacific " charter for an additional trip in January, 1957.

Tag recoveries in 1956 totalled 1,573, compared with 783 and 1,584 in 1955 and 1954 respectively. New experiments on Goose Island in 1955 accounted for more than one-third of the year's recoveries, which was expected in view of the large size of the experiments and the high intensity of the fishery upon the Goose Island grounds.

Recoveries from 1955 experiments on the Masset and Timbered Islet nursery grounds were very low. In this they agreed with first-year returns from the 1947 Masset experiment. The migration of halibut from the nursery areas is a gradual process.

The apparent utilization of the halibut on different sections of the coast appeared to vary greatly from one ground to another. The rate of utilization indicated by tag recoveries was relatively high for most of Area 2 and as far north as the Yakutat grounds in Area 3A, but became progressively lower on the grounds farther to the westward. Tag returns suggested that the stock on the far-western grounds was not being fully utilized, but were contradicted by the results of statistical and age-composition studies. Decision in this matter must be deferred until the causes of the different results obtained by the different methods are ascertained.

Studies of the early bottom life of the halibut, begun in 1955 to increase knowledge of the factors that determine recruitment of young into the commercial stock, were continued in 1956. The University of Washington's research vessel "Commando" was chartered for two months in two periods between June and September and operated between the north end of Vancouver Island and Sitka Sound in Southern Alaska.

As in 1955, these investigations consisted chiefly of exploratory fishing with various types of experimental gear. They were directed primarily toward increasing knowledge of the habitat of the young halibut and learning how to capture them. Fishing was conducted from the surf-line to depths as great as 70 fathoms.

A total of eighty-six halibut in the 0 to 3-year-old age-classes, ranging from 3 to 23 inches in length, were caught. Though no concentrations of small fish were located, much was learned regarding methods of sampling, both as to gear and locality. Results showed that considerably more exploratory work must be done before standardized quantitative sampling techniques can be applied.

A summary report upon the regulation of the fishery and upon the investigations in 1955 was published and distributed.

SALMON-SPAWNING REPORT, BRITISH COLUMBIA, 1956

GENERAL

Foreword.—Developments or trends of special interest associated with the 1956 salmon migration and spawning escapement include:—

1. No outstanding runs were looked for in 1956. With the exception of chums, the returns, as reflected in catches and spawning-ground escapements, indicated the occurrence of the several species at levels comparable to brood-years with normal variations as applied to the various areas and species.

2. Special regulatory measures designed to increase salmon escapements for reproduction were applied in Skeena, Butedale, and Bella Coola areas. These were fully justified in the light of developments and results achieved.

3. After a series of low-production years, the Nass area experienced excellent runs of all species of salmon.

4. There was a good run of sockeye to Rivers Inlet and Smith Inlet, providing a commercial catch of slightly less than 1,500,000 fish as well as satisfactory supplies for spawning-ground needs.

5. While the catch of pinks amounted to some 7,352,000 fish and was below general annual average, it was approximately 2,000,000 fish greater than the catch in the brood-year 1954. It is noteworthy that individual size of the fish generally was small, almost 1 pound less than normal.

6. For the second consecutive year, the outstanding feature was the serious decline in the chum run to most sections of the coast. A lengthy fishermen's strike during September and October in 1952 helped to provide brood stocks, the progeny of which would make up the runs in 1956. Although the runs in a few areas were larger than that of 1955, generally they were only about one-half of normal. Despite immediate application of added fishing restrictions designed to augment escapements for reproduction purposes, the seeding of the spawning-grounds, with few exceptions, can only be classed as light. As this year's failure follows that of the 1955 coastwise pattern, it can again only be assumed, with present information, it resulted from very unfavourable survival conditions either in fresh water or later during the longer period of existence in the ocean.

7. The chum failure in the Queen Charlotte Islands area was pronounced, and is the fourth consecutive season of poor chum runs, calling for immediate application of extraordinary measures for the rehabilitation of the once prolific chum-streams of this area. Pink returns to this area were also disappointingly light and will also require special conservation attention.

8. Despite special protective measures, chums destined for the Fraser were seriously reduced in numbers during passage through Johnstone Strait and Discovery Passage by the highly efficient and mobile seine and gill-net fleets there. Other important chum reproduction areas, in common with the Fraser, also suffered from the effectiveness of this fishing operation. These included generally the streams along the east coast of Vancouver Island below Seymour Narrows as far south as Chemainus River as well as on the Mainland streams opposite, including Jervis Inlet and Howe Sound. Further measures to provide for an adequate progressive escapement through this fishery are imperative immediately.

9. Two further aids to salmon-spawning migration were brought into operation during the year. Concrete and steel fishways were completed at Naden River, flowing into Naden Harbour on the north coast of Graham Island, in time to enable pink and

chum salmon to migrate to spawning-grounds not previously reached above the falls, and also facilitated passage of sockeye and cohoe. Two similar fishways were completed at Indian River on Princess Royal Island, where previously serious losses of spawning salmon, particularly pinks and chums, had occurred at unfavourable low-water stages.

10. The problem of securing adequate escapements for perpetuating our salmon runs was accentuated by the greater catching efficiency of the net-fishing fleet; coupled with this was the high mobility of the fleet for day-to-day concentration on high points of developing runs.

Sockeye.—While the over-all return of sockeye to the Fraser system was slightly less than in the cycle-year, the escapement to the various spawning-grounds is considered satisfactory. The Chilko spawning was heavy and equal to the brood-year.

In the northern area all the principal sockeye areas received satisfactory supplies—that is, Nass, Bella Coola, Rivers Inlet, and Smith Inlet. The Skeena, still in process of recovering from the Babine slide losses, experienced a run of unexpected proportions below normal but much larger than in 1955. On Vancouver Island the Nimpkish system was well stocked. The escapement to the Somass River in Alberni Inlet was light, amounting to about half of the cycle-year.

Springs.—Stocks of this species throughout the Province were fairly well maintained. In District 2 the escapement to the Nass and Skeena Rivers was above average, and in Bella Coola a heavy escapement, one of the best ever observed, reached the spawning-grounds. Supplies in Rivers Inlet were better than average.

Along the east coast of Vancouver Island and the adjacent Mainland, stocks were moderate except in the Campbell River and Salmon River, where they were only 40 per cent of the brood-year levels, and in the Puntledge River, where stocks were light. There was a good run, the best in the past three years, to the Somass River.

In the Fraser River system the run was below brood-year levels in the Prince George, Yale-Nicola, and Mission-Harrison areas, but comparable to the cycle-year in the Quesnel-Chilko, Kamloops, and Chilliwack-Hope sub-districts.

Cohoe.—The escapement of this species in District 2 was generally good and well above parent-year abundance in all sections, with the exception of the streams in the Queen Charlotte Islands and Rivers Inlet and Smith Inlet areas, where spawning was light.

In the streams of the east coast area of District 3, supplies were above average in the Alert Bay area, satisfactory in the Quathiaski and Pender Harbour districts, only fair in the Comox and Cowichan areas, and light in the Nanaimo-Ladysmith sub-district. Also the west coast of Vancouver Island streams in the Kyuquot and Clayoquot areas, as well as the Somass River, were well stocked; elsewhere spawning was generally light.

Other than the Chilliwack and Nicola Rivers, which were moderately seeded, all spawning areas tributary to the Fraser system were lightly stocked.

Pinks.—With the exception of the Queen Charlotte Islands and the Skeena River, where seedings were light, the escapement of pinks to all sections of District 2 was generally quite satisfactory, particularly so in the Namu-Bella Coola, Bella Bella, and Nass areas, and the northern portion of the Butedale area.

In District 3, supplies to the Alert Bay sub-district and Quathiaski sub-district were satisfactory. Spawning in the Comox area was much lighter than in 1954. Supplies to Koprino River were fairly good, about equal to those of the cycle-year.

This was the off-year for pinks in the Fraser system.

Chums.—For a second consecutive year, with few exceptions, the escapement of chums was again one of the lightest on record.

Runs to the Queen Charlotte Islands were generally light and below those of 1952. There was a medium seeding in the Nass, but stocks were below parent-year levels. Grenville-Principe area had light supplies, comparable with those of the cycle-year.

The run to Butedale sub-district was light, especially in the case of the early run. In Namu, Bella Bella, and Bella Coola areas the runs were light and below those of 1952. Stocks on the spawning-grounds in Rivers Inlet were medium-heavy and better than in the parent year, while in Smith Inlet supplies were also medium-heavy, similar to those of 1952.

In District 3, supplies were light, and only in Alert Bay and Quatsino sub-districts were they comparable to those of the parent year. Quathiaski, Comox, and Cowichan areas had poor runs, while stocks in the Nanaimo-Ladysmith area were very light. The escapement to Sarita and Nitinat Rivers was good, but throughout the remainder of the Barkley Sound and Nitinat areas was generally light. Other west coast sub-districts had light escapements.

