

INTERNATIONAL PACIFIC SALMON  
FISHERIES COMMISSION

APPOINTED UNDER A CONVENTION  
BETWEEN CANADA AND THE UNITED STATES FOR THE  
PROTECTION, PRESERVATION AND EXTENSION OF  
THE SOCKEYE AND PINK SALMON FISHERIES IN  
THE FRASER RIVER SYSTEM

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ANNUAL REPORT  
1961

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COMMISSIONERS

SENATOR THOMAS REID

DeWITT GILBERT

A. J. WHITMORE

CLARENCE F. PAUTZKE

W. R. HOURSTON

GEORGE C. STARLUND

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NEW WESTMINSTER  
CANADA  
1962

INTERNATIONAL PACIFIC SALMON  
FISHERIES COMMISSION

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MEMBERS  
AND PERIOD OF SERVICE  
SINCE THE INCEPTION OF THE COMMISSION  
IN 1937

| CANADA                                     | UNITED STATES                                    |
|--|--|
| William A. Found . . . . . 1937-1939       | Edward W. Allen . . . . . 1937-1951<br>1957-1957 |
| A. L. Hager . . . . . 1937-1948            | B. M. Brennan . . . . . 1937-1942                |
| Senator Thomas Reid . . . . . 1937-        | Charles E. Jackson . . . . . 1937-1946           |
| A. J. Whitmore . . . . . 1939-             | Fred J. Foster . . . . . 1943-1947               |
| Olof Hanson . . . . . 1948-1952            | Milo Moore . . . . . 1946-1949<br>1957-1961      |
| H. R. MacMillan, C.B.E., D.Sc. . 1952-1956 | Albert M. Day . . . . . 1947-1954                |
| F. D. Mathers . . . . . 1956-1960          | Alvin Anderson . . . . . 1949-1950               |
| W. R. Hourston . . . . . 1960-             | Robert J. Schoettler . . . . . 1951-1957         |
|  | Elton B. Jones . . . . . 1951-1957               |
|  | Arnie J. Suomela . . . . . 1954-1961             |
|  | DeWitt Gilbert . . . . . 1957-                   |
|  | Clarence F. Pautzke . . . . . 1961-              |
|  | George C. Starlund . . . . . 1961-               |

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DIRECTOR OF INVESTIGATIONS

LOYD A. ROYAL

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NEW WESTMINSTER

CANADA

1962



FIGURE 1—Newly completed Sweltzer Creek Field Station located near Cultus Lake. The laboratory will provide facilities for research on the tolerance limits of sockeye and pink salmon to possible environmental changes due to natural fluctuations, potential flood control, power development and pollution.

## REPORT OF THE INTERNATIONAL PACIFIC SALMON FISHERIES COMMISSION FOR THE YEAR 1961

The sockeye run to the Fraser River in 1961 was a disappointment to both the fishing industry and the Commission. While the total pack was the third highest for the cycle year since 1917, the basic potential of the run was much greater than that which occurred. The known productivity in fresh water, if followed by average survival in the sea, could have resulted in a run of several million more fish than actually returned. Since record cyclical runs occurred in 1958, 1959 and 1960, a good run in 1961 would have restored quadrennial production close to those levels existing before the Hell's Gate slide in 1913.

The failure of the 1961 sockeye run to approach normally expected numbers raises an important question as to whether this failure was due to errors in management of the fishery or to unusual natural conditions beyond control. Fortunately, the Commission has available a large amount of information on Fraser River sockeye and critical analysis of these data has made it possible, by the process of elimination, to fix the approximate period in the fish's life history when adverse influences had their effect on the 1961 run.

In 1957, the brood year, a total of 1,341,000 sockeye—four years old or older—was recorded on the spawning grounds of the Fraser River. The spawning population in 1957 was the largest of the cycle year since at least 1917 and possibly since 1913. Moreover, the 1957 escapement was probably the most effective in this cycle since 1913 because the escapement in 1917, whatever size it may have been, was severely impaired by the obstruction at Hell's Gate.

Field observations in the spring of 1958 on the Chilko and Horsefly Rivers indicated that egg to fry survival of the 1957 brood was normal for these two major spawning areas.

In 1959, a combination of either complete counts or a carefully calibrated index established the number of seaward migrants from three areas supporting 85 per cent of the 1957 spawning escapement. The Stuart Lake area produced an estimated 64,000,000 seaward migrants; Quesnel—32,000,000 and Chilko—10,000,000. On the basis of the data obtained from these three areas, it was estimated that 125,000,000 downstream migrants were produced from the 1957 brood spawning. The size and condition of the migrants was excellent in all areas observed.

In spite of the favorable production in fresh water the returning adult sockeye run in 1961, including the catch in non-Convention waters, was only 4,699,000 fish. Yet, on the basis of the number and condition of the seaward migrants in the spring of 1959 an excellent adult run should have returned in 1961. A marine survival rate similar to that which produced the 1958 Adams run would have returned 26,000,000 sockeye in 1961. Since the seaward migrants producing the 1961 run were larger than those which produced the 1958 run even higher marine survival rates were possible. If the more average marine conditions which produced the 1959 adult run had prevailed, a run of 20,000,000 adults would have returned in 1961. It is an obvious conclusion that the man-

agement of the fishery in 1957 was not in any way at fault. The cyclical escapement was the best since 1917, fry production was normal, the condition of the seaward migrants was excellent and the number of migrants was sufficient to return a sockeye run considerably larger than that of any year since 1913—ever larger than the record-breaking Adams River run in 1958.

The anomalies in the runs of Fraser River sockeye and pink salmon, apparently related to unusual fluctuations in marine environment, have occurred with alarming frequency during the past ten years. These anomalies were discussed in the 1959 Annual Report and have been individually referenced for several years. While similar anomalies occurred prior to 1950, it appears that they occurred with far less frequency although the data for prior years is meagre and confused by other factors such as the Hell's Gate obstruction.

The effect of variations in the environment of the *high seas* on salmon survival is not known, but all information available to date on several species of salmon suggests that the effect is moderate and the survival rate in this marine area is fairly consistent. The extreme fluctuations in the marine survival of salmon apparently occur during the estuarial transfer of the young salmon from their river of birth to their oceanic pastures, regardless of their age or size. Survival of Fraser River pink salmon fry has been inversely related, within practical limits of variation, to the mean temperature of Georgia Strait for the period of a few months following the entrance of these fry into this estuarial area. In the case of Fraser River sockeye, the approximate adult survival of the seaward migrants has been related for some nine years to the flow of the Fraser River at its mouth *at the time* the migrants enter Georgia Strait. Growth during the first few months of marine existence likewise has an apparent value in the prediction of adult survival. Both of the above relationships were used in forecasting a relatively poor run of four to seven million sockeye for 1961 in spite of the sizeable potential indicated by the number of downstream migrants.

The forecasting of salmon survival on the basis of past relationships incorporates a serious weakness as long as the functioning of the factors used is not thoroughly understood. Even though a relationship is established which has a high statistical significance, it can still be a fortuitous one or be subject to an occasional important influence from the intervention of another factor.

An example of possible error in predicting runs of Fraser River sockeye is evident in the 1961 season. While the general relationship of the survival of all seaward migrants to the flow of the Fraser River was established within practical limits, individual racial survival varied from rather high rates at the beginning of the season to extreme lows toward the end of the season. The average survival rate of all races conformed to the relationship but the survival rates of individual races did not always show a similar conformity.

The acquisition of biological knowledge is a slow and methodical process, so the obtaining of an understanding of the factors affecting survival of salmon during any period in the sea may possibly be a long term and difficult project. In the meantime it is apparent that the prediction of Fraser River sockeye and pink salmon runs on the basis of the number of adult spawners, fry hatched, or downstream migrants, or all three combined, can be subject to serious errors.

It is not yet possible to define all the factors affecting Fraser River sockeye and pink salmon survival or to understand the functioning of these factors. Neither can it be concluded that the factors apparently influencing survival of Fraser River stocks are operative in the same manner in other producing areas.

Nevertheless, variable estuarial factors have been closely related to marine survival of Fraser River sockeye and pink salmon during a period of several years when extreme fluctuations in the survival rates have occurred, so it is reasonable to assume that these relationships should continue to provide a means of forecasting runs within practical limits. However, each method of predicting survival will be viewed with some suspicion until the functioning of the factor used in formulating the method is fully understood. As long as the method, or methods, work they will be used. As long as fresh water production is satisfactory the isolation of the marine environment, principally that in the inshore area as an apparent cause of highly variable mortality, justifies the management principles used regardless of whether the returning run is large or small. A return to more stable meteorological conditions would certainly tend to stabilize the production of Fraser River sockeye and pink salmon.

### COMMISSION MEETINGS

The International Pacific Salmon Fisheries Commission held eleven formal meetings during 1961; the approved minutes for these meetings being forwarded to the Governments of the United States and Canada. The first meeting of the year was held on January 19 and 20 with the meeting on January 20 including the Commission's Advisory Committee composed of the following members:

| <i>Canada</i>                           | <i>United States</i>                  |
|---|---------------------------------------|
| H. Stavenes<br>Purse Seine Crew Members | John Brown<br>Reef Net Fishermen      |
| Richard Nelson<br>Salmon Processors     | John Plancich<br>Salmon Processors    |
| M. W. Black<br>Sport Fishermen          | Howard Gray<br>Sport Fishermen        |
| Peter Jenewein<br>Gill Net Fishermen    | Joe Erisman<br>Gill Net Fishermen     |
| Charles Clarke<br>Purse Seine Fishermen | N. Mladinich<br>Purse Seine Fishermen |
| R. H. Stanton<br>Troll Fishermen        | Bert G. Johnston<br>Troll Fishermen   |

The tentative recommendations for regulatory control of sockeye and pink salmon fishing in Convention waters for the year 1961, as submitted to the Advisory Committee on December 16, 1960, were discussed with the Committee and revisions were made as a result of the discussions. The recommendations for regulations governing the 1961 sockeye and pink salmon fishery in Convention waters were approved and were submitted for approval of the Government of Canada on February 8, 1961 and the Government of the United States on February 9, 1961. In a regular executive session the Commission approved a detailed study of sockeye production in the Birkenhead River with emphasis on the desirability of instituting an operation designed to increase the sockeye fishery supported by this river system.