In the Fraser system the escapement was extremely poor. In Lower Mainland streams the escapement was about 10 per cent of normal requirements. Early runs were a failure in the Mission-Harrison area and late runs were light, being satisfactory only in the Chehalis sloughs. Stocks in the Chilliwack-Hope area were poor and far below 1952 levels. The run to Squamish was extremely light, and supplies to Indian River in the North Vancouver area totalled only 2,000, compared with a spawning of well over 20,000 in the parent year. A flash flood in the Lower Mainland streams during the first week of December caused heavy damage to chum spawning-grounds.

IN DETAIL

Masset Inlet and North Coast of Graham Island Area

Generally the usual small run of sockeye was somewhat heavier than in the past, but the escapement to Yakoun River was lighter than for several seasons. A medium seeding of spring salmon occurred in the Yakoun River system. The run of cohoe was light to Masset Inlet streams, while in Naden River supplies were light to medium. Throughout the remainder of the area, numbers on the spawning-grounds were light. This was an on-year for pinks in Masset Inlet and Naden Harbour. The four main pink-streams on the west shore of Masset Inlet had light spawnings. In Juskatla Inlet the stocks were the heaviest for some years. Supplies to the Yakoun were moderate. Stocks in Naden River were medium, while in the outside streams flowing into Dixon Entrance seedings were light. The lightest escapement of chums ever observed occurred in Masset Inlet streams this year, with runs to the two main producers, the Awun and Ain, being very light. The escapement to Naden River was light to medium.

Skidegate Inlet and West Coast of Graham-Moresby Islands Area

Sockeye-supplies to Copper River and Skidegate Lake were the best in several years. Stocks of cohoe in Tlell River were heavy. Returns to Copper River and Skidegate Inlet streams were moderate, while streams on the west coast of Graham and Moresby Islands were lightly seeded. The expected returns from the heavy seeding of pinks in 1954 did not materialize in volume. Spawning in Copper and Tlell Rivers was heavy. Deena River received an adequate seeding, as did Kaisun River and the Security Inlet streams. Stocks in all other streams in the area were generally light. The chum escapement was disappointing and well below parent-year levels. Deena, Slatechuck, and Long Arm Rivers received adequate seedings, while the remaining Skidegate Inlet streams were lightly stocked. Streams on the west coast of Graham and Moresby Islands had very light spawnings, with the exception of Athlow Creek, where supplies were moderate.

East Coast of Moresby Island and South Queen Charlotte Islands Area

Cohoe-supplies were light in all streams in the area. The pink-seeding was generally light to very light, reflecting the poor seeding of 1954. The over-all spawning of chums

was light. Stocks in the George Bay streams were heavy, while Sedgwick Bay, Skaat Harbour, Harriet Harbour, and Huston Inlet streams were moderately supplied. All other streams in the sub-district were lightly seeded.

Nass Area

In general there was a moderately good escapement of sockeye to the entire Nass system. The Meziadin system, the main producer, was adequately seeded. Gingit River had a medium escapement, only slightly less than that of the cycle-year. The Damdochax system was also moderately supplied. The main spring-salmon spawning-grounds were adequately seeded. Supplies to the Meziadin were somewhat above average. Escapement to the Damdochax was moderate to heavy. A light to moderate escapement of cohoe, slightly better than that of the brood-year, 1953, occurred throughout the area. Generally there was a medium to heavy escapement of pinks. Dogfish, Toon, and Ensheshese Rivers were heavily supplied. Better than average stocks were also present in the Nass system. The chum escapement was adequate but slightly below 1952 levels.

Skeena and Babine-Morice Area

The below-normal run of sockeye to the Skeena River anticipated from the light seedings of 1951 and 1952 in the Babine system, the principal producer of this species, resulting from the block in the Babine River caused by the large rock-slide, developed in larger proportions than expected. Nine Mile, Morrison, and Anderson Creeks were heavily seeded. Stocks in Fulton River, Twin Creek, Grizzly Creek, and Tahlo Creek were moderately good. The total numbers of salmon passing through the counting-fence of the Fisheries Research Board located in Babine River just below the outlet of Babine Lake for 1956 were: Sockeye, 373,509; springs, 4,345; cohoe, 9,250; pinks, 2,691; and chums, 3. Spring-salmon supplies were near average in numbers but the percentage of jacks was large. The cohoe run was good, with only a few jacks present. The pink run was light, smaller than in the cycle-year.

Numbers of sockeye in the Bear Lake area were light and less than those of the parent year. The spring-salmon run to Bear River was estimated at 15,000 to 20,000 fish, an improvement over the cycle-year. Good numbers of cohoe spawned in the Bear River. No pinks were observed in this system in 1956.

The sockeye escapement to Nanika River was light, with stocks estimated at 5,000 to 7,000 spawners. Small runs were also present in other spawning areas of the Bulkley and Morice systems. The run of spring salmon to Morice River was average, estimated at apparently 10,000. Escapement of this species to the Upper Bulkley River was light. Average stocks of cohoe were noted in the Bulkley River and Morice Lake areas, all grounds being moderately seeded. Cohoe experienced some difficulty in surmounting beaver dams in the Upper Bulkley. A few pinks spawned in the Bulkley River below Moricetown Canyon, but none were observed above that point.

Skeena-Lakelse Area

The Kispiox and Allistair Lake systems were very well seeded with sockeye. Escapement to the Lakelse Lake grounds was very light. The Kitsumgallum area stocks were about average. The spring-salmon run was about average, with good numbers present in the Kitsumgallum and Kitwanga Rivers. Supplies in the Kispiox River were about average, as was the case in most of the smaller streams in the area. The cohoe spawning was good, much heavier than in the parent year. Very good seedings occurred in Lakelse system and Gitnadoix River. The escapement to the Kispiox was about average. Pink-supplies were below those of the cycle-year, 1954, the seeding in all streams throughout the sub-district being generally light. The chum escapement to the area totalled about 2,500 fish, compared to 11,000 in the parent year, 1952.

Lower Skeena Area

The sockeye escapement to Diana Creek and Johnson Lake, tributary to the Ecstall River, was moderate but well below that of the cycle-year. In Shawatlans River, stocks were about the same as those in 1952. The spring-salmon run to Johnson Creek was heavy and equal to that of the cycle-year. However, in Johnson Lake and Big Falls River, supplies were well below those of the brood-year. The cohoe run was light, showing decrease from the brood-year. Pink-supplies in the small streams were light and below those of 1954. In Big Useless Creek, La Hou Creek, and Moore Creek, however, stocks were on a par or better than those of the parent year. The escapement of chums to the spawning-grounds in general was light and below brood-year levels.

Grenville-Principe Area

The seeding of sockeye in the majority of streams and lake systems was light. In Bonilla Arm, Quinstonsta, Lewis Lake system, Endhill Creek, Gale Lake system, and Mikado Lake system, stocks were moderate, similar to the brood-year. Supplies to the Bear Lake and Mink Trap Lake systems were light. A moderately good run of cohoe was found on the spawning-grounds in most streams in the area. Supplies of pinks generally were medium throughout the area, considerably better than in the 1954 brood-year. Turn Creek on Gil Island had a particularly heavy escapement of this species. Good supplies were also found in Alpha Creek on Pitt Island and in Turtle Creek on Gil Island. The chum-spawning in practically all streams in the sub-district was light, about on a par with the brood-year. The heaviest seeding of this species occurred in the Bonilla Arm creeks and in Turn Creek on Gil Island.

Butedale Area

Generally there was a light escapement of sockeye, a decrease from the brood-year. Kitlope River and the rivers flowing into Douglas Channel received a light seeding. Stocks in Aristazabal Island, Laredo Channel, and Laredo Inlet streams were light and similar to those of the parent year. Supplies of spring salmon were similar to those of the brood-year. Generally the run of cohoe was good. Streams in Douglas Channel and on Aristazabal Island received excellent seedings. The escapement of pinks to the area showed a marked improvement over the past three years. Notwithstanding an intensive fishing effort, Kitimat River, Bisch Creek, Quaal River, Kitkiata River, and Kishkosh River, flowing into waters north of Wright Sound, were well seeded. This is attributed to the special closure measures applied to these waters throughout the season. Streams in the outer portion of the area received adequate stocks, with the exception of Laredo Inlet, where the escapement was light. Tolmie Channel, Klekane Inlet, Aaltanhash Inlet, Green Inlet, Sheep Passage, and Finlayson Channel streams received light to medium supplies, similar to the parent year. Generally the chum run was very light and the escapement was light. The early chum runs to Douglas Channel and Gardner Canal were exceptionally light, similar to the runs in the cycle-year.

Bella Bella Area

Sockeye-supplies were moderate, comparable to those of 1952. Some decrease was noted in Kwakusdis River and the East and West Tuno streams. Stocks in Kajusdis River were better than those of the cycle-year, while in Tinkey the spawning compared favourably with that of 1952. Good seedings of cohoe were noted throughout the area, especially in the Kajusdis system. The escapement of pinks was moderately heavy. Kainet River showed a marked decrease from the cycle-year, but this was more than offset by the excellent supplies present in Nameless Creek, Salmon Bay, James Bay, Neekis, Klatse, Howyet, and Gullchuck Rivers. Supplies of chums were light to moderate.