On March 30, 1961 the Commission inspected potential sites for the Sweltzer Creek Field Station and, after convening for regular business, approved the estimates for the Commission budget covering the fiscal year 1962-1963. Technical problems related to the restricted migration of Early Stuart sockeye through the Fraser Canyon were considered and remedial action in removing one high water obstruction was authorized.

An executive meeting of the Commission was held on June 28, 1961 to expedite progress on several functional items and to consider current proposals for hydroelectric power development in the region. Mr. Clarence F. Pautzke attended the meeting as a new United States Commissioner replacing Mr. Arnie J. Suomela. Mr. George C. Starlund, newly appointed Director of Fisheries for the State of Washington attended as an official observer in place of Mr. Milo Moore.

A meeting of the Commission was necessary on July 31 to consider regulatory adjustments required to obtain adequate spawning escapement from the current runs of sockeye. Recommendations for adjustment of existing regulatory control in Convention waters and a supplemental budget estimate of \$220,000 for the removal or overcoming of high water obstructions to sockeye migration in the Fraser Canyon were authorized.

A fifth meeting of the Commission was held on August 8, 1961 to execute the regulatory changes required for obtaining adequate escapement of sockeye to the Quesnel and Stuart Lake spawning areas.

The Commission met with its Advisory Committee on August 18 to discuss the development of regulatory problems during the current fishing season and the need for adjustment in existing regulations to protect the small run of Fraser River pink salmon. Suggestions for changes in the existing regulations were discussed and the required recommendations for modification were adopted. Mr. J. C. Murray attended his first meeting as representative of the Canadian Sport Fishermen replacing Mr. M. W. Black.

On August 25, 1961 the Commission reviewed the status of the Fraser River pink salmon run and approved a recommendation closing commercial fishing in all Convention waters, except the Fraser River, for a period of one week to obtain the required increase in the spawning escapement.

An emergency meeting of the Commission was held on September 1, 1961 to review conditions for obtaining an escapement of pink salmon and recommendations for additional closures of the commercial fishery were approved.

The ninth meeting of the Commission was held with its Advisory Committee on September 14, 1961 to review the 1961 sockeye fishery and consider the possible need for additional restrictions on the pink salmon fishery in Convention waters.

The Commission met in executive session on November 27, 1961 to review the results of the fishery management program in Convention waters for 1961 and to examine in detail the advice of the Director to the effect that the 1962 run of Fraser River sockeye would be far below normal expectations. Mr. George Starlund attended the meeting for the first time as an officially appointed United States Commissioner replacing Mr. Milo Moore.

The eleventh and final meeting of the year consisted of informal discussion on the afternoon of December 17, 1961, an executive business session on December 18 and an open meeting with the Advisory Committee on December 19. The purpose of the open meeting was to provide the Advisory Committee and the several hundred interested people in attendance with a review of the 1961 fishing season, details on adverse factors apparently controlling the size of the 1962 Fraser River sockeye run and the regulatory requirements tentatively considered necessary for the proper management of the fishery.

## 1961 REGULATIONS

Recommendations for regulations governing the 1961 sockeye and pink salmon fishery in Canadian Convention waters were adopted at a meeting of the Commission held on January 20, 1961 and submitted for approval and implementation to the Government of Canada on February 8, 1961. Recommendations for regulations governing the 1961 sockeye and pink salmon fishery in United States Convention waters were adopted at a meeting of the Commission held on January 20, 1961 and submitted to the Government of the United States for approval and to the State of Washington for activation on February 9, 1961. The recommendations for Canadian Convention waters were implemented by the Government of Canada in an Order-in-Council dated March 30, 1961 and for United States Convention waters by an order of the Director of the Washington State Department of Fisheries on April 28, 1961.