Matheson Channel streams had very light seedings, with stocks in Kainet River being only 15 per cent of those of the brood-year and in Salmon Bay only about 5 per cent of those of 1952. Supplies to Neekis River and the Bullock Channel streams were moderately heavy. Elsewhere in the area the escapement was light to medium, showing slight decrease from the brood-year.

Namu-Bella Coola Area

The Bella Coola-Atnarko River system received a heavy supply of sockeye spawners, and about 70 per cent of the run was composed of large fish. This was the reverse of other years, when 60 to 70 per cent of the run was composed of jacks. Stocks in Koeye River were medium and in the Kimsquit system light. Namu and Kisameet Rivers received heavier supplies than usual. The spring-salmon escapement was heavy, one of the best ever seen in the Bella Coola-Atnarko system. Very good supplies of cohoe, far above average, spawned in the Bella Coola-Atnarko system. Dean Channel streams also received good supplies of this species. The pink escapement was heavy, much better than in the cycle-year. The Bella Coola-Atnarko system received a heavy seeding, the best since 1951. Koeye and Kwatna Rivers received moderate supplies, and in the latter stream there was improvement over the cycle-year. Smaller streams in the area were moderately to heavily stocked. In general the chum escapement was light and below that of the parent year, 1952. Some Dean Channel streams had moderate escapements, while supplies to the Bella Coola, Dean, Kwatna, and Nootum Rivers were light. Undoubtedly the special closure of Dean and Burke Channels throughout most of the season was well justified from the results attained.

Rivers Inlet Area

Generally the over-all sockeye escapement to the Owekano system was satisfactory. Supplies in the Dallac River were heavy and similar to those of the 1951 and 1952 parent years. A good escapement was also noted on Whonnock Flats at the outlet of Owekano Lake. Stocks in the Quap and Wauk-Wash Rivers were medium and showed some decrease from those of the 1951 and 1952 cycle-years. Supplies in Indian River were heavy and similar to those of 1951, while in the Gennesse River the escapement was light to medium, comparing favourably with the brood-year. The Nookins and Asklum Rivers received moderate supplies. A heavy escapement was found in Shumuhalt River, comparable to that of 1952. The Cheo River was moderately stocked. A fair escapement occurred to the Markwell River. A medium-heavy escapement of springs reached the Whonnock River. Supplies to Kilbella and Chuckwalla Rivers were light. Stocks of cohoe were light and below those of 1953. The supply of pinks was better than in the brood-year. The chum escapement to most streams was light; however, moderately heavy supplies, better than in the brood-year, reached the Whonnock, Chuckwalla, and Kilbella Rivers.

Smith Inlet Area

The sockeye escapement to the Long Lake system was good. The Delabah and Geluck Rivers, which comprise the principal spawning-grounds, were both heavily supplied. Stocks of springs to the Docee River were medium and showed some increase over the parent year. The cohoe escapement was light and less than that of 1953. There was a heavy escapement of pinks to the Nekite River, showing considerable increase over the brood-year. Supplies of chums to Walkum River were moderately heavy, greater than in 1952, while in the Nekite and Takush Rivers spawning was similar to that of the parent year.

Alert Bay Area

The escapement of sockeye throughout the area was light to medium, comparing favourably with that of the brood-year. Stocks in the Upper Nimpkish River system

were most satisfactory, with the best spawning being observed on Woss Lake. Fair to good seedings occurred in Nahwitti, Quatse, Kakweiken, Mackenzie, Klinaklini, and Kingcome Rivers. Light numbers were found on spawning-grounds of other streams in this sub-district. The spawning of spring salmon was moderate, slightly less than last year. The run to Nimpkish River was satisfactory, while returns to Klinaklini and Kingcome Rivers were similar to those of recent years. Cohoe returned to the area in above average numbers, and the over-all escapement was considerably better than that of the brood-year, 1953. Satisfactory spawnings were observed on the Quatse, Keogh, Cluxewe, and Wakeman Rivers. A good run also occurred in the Nimpkish River, and once again Salmon River in Seymour Inlet and Tsulton River in Beaver Cove supported very good runs. Fair escapements of this species were noted in Nahwitti and Shushartie Rivers, Bughouse Bay and Embley Creeks, and to the rivers at the head of Knight and Kingcome Inlets. A medium-heavy return of pinks occurred throughout the sub-district. In Vancouver Island streams the spawning was generally heavy, particularly in Nahwitti, Shushartie, Quatse, Keogh, Tsitka, and Adam Rivers. In spite of the fact it was an off-year for the Mainland, the spawning returns were satisfactory. Stocks in the Embley, Glendale, Waterfall, and Hoeya Rivers were heavy, while streams such as the Kakweiken, Wakeman, and Viner Rivers had fair to good escapements. The over-all escapement of chums throughout the sub-district was light and similar to that of the cycle-year, 1952. The run to Nimpkish River was moderate and somewhat less than that of the brood-year. Moderate escapements also occurred in Salmon River in Seymour Inlet, Village Bay Creek in Belize Inlet, and in Nimmo, Tsibass, Mackenzie, Viner, and Klinaklini Rivers on the Mainland.

Quathiaski Area

The return of sockeye to Hayden Bay was light and less than that of the parent year. Supplies to Phillips River were also light, somewhat less than half brood-year numbers. Stocks of spring salmon in the Campbell and Salmon Rivers were low, estimated at 40 per cent of the brood-year escapements in both cases. Seedings in Quatum, Orford, and Phillips Rivers were also light. The early run of white springs to the head of Bute Inlet arrived in satisfactory numbers, comparable to those of the cycle-year. The spawning of cohoe in the majority of streams was satisfactory, comparable to 1953. Exceptions were Salmon, Stafford, Apple, and Orford Rivers, and Read, Fraser, Fredericks, and Christie Creeks, where returns were light and considerably less than those of the parent year. This was an on-year for pinks in the Vancouver Island, Quadra Island, and outer Loughborough Inlet streams. All spawning-grounds in these localities were well seeded, with the exception of Salmon River, where stocks were light. Campbell River showed an improved return over the brood-year, as did Grassy Creek in Loughborough Inlet. Cameleon Creek, Granite Bay Creek, and Kanish Creek supported very satisfactory numbers of this species. The number of chums which appeared on spawning-grounds in the sub-district were generally poor, comparable to the light spawnings of 1955 and considerably less than those of the cycle-year. Apple, Homathko, Orford, Salmon, and Southgate Rivers were very lightly seeded. Exceptions were Quatum River and Read Creek, where stocks were comparable to those of 1952. In Campbell and Phillips Rivers, Cameleon, Forward Harbour, and Hayden Bay Creeks, supplies were better than average but below brood-year levels.

Comox Area

The escapement of spring salmon to Puntledge River, estimated at 1,500, was very light, the lightest since 1941. However, stocks in both the Big and Little Qualicum Rivers, estimated at 1,200 in each stream, were more than four times greater than those of the brood-year. The escapement to Oyster River was again very light. With the exception of Englishman River and three smaller streams, the cohoe escapement was

lighter than that of the cycle-year. The escapement to Little Qualicum and Oyster Rivers was only half that of 1953, while stocks in the Big Qualicum River were only about two-thirds those of the parent year. Escapement of this species to Puntledge and Tsolum Rivers was also lighter than that experienced in 1953. Generally pink-supplies were much lighter than in brood-year, 1954. The pink escapement to Tsolum and Oyster Rivers was only 20 per cent of that of 1954, when an estimated 100,000 entered the former and 200,000 the latter stream. Numbers of this species in the Puntledge River totalled only 6,000, compared to 16,000 in the cycle-year. In Englishman River the escapement was about half that experienced in 1954, while stocks in other streams throughout the area were about equal to those of the brood-year. The chum run to Puntledge River was comparable to that of 1952. In the Little Qualicum and Big Qualicum Rivers, supplies were well below brood-year levels. In Englishman River, numbers on the spawning-grounds were only about one-tenth those of the parent year. In Oyster River, only 300 were noted on the spawning-grounds, compared to 6,000 in 1952. In the smaller streams, chum escapements were generally lighter than in the brood-year.

Pender Harbour Area

The escapement of sockeye to Sakinaw Lake was light, about two-thirds of the escapement in 1952. Stocks in Tzoonie River were good and substantially more than those of the parent year. Numbers of spring salmon in Tzoonie River were far in excess of those of the cycle-year, while average seedings occurred in the Toba River system and Klite Creek. Numbers of cohoe on the spawning-grounds were generally satisfactory, with about half the streams frequented by this species showing increases over the cycle-year. This was most apparent in Brem, Sakinaw, Squawawka, and Vancouver Rivers, as well as in Shannon Creek, Storm Bay Creek, and Tzoonie River. Stocks of this species in Toba River showed a marked increase over the cycle-year. This was an off-year for pinks in the area, and in those streams normally frequented by this species, only a few individual spawners were observed. A light chum escapement occurred in most of the streams throughout the sub-district, about one-quarter showing an increase over brood-year numbers. Returns to Kelly Creek, Klite Creek, Little Toba River, Toba River, and Squawawka River were double the 1952 spawnings. Some increase was also noted in Saltery Bay Creek in Jervis Inlet and in Pete Creek in Sechelt Inlet. The escapement to Deserted River in Jervis Inlet, one of the top chum-producers in the area, was only about half that of the cycle-year.