The recommendations of the Commission were as follows:

**Canadian Convention Waters**

"The International Pacific Salmon Fisheries Commission appointed pursuant to the Convention between Canada and the United States of America for the protection, preservation and extension of the Sockeye Salmon Fisheries in the Fraser River System, signed at Washington on the 26th day of May, 1930, as amended by the Pink Salmon Protocol signed at Ottawa on the 28th day of December, 1956, hereby recommends that regulations to the following effect, in the interests of such fisheries, be adopted by Order-in-Council as amendments to the Special Fishery Regulations for British Columbia, for the season of 1961 under the authority of the Fisheries Act, namely:

1. (1) No person shall fish for sockeye or pink salmon in the waters of the southerly portion of District No. 3 embraced in Area 20 and that portion of Area 19 lying westerly of a straight line drawn across Juan de Fuca Strait joining William Head and Angeles Point through Race Rocks commencing at point of intersection with the international boundary line with purse seines:
  - (a) From the 24th day of June, 1961, to six o'clock in the forenoon of the 17th day of July, 1961, both dates inclusive;
  - (b) From the 17th day of July, 1961, to the 19th day of August, 1961, both dates inclusive, except from six o'clock in the forenoon to six o'clock in the afternoon of Monday and Tuesday in each week;
  - (c) From the 20th day of August, 1961, to the 2nd day of September, 1961, both dates inclusive, except from six o'clock in the forenoon to six o'clock in the afternoon of Monday in each week; and
  - (d) From the 3rd day of September, 1961, to six o'clock (P.S.T.) in the afternoon of the 24th day of September, 1961, both dates inclusive, except from six o'clock in the forenoon to six o'clock in the afternoon of Monday and Tuesday in each week.
- (2) No person shall fish for sockeye or pink salmon in the waters described in subsection (1) of this section with gill nets:
  - (a) From the 24th day of June, 1961, to six o'clock in the afternoon of the 17th day of July, 1961, both dates inclusive;

- (b) From the 17th day of July, 1961, to the 19th day of August, 1961, both dates inclusive, except from
  - (i) six o'clock in the afternoon of Monday to six o'clock in the forenoon of Tuesday; and
  - (ii) six o'clock in the afternoon of Tuesday to six o'clock in the forenoon of Wednesday in each week;
- (c) From the 20th day of August, 1961, to the 2nd day of September, 1961, both dates inclusive, except from six o'clock in the afternoon of Monday to six o'clock in the forenoon of Tuesday of each week; and
- (d) From the 3rd day of September, 1961, to six o'clock (P.S.T.) in the afternoon of the 24th day of September, 1961, both dates inclusive, except from
  - (i) six o'clock in the afternoon of Monday to six o'clock in the forenoon of Tuesday; and
  - (ii) six o'clock in the afternoon of Tuesday to six o'clock in the forenoon of Wednesday in each week.

(3) No person shall fish for sockeye or pink salmon in the waters described in subsection (1) of this section with commercial trolling gear from the 16th day of July, 1961, to six o'clock (P.S.T.) in the afternoon of the 24th day of September, 1961, both dates inclusive, except from one minute after twelve o'clock in the forenoon of Monday to one minute after twelve o'clock in the forenoon of the following Saturday in each week.

2. No person shall fish for sockeye or pink salmon in the waters of the said southern portion of District No. 3 embraced in Areas 17 and 18 and that portion of Area 19 lying easterly of a straight line drawn across Juan de Fuca Strait joining William Head and Angeles Point through Race Rocks commencing at point of intersection of the international boundary line and in the waters of District No. 1 by means of nets from the 25th day of June, 1961, to the 2nd day of September, 1961, both dates inclusive except from eight o'clock in the forenoon of Monday to eight o'clock in the forenoon of Wednesday in each week.

3. No person shall fish for sockeye or pink salmon in the waters of the said southern portion of District No. 3 embraced in Areas 17 and 18 and that portion of Area 19 lying easterly of a straight line drawn across Juan de Fuca Strait joining William Head and Angeles Point through Race Rocks commencing at point of intersection of the international boundary line by means of nets from the 3rd day of September, 1961, to the 8th day of October, 1961, both dates inclusive.

4. No person shall fish for sockeye or pink salmon in the waters of District No. 1:

- (a) by means of nets from the 3rd day of September, 1961, to the 9th day of September, 1961, both dates inclusive;
- (b) by means of nets from the 10th day of September, 1961, to the 16th day of September, 1961, both dates inclusive except from eight o'clock in the forenoon of Monday to eight o'clock in the forenoon of Tuesday;

- (c) by means of nets from the 17th day of September, 1961, to the 23rd day of September, 1961, both dates inclusive, except from eight o'clock in the forenoon of Tuesday to eight o'clock in the forenoon of Wednesday; and
- (d) by means of nets from the 24th day of September, 1961, to the 8th day of October, 1961, both dates inclusive except from eight o'clock (P.S.T.) in the forenoon of Monday to eight o'clock (P.S.T.) in the forenoon of Tuesday of each week.

5. Section 4 above does not apply to sockeye or pink salmon taken in gill nets having mesh of not less than 9 inches extension measure for linen nets and 9½ inches extension measure for nylon nets from the 3rd day of September, 1961, to the 30th day of September, 1961, both dates inclusive, where operation of gill nets having a mesh greater in size than the minimum measurement prescribed herein has been authorized for the taking of spring salmon by the Area Director of Fisheries for British Columbia pursuant to the provisions of the British Columbia Fishery Regulations.

All times hereinbefore mentioned shall be Pacific Daylight Saving Time except where otherwise specified."