Nanaimo-Ladysmith Area

The spring-salmon escapement to Nanaimo River showed a marked improvement. It was much better than average and nearly double that of the brood-year. A light supply of this species also entered Chemainus River. For the second successive year the cohoe escapement showed marked decline. Stocks on the spawning-grounds were well below average, amounting to about one-third those of the cycle-year. The escapement to the secondary and minor streams was very light, and even to the main producers the runs can only be classed as light. The usual small pink-salmon run to the Nanaimo River was light. Notwithstanding the application of special conservation measures, the escapement of chum salmon was extremely light. While last year stocks were inexplicably poor, this year over-all numbers on the spawning-grounds were only 75 per cent of the 1955 level. Nanaimo River is the only stream in the area which received any appreciable escapement.

Cowichan Area

Stocks of cohoe salmon in both Cowichan and Koksilah Rivers were below those of 1955 and somewhat below those of the brood-year, 1953. It is estimated that 30,000 cohoe were present in the Cowichan River, while about 3,500 spawned in the Koksilah

system. The run of spring salmon to the Cowichan system was much below the run experienced in 1955. It is estimated that between 3,000 and 4,000 of this species spawned in the Cowichan River, which is about half of the number present last year. Generally the escapement of chums was below the parent-year level. The Koksilah River was the only stream where the escapement of this species was comparable to that of 1952. Conditions in the streams at the time chums started to move in, however, were ideal.

Victoria Area

Stocks of cohoe throughout the area were generally light, somewhat less than half those of the parent year. The escapement of chums to Goldstream was considerably less than that of 1952. Very light seedings occurred in Stoney, Tugwell, Muir, and Coal Creeks. In Jordan River, spawning-grounds were almost barren of this species. In De Mamiel Creek, about 11,000 chums were present. In Sooke River, stocks were in excess of those of 1952. On December 8th and 9th melting snows and unprecedented rainfall played havoc with the spawning-grounds throughout the area; for example, 14 inches of rain fell at Jordan River in twenty-four hours. Streams suffered considerable erosion, scouring of gravel-beds, and changes in course due to extreme flooding. Fortunately late runs of chums materialized at Goldstream and at De Mamiel Creek, which will assist in replacing spawn-deposits lost through flood conditions.

Alberni-Nitinat Area

The sockeye escapement to the Somass system was light, totalling about 10,000 fish, which is about half the number of the cycle-year. The Henderson (Anderson) Lake run was also down this year, also estimated to be less than half that of the brood-year. The escapement to Hobarton Lake was light, estimated at slightly in excess of 3,000 fish. Stocks of spring salmon in the Somass River were good, somewhat better than for the past three years. Henderson (Anderson) River received a normal escapement, while the Nitinat, Gordon, San Juan, and Sarita Rivers received light seedings. The escapement to the Nahmint River was below average, and Toquart and Effingham Rivers had their usual light runs. The escapement of cohoe to the Somass River system was satisfactory, showing improvement over the past three years. The San Juan and Gordon Rivers had fair seedings, while supplies in Maggie and Toquart Rivers were somewhat less than those of the last few years. Runs to other streams in the area were in general fairly light. This being an on-year for pinks in the area, the usual light escapement of about 2,000 fish reached the spawning-grounds of San Juan and Gordon Rivers. Several hundred pinks were also observed in each of the Toquort, Sarita, and Nahmint Rivers, as well as a few in Carnation Creek and the Somass River. Generally the chum-salmon escapement was fair. Supplies in the Sarita and Nitinat Rivers were fairly good. The escapement to Nahmint and Toquart Rivers was light for the second successive year. Effingham River was well seeded, showing some improvement over recent years. Salmon Creek in Ucluelet Harbour, Grappler Creek near Bamfield, and the Dutch Harbour creeks maintained their usual very good runs. All of the Alberni Inlet streams, which include the Somass system, were poorly seeded, and in some cases, such as Mackintosh, China, and Coleman Creeks, almost barren conditions prevailed.

Clayoquot Area

The Kennedy Lake system received a very poor seeding of sockeye. Runs of creek sockeye to Megin and Cecilia Lakes were light. The light run of springs to the area was about average. The seeding of cohoe was above average and generally satisfactory throughout the area. The Kennedy River system, Tofino Inlet streams, and Moyeha River had particularly good escapements. The spawning of chums throughout the area

was generally light. However, fair seedings occurred in Bowden Bay Creek, Moyeha River, Atleo River, and Tranquil Creek. Sidney Inlet streams were very lightly stocked, but showed slight improvement over recent years.

Nootka Area

The escapement of creek sockeye to the streams frequented by small runs of this species was about average, and small numbers were seen on the spawning-grounds in the Gold, Burman, Owossitsa, Parks, and Zeballos Rivers. The spring-salmon escapement to Gold and Burman Rivers was below average. The cohoe escapement was generally light and below that of the parent year. This being an on-year for pinks, a few of this species were observed in streams throughout the sub-district in numbers comparable to the parent year. Stocks of chums were light and lower than levels of the cycle-year. An exception was the Mary Basin streams, where fairly substantial numbers were found on the spawning-grounds.

Kyuquot Area

Power Lake and River creek-sockeye seeding can only be classed as exceedingly light due to adverse water conditions on the spawning-grounds. The run to Jansen Lake and River was almost wiped out for the same reason. A lighter than brood-year run of spring salmon occurred and encountered low water-levels, which delayed their arrival on the spawning-grounds. A very heavy escapement of cohoe took place in all streams throughout the area. The seeding in Easy Inlet and Nasparti Inlet streams was particularly good, as was the case in Ououkinish and Tahsish Inlet rivers. This being an on-year for pinks, this species returned in good numbers to the sub-district. Increases over parent-year spawnings were noted in nearly all streams. Good runs were reported in Kaoowinch, Tahsish, and Malksope Rivers. The escapement of chums was considerably lighter than in the parent year. The usual late run in most cases did not materialize in any strength. Fairly good numbers were found in Chamiss River and in Kaouk River in Easy Inlet. Normal runs also occurred in the Nasparti, Malksope, and Chamiss Rivers. Stocks were light in the Tahsish Inlet, Cachalot Inlet, and Kàshutl Inlet areas. It was also estimated that up to 40 per cent of the chum spawn deposited was destroyed as a result of floods during November. Flood damage to Malksope and Chamiss Rivers was, however, considerably less than in the remainder of the area.

Quatsino Area

The creek sockeye-salmon escapement was light to fair and continued to follow the pattern of previous years. The run is of little commercial importance. Spring-salmon stocks were fairly light but comparable to those of the past few years. The cohoe escapement showed improvement over that experienced in 1955 and was on a par with that of the parent year. This was particularly apparent in the San Josef and Fisherman Rivers and in a number of smaller streams throughout the sub-district. This was a pink-salmon year for the sub-district. While the escapement was generally less in all streams than in the cycle-year, stocks in Koprino River, one of the main producers, almost equalled those of 1954. Supplies in the Cape Scott area were disappointingly light, as was the case in the Cape Cook area. Klaskish River, which had a moderate escapement in 1954, had practically no pinks on the spawning-grounds this year. The only major river which showed improvement over the parent year was Rupert River. While the over-all chum-salmon escapement was light, it was better than that of 1955 and compared favourably with the cycle-year, particularly so in Rupert, Marble, and Mahatta Rivers. Browning, Klaskish, San Josef, and Fisherman Rivers all showed some slight decrease from brood-year levels.

Fraser River-Prince George Area

Approximately 27,000 sockeye spawned in the Stuart Lake system. The early runs consisted of 25,150 fish, compared to 1952 stocks of 33,500. The late run, totalling 1,500, on the other hand, was an increase over the cycle-year. Supplies in Forfar, Kynock, and Gluskie Creeks were smaller than those of the cycle-year, while small increases were noted in Rosette Creek and Middle and Tachie Rivers. The runs commenced to arrive in Stuart Lake on July 17th, which date is comparable to the arrival date of July 18th in 1952. The early-run escapement to the Fraser-Francois system was approximately 1,610 fish, compared to 2,800 in the cycle-year. The late run to Stellako River was estimated at 38,200 sockeye, compared to 40,000 fish in 1952. Supplies of spring salmon at Tête Jaune were less than in the brood-year. The escapement to Stuart River was light and less than in the brood-year. Two hundred springs were present on the spawning-grounds in the residual Nechako River above Fort Fraser.