#### **United States Convention Waters**

"The International Pacific Salmon Fisheries Commission appointed pursuant to the Convention between Canada and the United States of America for the protection, preservation and extension of the Sockeye Salmon Fisheries in the Fraser River System, signed at Washington on the 26th day of May, 1930, as amended by the Pink Salmon Protocol signed at Ottawa on the 28th day of December, 1956, hereby recommends to the Director of Fisheries of the State of Washington, that regulations to the following effect in the interests of such fisheries, be adopted by him for the year 1961 by virtue of authority in him vested by Section 6 of Chapter 112 of the Laws of the State of Washington of 1949, namely:

1. (1) No person shall fish for sockeye or pink salmon in the Convention waters of the United States lying easterly of a straight line drawn from the lighthouse on Tatoosh Island in the State of Washington to Bonilla Point in the Province of British Columbia and westerly of a straight line drawn from Angeles Point in the State of Washington across Race Rocks to William Head in the Province of British Columbia with purse seines:

- (a) From the 24th day of June, 1961, to four o'clock in the forenoon of the 17th day of July, 1961, both dates inclusive;
- (b) From the 17th day of July, 1961, to the 12th day of August, 1961, both dates inclusive, except from four o'clock in the forenoon to eight o'clock in the afternoon of Monday, Tuesday and Wednesday of each week;
- (c) From the 13th day of August, 1961, to the 2nd day of September, 1961, both dates inclusive, except from four o'clock in the forenoon to eight o'clock in the afternoon of Monday and Tuesday of each week; and
- (d) From the 3rd day of September, 1961, to six o'clock in the afternoon of the 24th day of September, 1961, both dates inclusive, except from four o'clock in the forenoon to eight o'clock in the afternoon of Monday, Tuesday and Wednesday of each week.

(2) No person shall fish for sockeye or pink salmon in the waters described in subsection (1) of this section with gill nets:

- (a) From the 24th day of June, 1961, to six o'clock in the afternoon of the 16th day of July, 1961, both dates inclusive;
- (b) From the 16th day of July, 1961, to the 5th day of August, 1961, both dates inclusive, except from
  - (i) six o'clock in the afternoon of Sunday to eight o'clock in the forenoon of Monday;
  - (ii) six o'clock in the afternoon of Monday to eight o'clock in the forenoon of Tuesday; and
  - (iii) six o'clock in the afternoon of Tuesday to eight o'clock in the forenoon of Wednesday of each week.
- (c) From the 6th day of August, 1961, to the 12th day of August, 1961, both dates inclusive, except from
  - (i) six o'clock in the afternoon of Monday to eight o'clock in the forenoon of Tuesday;
  - (ii) six o'clock in the afternoon of Tuesday to eight o'clock in the forenoon of Wednesday; and
  - (iii) six o'clock in the afternoon of Wednesday to eight o'clock in the forenoon of Thursday.
- (d) From the 13th day of August, 1961, to the 2nd day of September, 1961, both dates inclusive, except from
  - (i) six o'clock in the afternoon of Monday to eight o'clock in the forenoon of Tuesday; and
  - (ii) six o'clock in the afternoon of Tuesday to eight o'clock in the forenoon of Wednesday of each week.
- (e) From the 3rd day of September, 1961, to six o'clock in the afternoon of the 24th day of September, 1961, both dates inclusive, except from
  - (i) six o'clock in the afternoon of Monday to eight o'clock in the forenoon of Tuesday;
  - (ii) six o'clock in the afternoon of Tuesday to eight o'clock in the forenoon of Wednesday; and
  - (iii) six o'clock in the afternoon of Wednesday to eight o'clock in the forenoon of Thursday of each week.

(3) No person shall fish for sockeye or pink salmon in the waters described in subsection (1) of this section with commercial trolling gear from the 16th day of July, 1961, to the 24th day of September, 1961, both dates inclusive, except from midnight Sunday to midnight Friday of each week.

2. (1) No person shall fish for sockeye or pink salmon in the Convention waters of the United States of America lying easterly of a straight line drawn from Angeles Point in the State of Washington across Race Rocks to William Head in the Province of British Columbia with purse seines or reef nets:

- (a) From the 24th day of June, 1961, to the 12th day of August, 1961, both dates inclusive, except from four o'clock in the forenoon to eight o'clock in the afternoon of Monday, Tuesday and Wednesday of each week; and
  - (b) From the 13th day of August, 1961, to the 2nd day of September, 1961, both dates inclusive, except from four o'clock in the forenoon to eight o'clock in the afternoon of Monday and Tuesday of each week;
  - (c) From the 3rd day of September, 1961, to six o'clock in the afternoon of the 1st day of October, 1961, both dates inclusive except from four o'clock in the forenoon to eight o'clock in the afternoon of Monday, Tuesday and Wednesday of each week.
- (2) No person shall fish for sockeye or pink salmon in the waters described in subsection (1) of this section with gill nets:
- (a) From the 24th day of June, 1961, to the 5th day of August, 1961, both dates inclusive, except from
    - (i) six o'clock in the afternoon of Sunday to eight o'clock in the forenoon of Monday;
    - (ii) six o'clock in the afternoon of Monday to eight o'clock in the forenoon of Tuesday; and
    - (iii) six o'clock in the afternoon of Tuesday to eight o'clock in the forenoon of Wednesday of each week.
  - (b) From the 6th day of August, 1961, to the 12th day of August, 1961, both dates inclusive, except from
    - (i) six o'clock in the afternoon of Monday to eight o'clock in the forenoon of Tuesday;
    - (ii) six o'clock in the afternoon of Tuesday to eight o'clock in the forenoon of Wednesday; and
    - (iii) six o'clock in the afternoon of Wednesday to eight o'clock in the forenoon of Thursday.
  - (c) From the 13th day of August, 1961, to the 2nd day of September, 1961, both dates inclusive, except from
    - (i) six o'clock in the afternoon of Monday to eight o'clock in the forenoon of Tuesday; and
    - (ii) six o'clock in the afternoon of Tuesday to eight o'clock in the forenoon of Wednesday in each week.
  - (d) From the 3rd day of September, 1961, to six o'clock in the afternoon of the 1st day of October, 1961, both dates inclusive, except from
    - (i) six o'clock in the afternoon of Monday to eight o'clock in the forenoon of Tuesday;
    - (ii) six o'clock in the afternoon of Tuesday to eight o'clock in the forenoon of Wednesday; and
    - (iii) six o'clock in the afternoon of Wednesday to eight o'clock in the forenoon of Thursday of each week.

3. No person shall fish for sockeye or pink salmon in the Convention waters of the United States of America lying westerly of a straight line drawn true south from the southeast tip of Point Roberts in the State of Washington (otherwise known as Lilly Point) to the international boundary line from the 3rd day of September, 1961, to the 9th day of September, 1961, both dates inclusive.

4. No person shall fish for sockeye or pink salmon in the Convention waters of the United States of America lying westerly of a straight line drawn from the Iwersen Dock on Point Roberts in the State of Washington to the flashing white light on Georgina Point at the entrance to Active Pass in the Province of British Columbia from the 10th day of September, 1961, to the 24th day of September, 1961, both dates inclusive.

All times hereinbefore mentioned shall be Pacific Standard Time.

In making the above recommendations for regulatory control of sockeye and/or pink salmon fishing in the Convention waters of the United States of America for the year 1961 the Commission recognizes the need for the continued maintenance of certain preserves previously established by the Director of Fisheries of the State of Washington for the protection and preservation of other species of food fish."

#### **Emergency Amendments**

In order to provide for adequate racial escapement of Fraser River sockeye and pink salmon and for an equal share of the season's catch of each of the two species by the fishermen of Canada and the United States the approved regulations as detailed above were later amended on recommendation of the International Pacific Salmon Fisheries Commission. A detailed list of the regulatory amendments is as follows:

July 6, 1961—In the interest of equalizing the catch of sockeye between the fishermen of the two countries fishing time was reduced by 24 hours for the week commencing July 9 in United States Convention waters lying easterly of the Angeles Point-William Head Line.

July 10, 1961—In the interest of equalizing the catch of sockeye between the fishermen of the two countries fishing time was increased by 24 hours effective Wednesday, July 12 in Canadian Convention waters lying easterly of the Angeles Point-William Head Line.

July 12, 1961—In the interest of equalizing the catch of sockeye between the fishermen of the two countries fishing time was increased an additional 24 hours effective July 13 for Canadian Convention waters lying easterly of the Angeles Point-William Head Line.

July 24, 1961—Action was taken to further equalize the sockeye catch between the fishermen of the two countries by adding an additional 24 hours of fishing time effective Wednesday, July 26 in Canadian Convention waters of Juan de Fuca Strait lying westerly of the Angeles Point-William Head Line.