Quesnel-Chilko Area

The Chilko sockeye-spawning was heavy. Runs arrived on the spawning-ground in excellent condition, and in the Farwell Canyon area at the peak of migration there was no noticeable delay in the passage of fish. The Taseko Lake area was adequately seeded. In the Horsefly River on the Quesnel system there was a light showing of sockeye, about the same as that observed in 1952. A few were also observed in Mitchell River. Although stocks in the Upper Bowron were considerably below the brood-year levels, all spawning occurred on the best areas under ideal conditions. Supplies of spring salmon to the Chilcotin and Quesnel systems were about average. The usual small number of this species also appeared in Upper Swift River. The return to the Bowron also compared favourably with that of the parent year, and spawning conditions were better than in the past several years.

Fraser River

Kamloops Area.—In general the sockeye runs to the Kamloops sub-district were light and in only a few instances surpassed brood-year populations. The Adams and Little River run totalled about 10,000 fish, showing a decrease from the parent year. In Seymour River about 2,500 sockeye were found on the spawning-grounds. Supplies in Scotch Creek amounted to about 200. Stocks to Raft River were estimated at 9,000 to 10,000. Spring-salmon supplies in the Upper and Lower Shuswap Rivers totalled 6,500 fish. In the North Thompson system there was a good run to Finn Creek, almost double that of the parent year. In Raft River supplies were comparable to those of the cycle-year. The run to the South Thompson was light, with only 450 spring salmon present, compared with 2,700 in the parent year. Supplies to Eagle River totalled 800 and fell far short of the brood-year, when over 3,000 were present in this stream. Light to medium runs were also found in Salmon River, Little River, and Adams River. With the exception of Eagle River and Deadman Creek, the number of spawners in all streams barely approached or fell short of brood-year populations. Spawners in the Eagle River, estimated at 3,000, comprised the largest individual run to the area.

Lillooet Area.—A fairly large spawning of sockeye occurred in the Birkenhead River. Between 9,000 and 10,000 spawned in Gates Creek, an increase over the brood-year. Small numbers were observed in Seton Creek, Anderson Lake, and in Portage Creek. A few spring salmon were observed in Seton and Portage Creeks. The cohoe run to Birkenhead was light, estimated at 2,500, compared with 5,000 in the brood-year. Only the odd spring was observed in the Yalakom River.

Yale-Nicola (Formerly Yale-Merritt) Area.—The spring-salmon run to the Coldwater River and Spius Creek was fair but slightly less than runs of the past two years. The escapement to Nicola River was light. Nicola River received a moderate seeding of

cohoe, and moderate supplies were also noted in Coldwater River and Spius Creek. This was the off-year for pinks, and none of this species was observed in the streams in the area.

Chilliwack-Hope Area.—Approximately 13,000 sockeye entered Cultus Lake this year, compared with 18,200 in 1952. The escapement to Chilliwack River and Kawkawa Creek was very light. Stocks of spring salmon in the Chilliwack River were comparable to those of the parent year, when 600 were present. Fifteen thousand cohoe, comparing favourably in numbers with those present in 1953, spawned in the Chilliwack-Vedder system. The main spawning took place in the upper reaches of the Chilliwack River. In 1954, 2,500,000 pink eggs were planted in the control channel at Jones Creek. Despite several severe freshets and considerable silting during the winter of 1954–55, 2,800 pinks returned to the stream this year. Of these, approximately 2,500 spawned in the control channel while 300 utilized the spawning-grounds near the mouth of the stream. The chum escapement was very light, with the Chilliwack-Vedder system supporting about 8,000 fish, compared with 42,000 in 1952. In Sweltzer Creek only 700 were observed, compared to an estimated 20,000 in the parent year. The run to Coquihalla River totalled only fifty, compared to 1,000 in the brood-year. Stocks were also very light in Silver, Succer, Luckakuck, and Jones Creeks.

Mission-Harrison Area.—Supplies of sockeye generally were not up to the relatively good escapements of the brood-year. It is also estimated that there was a 25-per-cent loss of spawn due to flood conditions from the below-average run to Weaver Creek, which had been anticipated as a result of drought conditions in the parent year. Supplies to Harrison River and Big Silver Creek also showed decrease from previous cycles. Elsewhere throughout the district supplies were light. The early cohoe runs were very weak or non-existent. Late-run fish to the Chehalis totalled 2,000, compared with 10,000 in the parent year. The run to Weaver Creek was very light, totalling not more than 700 fish, compared with 3,000 in 1953. Supplies to Nicomen Slough and Hicks Creeks were also light, with escapements being only approximately half those of the brood-year. Stocks in the Hatzic watershed, Whonock Creek, and Suicide Creek were but a fraction of those of 1953. The early chum runs were practically non-existent. The late runs provided a satisfactory spawning in the Chehalis sloughs as well as a fair escapement to the Stave River. The seeding in Inches Creek was fair, while a moderate run occurred to Worths Creek. Supplies to all other streams in the area were very light. The early run of red springs to Chehalis River did not appear. There was, however, an unusually large number of this species in the Stave River in May and June. From the late run there was a good escapement to Big Silver River and fair supplies were observed in Spring Creek. The run of white springs to Harrison River was light, with less than 4,000 on the spawning-grounds, including approximately 800 jacks.

Lower Fraser Area.—The over-all escapement of sockeye to the Upper Pitt River system was approximately 32,000 fish. A comparatively good escapement of 1,500 to 2,000 spring salmon occurred in the Upper Pitt system. While good catches of cohoe were made in the early-fall commercial fishery in the Fraser River, the over-all escapement of this species to the Lower Mainland streams was very light. The exceptions were the Nicomekl, Serpentine, and Campbell Rivers. Stocks in the Nicomekl and its tributaries, Twigg and Anderson Creeks, totalled 1,500 to 2,000, comparing favourably with the parent year. This was also the case in the Serpentine River, where 1,000 to 1,500 spawners were present, and in the Campbell River, with an estimated 500 to 1,000 of this species on the spawning-grounds. All other streams in the area had light escapements. The escapement of chums to Lower Mainland streams was very poor, in some cases practically non-existent, and in general estimated to be only about 10 per cent of normal requirements. The South Allouette River, with about 300 on the spawning-grounds, had the best seeding in the area. Supplies to the North Allouette were very light, with 150 to 200 present, compared with over 2,000 in the parent year. This was also the

case with Coquitlam River, where 150 chums spawned, compared with 5,000 to 10,000 in 1952. Other streams in the sub-district had light or negligible stocks of this species on the spawning-grounds. A severe flash flood during the first week of December caused heavy damage to the chum spawning-grounds, and it is felt that this condition, together with the abnormally light runs, has created a serious situation in the area. This flood also affected the spawning of cohoe, but the damage to their spawning-grounds was not as great as in the case of the chum salmon.

Squamish Area

The spring-salmon run to the Squamish system was about the same as that of the parent year, when 15,000 were present on the spawning-grounds. Stocks of cohoe in the Squamish were about half those of 1953. Supplies of this species to the Cheakamus were light but slightly in excess of those recorded in the brood-year. The chum run to the area was very light, and only 10,000 were found in the Squamish River, compared with 175,000 in 1952. In the Cheakamus River 3,000 chums were present, compared with 15,000 in the brood-year, and in the Mamquam stocks were only about one-seventh those of 1952, when 10,000 spawned in this river. The runs of this species to Howe Sound and Gulf of Georgia streams were abnormally small and below parent-year levels.

North Vancouver Area

Supplies of cohoe to Seymour and Lynn Creeks and Indian River were moderate and comparable to those of 1953. The run to Capilano River showed a marked decline. The fish-trap facilities provided by the Greater Vancouver Water Board in this stream below Cleveland Dam were in operation, and during the season 1,840 cohoe were trapped and trucked to a point several miles above the dam, where they were released to migrate to their spawning-grounds. Of interest is the fact that 50 per cent of these fish were small. The chum escapement was far below brood-year levels, with 2,000 being found in Indian River, where well in excess of 20,000 spawned in 1952. There was also a marked decline in Seymour River, where 150 were present, compared with 1,000 to 2,000 in the parent year. A maximum of fifty of this species spawned in Capilano River, where numbers in the brood-year were comparable to those in Seymour Creek. There were two flash floods in the streams in the area during the late fall, but the resulting damage fortunately was slight.

STATISTICAL TABLES

LICENCES ISSUED BY THE DEPARTMENT OF FISHERIES FOR THE 1956 SEASON

Kind of Licence	Number of Licences	Revenue
Salmon-cannery	18	$3,600.00
Herring-cannery	1	100.00
Pilchard-cannery	----	----------
Herring reduction	13	1,300.00
Pilchard reduction	----	----------
Tierced salmon	6	600.00
Fish cold storage	14	1,400.00
Fish-processing	17	17.00
Shell-fish cannery	8	8.00
Tuna-fish cannery	1	1.00
Fish-offal reduction	9	9.00
Fish-liver reduction	4	4.00
Whale reduction	1	100.00
Pickled herring	----	----------
Herring dry-saltery	1	----------
Processing aquatic plants	----	----------
Harvesting aquatic plants	----	----------
Fish-buyers	494	12,350.00
Non-tidal fishing	190	193.00
Dog-fish reduction	1	1.00
General receipts	3	27.50
Total		$19,810.50

SUMMARY SHOWING NUMBERS OF SALMON CAUGHT IN 1956 BY AREA

(Rounded to nearest hundred.)

Area	Cohoe	Sockeye	Pinks	Chums	Red Spring	White Spring	Steel-head	Jacks	Total
C	83	[1]	[1]	----	5	1	----	[1]	89
1	2,331	28	1,638	182	163	25	1	1	4,369
2AE	683	[1]	1,252	251	51	7	----	1	2,245
2AW	97	6	840	762	42	7	[1]	[1]	1,754
2BE	509	----	306	223	19	9	[1]	[1]	1,066
2BW	10	----	[1]	69	4	[1]	----	[1]	83
3	1,142	2,548	10,052	3,613	165	29	34	51	17,634
4	1,205	1,491	4,164	514	252	39	56	9	7,730
5	1,021	706	5,713	266	115	17	4	9	7,851
6	1,173	436	17,322	1,141	30	16	3	11	20,132
7	1,392	143	9,531	2,123	120	16	2	14	13,341
8	1,665	1,086	10,334	2,402	84	18	39	29	15,657
9	355	10,723	942	111	31	11	21	9	12,203
10	122	4,423	253	137	36	3	10	4	4,988
11	47	58	3	26	1	[1]	[1]	[1]	135
12	4,772	1,237	8,001	3,455	269	72	9	28	17,843
13	1,019	329	1,201	1,911	226	217	2	28	4,933
14	920	[1]	3	75	70	8	[1]	32	1,108
15	195	[1]	1	45	112	21	[1]	10	384
16	382	34	1	168	116	32	[1]	11	744
17	472	4	[1]	114	251	7	[1]	36	384
18	27	11	[1]	109	4	1	1	[1]	153
19	12	8	----	1	1	[1]	----	2	24
20	1,270	2,504	6	15	32	7	1	152	3,987
21	1,981	587	6	33	83	16	2	42	2,750
22	10	15	----	1,184	[1]	[1]	[1]	----	1,209
23	350	92	2	2,574	2,846	268	5	9	6,146
24	676	277	15	535	752	41	[1]	2	2,298
25	1,195	3	72	883	798	82	[1]	3	3,036
26	1,626	3	231	391	297	15	[1]	1	2,564
27	679	1	1,611	487	101	10	[1]	[1]	2,889
28	29	2	----	77	13	7	[1]	2	130
29A and 29B	1,169	4,055	15	688	395	451	33	88	6,894
29C	12	160	[1]	17	12	8	[1]	5	214
29D	65	1,605	5	2	195	76	7	14	1,969
Totals	28,696	32,575	73,520	24,584	7,691	1,537	230	603	169,436

[1] Less than 50 pounds.

The above figures were taken from British Columbia Catch Statistics, 1956, Department of Fisheries of Canada (Pacific Area).

SUMMARY SHOWING TOTAL WEIGHT OF SALMON CAUGHT IN 1956 BY AREA

(In hundredweight.)

Area	Cohoe	Sockeye	Pinks	Chums	Red Spring	White Spring	Steel-head	Jacks	Total
C	451	[1]	[1]	.....	64	18	.....	[1]	533
1	15,853	157	6,627	1,901	2,744	496	10	4	27,792
2AE	5,159	1	4,671	2,411	680	111	.....	4	13,037
2AW	916	30	3,322	7,357	771	91	[1]	[1]	12,487
2BE	3,707	.....	1,157	2,030	280	34	[1]	[1]	7,208
2BW	71	.....	[1]	627	86	5	.....	[1]	789
3	8,900	15,448	37,969	42,773	2,999	577	303	248	109,217
4	8,704	8,796	17,518	6,434	4,360	899	619	43	47,373
5	7,112	4,113	22,493	3,226	1,419	248	34	43	38,688
6	10,302	2,453	71,366	12,468	372	178	26	50	97,215
7	11,106	650	34,917	21,976	1,625	286	16	64	70,640
8	15,881	5,279	40,366	31,832	1,513	383	368	106	95,728
9	3,272	77,053	4,013	1,527	500	218	183	41	86,807
10	1,055	31,524	1,177	1,591	319	43	87	17	35,813
11	451	392	11	279	9	2	2	1	1,147
12	40,476	7,379	31,971	38,949	3,293	1,262	85	132	123,547
13	9,226	2,078	4,378	21,276	1,900	2,597	18	111	41,584
14	4,674	3	9	830	531	92	1	115	6,255
15	1,471	3	1	510	757	215	1	34	2,992
16	1,870	184	2	1,831	813	328	[1]	37	5,065
17	2,186	24	2	1,231	1,663	79	[1]	131	5,316
18	261	70	[1]	1,169	42	16	12	[1]	1,570
19	97	52	.....	9	9	2	.....	7	176
20	9,392	16,017	25	176	457	104	11	478	26,660
21	16,560	3,894	29	343	896	235	17	155	22,129
22	126	54	.....	13,000	1	[1]	[1]	.....	13,181
23	15,480	503	8	25,859	28,361	3,865	36	37	74,149
24	4,643	1,513	58	5,618	9,020	602	1	7	21,462
25	7,879	18	258	8,843	12,397	1,155	1	14	30,565
26	9,392	16	820	3,953	4,694	238	1	6	19,120
27	4,960	6	6,085	4,679	1,537	143	[1]	1	17,411
28	291	10	.....	894	101	107	[1]	6	1,409
29A and 29B	9,733	26,021	79	8,438	5,982	10,270	386	438	61,347
29C	103	1,040	2	197	124	110	3	24	1,603
29D	408	10,193	28	33	2,867	1,596	69	68	15,262
Totals	232,168	214,974	289,362	274,270	93,186	26,605	2,290	2,422	1,135,277

[1] Less than 50 pounds.

The above figures were taken from British Columbia Catch Statistics, 1956, Department of Fisheries of Canada (Pacific Area).

PACK OF BRITISH COLUMBIA SALMON, 1956 SEASON

(Showing the Origin of Salmon Caught in Each District (48-pound Cases))

District	Sockeyes	Springs	Steelheads	Cohoes	Pinks	Chums	Total
Fraser River	88,132½	2,873½	337½	12,273½	348	9,989	113,954
Queen Charlotte Islands	1,323	1	.....	7,314½	18,809½	17,443½	44,891½
Nass River	22,505	536	217	8,165½	44,402½	35,588	111,414
Skeena River	14,663	371	312	8,265	25,633	6,283	55,527
Rivers Inlet	124,634½	419	55	6,601½	12,046½	2,926½	146,683
Smith Inlet	36,898	166	33½	2,249	1,664	1,642	42,652½
Vancouver Island and adjacent Mainland	13,970	5,941½	25½	118,938	55,052½	71,595½	265,523
Central	17,967	1,364½	273½	40,299	205,658	58,602½	324,164½
Alaska	.....	.....	.....	8,034½	.....	.....	8,034½
Totals	320,093	11,672½	1,254	212,140½	363,614	204,070	1,112,844

NOTE.—10,549 cases of bluebacks are included with cohoes, Vancouver Island; also included are 360½ cases of chums packed in oil.

STATEMENT SHOWING THE TOTAL SALMON-PACK OF BRITISH COLUMBIA BY SPECIES FROM 1948 TO 1956, INCLUSIVE

	1956	1955	1954	1953	1952	1951	1950	1949	1948
Sockeyes	320,093	244,821⅜	680,789	510,148	449,494½	428,299	408,026½	259,821	261,230½
Springs	11,672½	17,859½	14,357	13,048½	9,279	13,698	9,233½	21,184	16,445½
Chums	204,070	128,289	582,124½	394,867	96,005	462,101	507,611	230,556½	511,404
Pinks	363,614	831,255	337,062½	795,330	679,182	736,093	446,456½	709,987	321,721½
Cohoes	212,140½	186,191½	129,624	110,164½	67,438	313,674	123,629½	215,944	221,804
Steelheads	1,254	1,882	3,897½	3,030½	3,762	3,655½	3,227½	2,373	5,663½
Totals	1,112,844	1,410,298¾	1,747,854½	1,826,588½	1,305,160½	1,957,520½	1,498,184½	1,439,866	1,338,271