- August 1, 1961—To provide for increased escapements of sockeye destined for the Quesnel and Stuart River systems action was taken to reduce fishing time to 24 hours on August 10 for the week commencing August 6 in all United States Convention waters, to close all Canadian Convention waters lying easterly of the Angeles Point-William Head line commencing August 2 until August 10, and to close Canadian Convention waters in Juan de Fuca Strait lying westerly of the Angeles Point-William Head line commencing August 2 until August 9.
- August 8, 1961—To further provide for increased escapement of sockeye and allow for equalization of the sockeye catch the Canadian Convention waters of Juan de Fuca Strait lying westerly of the Angeles Point-William Head line were closed at six o'clock a.m. Tuesday, August 11 after a 48-hour fishing period until six o'clock a.m. Tuesday, August 15 at which time 48 hours of fishing time was permitted; all Canadian Convention waters lying easterly of the Angeles Point-William Head line were further closed until eight o'clock a.m. Sunday, August 13 after which time three days fishing was permitted; the opening time for fishing in United States Convention waters for the week commencing August 13 was delayed until August 15.
- August 18, 1961—In the interest of equalizing the catch of pink salmon between the fishermen of the two countries fishing time was increased by 24 hours for the week commencing August 20 in the Canadian Convention waters of Juan de Fuca Strait lying westerly of the Angeles Point-William Head line.
- August 25, 1961—In the interest of the conservation of pink salmon all United States Convention waters and all Canadian Convention waters were closed for the week commencing August 27 except those waters of the Fraser River lying above a line extending from Point Grey Buoy to North Arm Jetty to Sand Heads Light to Canoe Pass Buoy to the Light on the westerly end of Tsawwassen Causeway and thence towards West Point Roberts Light to the international boundary line; this latter area being open for a period of 48 hours commencing at eight o'clock a.m. August 28.
- September 1, 1961—In the interest of the conservation of sockeye and pink salmon and coinciding with an equivalent net fishing restriction the waters of District No. 1 of Canadian Convention waters were closed to commercial trolling from eight o'clock a.m. Monday, September 4 to eight o'clock a.m. Monday, September 25. To provide further protection for the light run of Fraser River pink salmon all United States Convention waters were closed until September 18; Canadian Convention waters in Juan de Fuca Strait westerly of the Angeles Point-William Head line were closed until September 5 at which time fishing was permitted for 48 hours, thence these waters were closed until September 17, the Commission relinquishing regulatory control after that date; waters of

District No. 1 were closed until September 25 except that fishing for spring salmon with large mesh nets was permitted by the Canada Department of Fisheries for 12 hours daily in the Fraser River proper on September 7, 13 and 21.

- September 8, 1961—The closure previously established in Canadian Convention waters of Juan de Fuca Strait lying westerly of the Angeles Point-William Head line was modified to permit 48 hours of fishing effective September 12 and 13 to assist in determining the strength of the late run of Fraser River pink salmon.
- September 17, 1961—In view of the absence of pink salmon in United States Convention waters regulatory controls were relinquished except in those waters lying northerly of a line projected from Point Whitehorn to Patos Island Light thence true west to the international boundary, the latter waters being closed until September 25.
- September 21, 1961—The closure of the Canadian Convention waters of District No. 1 to all fishing including commercial trolling was extended to October 2 for the protection of pink and sockeye salmon.
- September 24, 1961—United States Convention waters lying northerly of a line projected in a southwesterly direction from the Iwersen Dock on Point Roberts to the light on Georgina Point at the entrance to Active Pass were closed from September 25 until October 2 for the protection of the Fraser River pink salmon run.
- September 25, 1961—Fishing for spring salmon with large mesh nets was permitted for 12 hours on September 27 in the Fraser River by the Canada Department of Fisheries.
- September 28, 1961—To further protect the light Fraser River pink salmon run the closure of the waters of District No. 1 of Canadian Convention waters was extended to October 3 at which time fishing was permitted for a 24-hour period prior to the relinquishment of control by the Commission on October 8. Regulatory controls were relinquished in all Canadian Convention waters lying easterly of the Angeles Point-William Head line except the waters of District No. 1 effective October 1.

## SOCKEYE SALMON REPORT

### The Fishery

The timing of sockeye entering the fishery was slightly later than that of 1953 but considerably earlier than in 1957, thus following the eight-year cycle frequency of alternating early and late runs. The average weight of 1961 sockeye was above that of the brood year for four-year-old fish and the relatively large size obviously contributed to an increase in the efficiency of the gill net fishery particularly in the United States.

Cyclical Average Weights of Four-Year-Old Fraser River Sockeye

| <i>Cycle Year</i> | <i>Average Weight Pounds</i> | <i>Cycle Year</i> | <i>Average Weight Pounds</i> | <i>Cycle Year</i> | <i>Average Weight Pounds</i> |
|-------------------|------------------------------|-------------------|------------------------------|-------------------|------------------------------|
| 1917 .....        | 5.47                         | 1933 .....        | 5.43                         | 1949 .....        | 5.85                         |
| 1921 .....        | 5.89                         | 1937 .....        | 5.06                         | 1953 .....        | 6.08                         |
| 1925 .....        | 5.76                         | 1941 .....        | 5.53                         | 1957 .....        | 5.27                         |
| 1929 .....        | 5.92                         | 1945 .....        | 5.71                         | 1961 .....        | 5.69                         |

The share of the Canadian catch taken in Juan de Fuca Strait dropped slightly from that of the brood year because of the relative strength of the Early Stuart run which was fished in the Fraser River but passed through the Strait area prior to the opening date of the fishery on July 17. The unexplained drop in the marine survival rate of the later runs did not permit the Canadian Strait fishery to entirely compensate for the good catches made in the Fraser River fishery earlier in the season. The share of the Straits catch taken by gill nets increased substantially over that of the brood year as shown in the following table.