STATEMENT SHOWING THE TOTAL SALMON-PACK OF BRITISH COLUMBIA BY DISTRICTS FROM 1948 TO 1956, INCLUSIVE

	1956	1955	1954	1953	1952	1951	1950	1949	1948
Fraser River	113,954	294,238¾	563,807½	496,936½	151,147	268,233	139,721½	189,938	104,485
Skeena River	55,527	123,507	136,500	117,406	221,306½	130,681	97,889	129,027	193,435½
Rivers Inlet	146,683	71,164	71,023	148,885½	105,040	148,996	172,107½	70,210½	72,117
Smith Inlet	42,652½	34,570½	23,548½	35,870½	43,562½	58,022	52,750	19,083	14,675
Nass River	111,414	62,081½	69,358½	66,510½	57,775	152,742½	57,961	58,336½	38,538½
Vancouver Island and adjacent Mainland	265,523	581,599	349,586½	671,981½	245,437	585,240	347,996½	538,370½	317,572
Other districts	377,090½	239,147	529,972½	338,432	475,066	612,482	623,609	431,498½	567,314
Cold storage		3,991	4,058	566	5,826½	1,124	6,150	3,402	30,134
Grand totals	1,112,844	1,410,298¾	1,747,854½	1,826,588½	1,305,160½	1,957,520½	1,498,184½	1,439,866	1,338,271

TABLE SHOWING THE TOTAL SOCKEYE-PACK OF THE FRASER RIVER, ARRANGED IN ACCORDANCE WITH THE FOUR-YEAR CYCLE, 1895–1956

British Columbia	1895— 395,984	1896— 356,984	1897— 860,459	1898— 256,101
Washington	65,143	72,979	312,048	252,000
Total	461,127	429,963	1,172,507	508,101
British Columbia	1899— 480,485	1900— 229,800	1901— 928,669	1902— 293,477
Washington	499,646	228,704	1,105,096	339,556
Total	980,131	458,504	2,033,765	633,033
British Columbia	1903— 204,809	1904— 72,688	1905— 837,489	1906— 183,007
Washington	167,211	123,419	837,122	182,241
Total	372,020	196,107	1,674,611	365,248
British Columbia	1907— 59,815	1908— 74,574	1909— 585,435	1910— 150,432
Washington	96,974	170,951	1,097,904	248,014
Total	156,789	245,525	1,683,339	398,446
British Columbia	1911— 58,487	1912— 123,879	1913— 719,796	1914— 198,183
Washington	127,761	184,680	1,673,099	335,230
Total	186,248	308,559	2,392,895	533,413
British Columbia	1915— 91,130	1916— 32,146	1917— 148,164	1918— 19,697
Washington	64,584	84,637	411,538	50,723
Total	155,714	116,783	550,702	70,420
British Columbia	1919— 38,854	1920— 48,399	1921— 39,631	1922— 51,832
Washington	64,346	62,654	102,967	48,566
Total	103,200	111,053	142,598	100,398
British Columbia	1923— 31,655	1924— 39,743	1925— 35,385	1926— 85,689
Washington	47,402	69,369	112,023	44,673
Total	79,057	109,112	147,408	130,362
British Columbia	1927— 61,393	1928— 29,299	1929— 61,569	1930— 103,692
Washington	97,594	61,044	111,898	352,194
Total	158,987	90,343	173,467	455,886
British Columbia	1931— 40,947	1932— 65,769	1933— 52,465	1934— 139,238
Washington	87,211	81,188	128,518	352,579
Total	128,158	146,957	180,983	491,817
British Columbia	1935— 62,822	1936— 184,854	1937— 100,272	1938— 186,794
Washington	54,677	59,505	60,259	135,550
Total	117,499	244,359	160,531	322,344
British Columbia	1939— 54,296	1940— 99,009	1941— 171,290	1942— 446,371
Washington	43,512	63,890	110,605	263,458
Total	97,808	162,899	281,895	709,829
British Columbia	1943— 31,974	1944— 88,515	1945— 79,977	1946— 341,957
Washington	19,117	37,509	53,055	268,561
Total	51,091	126,024	133,032	610,518
British Columbia	1947— 33,952	1948— 64,823½	1949— 96,159	1950— 108,223
Washington	6,760	90,441	80,547	116,458
Total	40,712	155,264½	176,706	224,681
British Columbia	1951— 145,321	1952— 134,625	1953— 191,123	1954— 497,023
Washington	118,151	114,638	178,323	501,496
Total	263,472	249,263	369,446	998,519
British Columbia	1955— 103,678	1956— 88,132		
Washington	85,136	84,052		
Total	188,814	172,184		

STATEMENT SHOWING THE SALMON-PACK OF BRITISH COLUMBIA BY DISTRICTS AND SPECIES

FRASER RIVER, 1948 TO 1956, INCLUSIVE

	1956	1955	1954	1953	1952	1951	1950	1949	1948
Sockeyes	88,132½	103,678¼	497,023	191,123	134,625	145,231½	108,223	96,159½	64,823½
Springs	2,873½	6,843½	8,298	5,620	2,279	5,719	1,818½	9,889	2,955½
Chums	9,989	7,350½	45,444	26,921	8,480	35,530½	23,343½	6,763	20,209
Pinks	348	160,187½	17½	204,421½	60	66,673	72	66,626	31
Cohoes	12,273½	15,910	11,948	15,480	5,500½	14,848½	6,025½	10,286	16,102
Steelheads	337½	269	1,077	371	202½	230½	240	214½	364
Totals	113,954	294,238¾	563,807½	496,396½	151,147	268,233	139,721½	189,938	104,485

SKEENA RIVER, 1948 TO 1956, INCLUSIVE

	1956	1955	1954	1953	1952	1951	1950	1949	1948
Sockeyes	14,663	14,649	60,817	65,003	114,775	61,694½	47,479½	65,937	101,267½
Springs	371	1,430	1,260½	1,174½	2,082	2,055½	1,758½	2,507½	4,018½
Chums	6,283	5,471½	23,135½	15,114½	4,638	14,778	10,969	4,896	11,863
Pinks	25,633	86,788	39,324½	29,884	89,314	30,356½	26,256	33,069½	50,656
Cohoes	8,265	14,192	10,449	5,260	8,358	19,977½	9,781	21,333½	22,086½
Steelheads	312	976½	1,513½	970	2,139½	1,819	----------	2,507½	3,544
Totals	55,527	123,507	136,500	117,406	221,306½	130,681	97,889	129,027	193,435½

RIVERS INLET, 1948 TO 1956, INCLUSIVE

	1956	1955	1954	1953	1952	1951	1950	1949	1948
Sockeyes	124,634½	50,702½	50,639½	132,925½	84,297½	102,565½	142,710½	39,494½	37,665½
Springs	419	813	649	865½	865½	937½	619½	743	899½
Chums	2,926½	5,588	12,352½	5,627	3,711½	11,842½	10,014½	11,819	11,486½
Pinks	12,046½	8,658	2,581½	7,304½	12,469½	20,960	12,864	11,937	13,491
Cohoes	6,601½	5,316½	4,669½	1,979	3,415½	12,146	5,736	5,978	8,143
Steelheads	55	86	131	184	280½	274½	163	239	431½
Totals	146,683	71,164	71,023	148,855½	105,040	148,996	172,107½	70,210½	72,117

SMITH INLET, 1948 TO 1956, INCLUSIVE

	1956	1955	1954	1953	1952	1951	1950	1949	1948
Sockeyes	36,898	28,864	18,937	29,947	34,834	49,473	42,435	13,189	10,456½
Springs	166	326	177½	176	367	174½	71½	159	186½
Cohoes	2,249	1,014½	868	615	1,466	3,259	397	785	929½
Pinks	1,664	2,275½	523	1,017	6,496	2,482	5,308	2,533	1,481½
Chums	1,642	2,070	2,992	4,015	315½	2,530	4,499½	2,361	1,521½
Steelheads	33½	20½	51	100½	84	103½	39	56	99½
Totals	42,652½	34,570½	23,548½	35,870½	43,562½	58,022	52,750	19,083	14,675

NASS RIVER, 1948 TO 1956, INCLUSIVE

	1956	1955	1954	1953	1952	1951	1950	1949	1948
Sockeyes	22,505	13,654½	10,285	18,162½	29,429	24,405½	27,286½	9,268	13,181½
Springs	536	1,028	398½	527½	641	596½	798½	174½	416
Chums	35,588	8,904	15,965½	25,756½	13,112½	37,742	14,321	7,854	7,272½
Pinks	44,402½	29,040	36,448	16,635½	13,016	70,880	12,582	34,324	8,565
Cohoes	8,165½	9,356	6,024½	5,118	1,223	18,711	2,737	6,665	8,954½
Steelheads	217	99	237	310½	290½	407½	236	51	149
Totals	111,414	62,081½	69,358½	66,510½	57,775	152,742½	57,961	58,336½	38,538½

STATEMENT SHOWING THE SALMON-PACK OF BRITISH COLUMBIA BY DISTRICTS AND SPECIES—*Continued*

VANCOUVER ISLAND DISTRICT AND ADJACENT MAINLAND, 1948 TO 1956, INCLUSIVE

	1956	1955	1954	1953	1952	1951	1950	1949	1948
Sockeyes	13,970	13,192½	12,051	46,895½	24,252½	22,107	13,806	19,486½	9,981½
Springs	5,941½	5,534	1,649½	3,115½	1,687	3,133	3,343	6,361½	6,622
Chums	71,595½	40,105	248,098½	124,840	24,039	105,458	125,833	51,629	147,227½
Pinks	55,052½	421,355½	32,913	439,173½	171,812	303,102½	132,016	361,783½	43,574½
Cohoes[1]	118,938	101,349	54,783	57,773	23,583	151,325½	72,871	98,958½	109,939½
Steelheads	25½	63	91½	184	63½	114	127½	151½	227
Totals	265,523	581,599	349,586½	671,981½	245,437	585,240	347,996½	538,370½	317,572

[1] Since 1940, bluebacks have been included with the cohoe-pack for Vancouver Island.

QUEEN CHARLOTTE ISLANDS, 1948 TO 1956, INCLUSIVE

	1956	1955	1954	1953	1952	1951	1950	1949	1948
Sockeyes	1,323	433	107½	246	635	510	89	----------	20
Springs	1	16	6½	1½	96	----------	48	----------	145
Chums	17,443½	9,420	83,805½	17,304	1,712	61,696½	148,669	24,852½	71,287
Pinks	18,809½	548	105,123	811	178,959½	3,455	92,986	1,550	51,722
Cohoes	7,314½	11,666	11,289	2,437½	4,168	22,579	9,021	8,141½	4,145
Steelheads	----------	5	37½	6	19½	----------	15	----------	----------
Totals	44,891½	22,088	200,369	20,806	185,590	88,240½	250,828	34,544	127,319

CENTRAL AREA, 1948 TO 1956, INCLUSIVE

	1956	1955	1954	1953	1952	1951	1950	1949	1948
Sockeyes	17,967	19,648	30,858½	25,845½	26,583½	22,312	25,997	16,140½	23,246½
Springs	1,364½	1,864	1,645	1,568	1,261½	1,082	776	1,007	1,195½
Chums	58,602½	45,950	149,672	175,289	36,605	190,843½	164,884	116,292½	225,686
Pinks	205,658	122,371½	118,538½	92,517	207,055	237,559	163,301	173,456	152,200½
Cohoes	40,299	24,846	26,511	21,502	17,289	61,423½	17,061	44,169	36,816
Steelheads	273½	318½	595½	904½	682	706½	762	355	850½
Totals	324,164½	214,998	327,820½	317,626	289,476	513,926½	372,781	351,420	439,995

STATEMENT SHOWING THE QUANTITY OF PILCHARD PRODUCTS PRODUCED IN BRITISH COLUMBIA, 1930 TO 1956

Season	Canned	Meal	Oil
	Cases	Tons	Gal.
1930–31	55,166	13,934	3,204,058
1931–32	17,336	14,200	2,551,914
1932–33	4,622	8,842	1,315,864
1933–34	2,946	1,108	275,879
1934–35	35,437	7,628	1,635,123
1935–36	27,184	8,666	1,634,592
1936–37	35,007	8,715	1,217,087
1937–38	40,975	8,483	1,707,276
1938–39	69,473	8,891	2,195,850
1939–40	7,300	906	178,305
1940–41	59,166	4,853	890,296
1941–42	72,498	11,437	1,916,191
1942–43	42,008	11,003	1,560,269
1943–44	94,512	15,209	2,238,987
1944–45	78,772	8,435	1,675,090
1945–46	79,536	5,812	1,273,329
1946–47	4,359	699	81,831
1947–48	2,656	67	12,833
1948–49	.....	.....	.....
1949–50	.....	.....	.....
1950–51	.....	.....	.....
1951–52	.....	.....	.....
1952–53	.....	.....	.....
1953–54	.....	.....	.....
1954–55	.....	.....	.....
1955–56	.....	.....	.....
1956–57	.....	.....	.....

STATEMENT SHOWING THE QUANTITY OF HERRING PRODUCTS PRODUCED IN BRITISH COLUMBIA, 1935 TO 1956

Season	Canned	Dry-salted	Pickled	Meal	Oil
	Cases	Tons	Tons	Tons	Gal.
1935–36	26,143	14,983	.....	5,313	328,639
1936–37	20,914	16,454	.....	10,340	786,742
1937–38	27,365	10,230	.....	14,643	1,333,245
1938–39	23,353	7,600	.....	18,028	1,526,117
1939–40	418,021	7,596	.....	22,870	1,677,736
1940–41	640,252	5,039	892	10,886	923,137
1941–42	1,527,350	.....	779	8,780	594,684
1942–43	1,253,978	.....	502	4,633	323,379
1943–44	1,198,632	.....	591	7,662	512,516
1944–45	1,190,762	.....	26	9,539	717,655
1945–46	1,307,514	302	100	5,525	521,649
1946–47	1,634,286	5,807	129½	7,223	484,937
1947–48	1,283,670	3,084[1]	1	18,948	1,526,826
1948–49	92,719	412	.....	31,340	2,614,925
1949–50	77,913	3,858	.....	30,081	3,823,464
1950–51	56,798	4,418	.....	31,913	3,385,685
1951–52	103,928	4,331	.....	32,777	3,832,301
1952–53	5,132	5,871	.....	218	7,203
1953–54	66,231	3,910	.....	31,740	3,516,106
1954–55	.....	2,397	.....	28,782	3,714,924
1955–56	25,508	249	.....	47,097	4,475,536
1956–57	11,728	290	.....	32,772	3,602,937

[1] Previously reported as 2,988 tons.

The above figures are for the season October to March 31st, annually.

STATEMENT SHOWING THE QUANTITY OF MEAL, OIL, VITAMIN A, AND FERTILIZER PRODUCED FROM SOURCES OTHER THAN HERRING AND PILCHARD, 1947 TO 1956.

Season	From Whales			From Fish-livers	From Other Sources	
	Whalebone and Meal	Fertilizer	Oil	Oil	Meal and Fertilizer	Oil
	Tons	Tons	Gal.	Units[1]	Tons	Gal.
1947–48	-------	-----	----------	11,109,063	3,929	519,802
1948–49	119	324	186,424	10,121,374	1,172	141,098
1949–50	921	21	312,055	12,079,015	1,635	175,202
1950–51	1,098	.....	393,176	3,578,905	1,717	166,898
1951–52	1,981	.....	680,129	5,250,441	3,593	250,777
1952–53	2,349	.....	668,408	5,409,264	2,011	192,315
1953–54	1,786	.....	5,707,968	5,339,768	2,059	243,819
1954–55	2,502	.....	872,060	4,310,057	2,361	265,405
1955–56	3,411	.....	759,785	4,760,668	1,993	201,690
1956–57	2,182	.....	526,584	2,355,410	1,925	187,787

[1] Million U.S.P. units Vitamin A.

CATCH OF FISH TAKEN FROM NON-TIDAL WATERS, 1956–57 SEASON

Lakes and Rivers	Kind of Licence			Trout		Kokanee		Lake-trout		Whitefish		Carp		Ling		Squawfish		Suckers		Other Fish		Number of Fish Taken	Approximate Weight (Lb.)
	Fur-farm	Ordinary	Sturgeon	No.	Lb.	No.	Lb.	No.	Lb.	No.	Lb.	No.	Lb.	No.	Lb.	No.	Lb.	No.	Lb.	No.	Lb.		
Atlin Lake	---	2	---							119	135											119	135
Arrow Lake	1	---	---													350	500	200	350			550	850
Bednesti Lake	1	---	---											100	400	800	400	600	1,400			1,500	2,200
Cameron Lake	---	2	---					18	180	1,370	4,817											1,388	4,997
Christina Lake	---	11	---																			*Nil*	*Nil*
Cluculz Lake	1	---	---											120	480	1,000	500	950	2,300			2,070	3,280
Cobb Lake	1	---	---											110	440	950	450	750	1,800			1,810	2,690
Duck Lake	---	1	---									3,475	14,000									3,475	14,000
Eaglet Lake	1	---	---			725	178							40	82	48	59	5	10			818	329
Francois Lake	---	3	---					37	298	8	34			9	34			17	52			71	418
Fraser River	1	---	1											4	12	14	29	98	201			116	242
Inzana Lake	---	2	---																				
Klua Lake	---	4	---							402	2,200									6	40	408	2,240
Moberly Lake	---	8	---					141	1,465	2,605	6,860							5	10	25	90	2,776	8,425
Naltesby Lake	1	---	---																				*Nil*
Nation Lake	---	1	---																				
Nechako River	---	---	2																	8	583[2]	8	583
Okanagan Lake	---	144	---			7,501	6,293											20	40			7,521	6,333
Pinchi Lake	---	1	---																				
Premier Lake	---	1	---																				*Nil*
Swan Lake	---	2	---																	3	32	3	32
Tchesinkut Lake	---	2	---					30	240							50	75	600	1,550			680	1,865
Tezzeron Lake	---	2	---																				
Woods Lake	---	1	---									3,475	14,000									3,475	14,000
Whitefish Lake	---	1	---																				
Totals	---	---	---			8,226	6,471	226	2,183	4,504	14,046	6,950	28,000	383	1,448	3,212	2,013	3,245	7,713	42	745	26,788	62,619

Licences Issued during the 1956–57 Season

Fur-farm	5
Ordinary	183
Sturgeon	2
Total	190

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