| <i>Cycle Year</i> | <i>Per cent of Canadian Sockeye Catch Taken in Juan de Fuca Strait</i> | <i>Per cent of Canadian Sockeye Catch Taken by Purse Seines in Juan de Fuca Strait*</i> |                 | <i>Per cent of Canadian Sockeye Catch Taken by Gill Nets in Juan de Fuca Strait*</i> |                 |
|-------------------|--|---|-----------------|--|-----------------|
|                   | <i>Per Cent</i>  | <i>Maximum P.S. Units</i>   | <i>Per Cent</i> | <i>Maximum G.N. Units</i>  | <i>Per Cent</i> |
| 1961 .....        | 46.73  | 101   | 26.00           | 395  | 20.23           |
| 1957 .....        | 50.92  | 104   | 38.39           | 269  | 12.41           |
| 1953 .....        | 33.01  | 66  | 29.81           | 12   | 1.92            |
| 1949 .....        | 14.72  | 40  | 9.71            | 0  | 0.00            |
| 1945 .....        | 3.14   | 0   | 0.00            | 0  | 0.00            |

\* Troll catches not listed.

Due to the unexplained decline in marine survival rates of the individual runs as the season progressed, the abundance of the late season sockeye runs was lower than expected and this, plus the high efficiency of the fishing gear, caused serious regulatory difficulties, particularly in United States Convention waters. Having regard for the number of fish available, record catches were made in United States waters and proper management of the fishery was possible only by frequent adjustment of fishing time. Under the prevailing circumstances it is fortunate that practical division of the catch between the two countries was obtained and the catch-escapement ratio apparently was satisfactory.

The total catch of 2,735,491 sockeye was less than that of the two preceding cycle years (Table II) but, due to the relatively large size of the fish, the number of cases packed was larger than that of the brood year. The 1961 pack of sockeye was the third largest for the cycle since 1917. The share of the catch by each country was as follows: Canada 49.61 per cent and the United States 50.39 per cent.

The effect of increasing units of gear, greater gear efficiency, and expanded fishing area in Convention waters has been largely offset by reduced fishing time to a point where management of the fishery has become extremely difficult and liable to possible errors of importance. Coinciding with the reduction in fishing time there has been increasing dissatisfaction on the part of the fishermen. Even in 1959 when the sockeye catch exceeded any for the cycle year for 56 years and in 1960 when the catch was the second best for that cycle year in 48 years the fishermen were unhappy with their individual returns.

The Commission by its terms of reference cannot concern itself directly with the economic plight of the individual fishermen, but it is becoming increasingly obvious that the regulations necessary for good management are not only difficult for the Commission to design but they are militating against a healthy and happy industry in spite of relatively good total catches. The income of many individual fishermen is declining in relation to the total catch of Fraser River sockeye because of the increase in the total units of gear and wider fishing effort. This developing situation in its various aspects and the limitations of the Commission under the terms of the Convention in relation to it has been drawn pointedly to the attention of the industry and the two Governments. In the opinion of the Commission it is of vital importance to the prosperity of the industry and to the conservation of the Fraser River salmon resources that the intensity of fishing pressure be brought to a rational standard.

### **Escapement**

The net sockeye escapement recorded on the spawning grounds of the Fraser River watershed was 1,253,012 fish (Table VI) or 30.4 per cent of the total run in Convention waters, estimated at 4,126,031 sockeye. When the estimated catch of Fraser River sockeye in non-Convention waters is included the net escapement is lowered to 26.70 per cent of a total run of 4,698,881 fish.

The spawning escapement for 1961 was down substantially over that of the brood year (1957) but much of the decline was in relatively non-productive jacks or three-year-olds. The 1961 escapement of four-year-old or older sockeye was 1,163,000 fish compared with 1,341,000 in 1957 and 1,035,000 in the previous brood year of 1953. Individual escapement requirements were exceedingly difficult to obtain because of the decline in the marine survival of the racial populations as the season progressed. Extensive closures of the fishery were required during August to obtain reasonably satisfactory escapements to many of the reproductive areas. Late runs, with the exception of the one to the Harrison River, were very poor. The almost complete closure of the pink salmon fishery when the late running sockeye were available prevented a substantial decline in the cyclical escapement of these populations.

The escapements of the early season runs destined for the Early Stuart spawning areas, Upper Pitt River and Bowron River were down slightly over those of the brood year. Excellent flow conditions prevailed in the Fraser Canyon during the upstream migration of sockeye destined for the Early Stuart spawning areas and the fish arrived on time and in excellent condition. Many of the smaller spawning tributaries of Takla Lake and Middle River had a very low flow due to the record-breaking warm summer season, and sockeye found it difficult, if not impossible at times, to enter these streams. The low flow of some of the streams is believed responsible for the heavy spawning in the Driftwood River, Frypan and Narrows Creeks on Upper Takla Lake where flow conditions were nearer normal.

Escapements to Gates and Scotch Creeks were a disappointment and the rehabilitation of these areas is obviously set back by the exceptionally poor marine survival of this year class. All other summer runs had a fairly satisfactory escapement with the exception of the run to Chilko Lake. Approximately 10,000,000 migrants went to sea in 1959 from the spawning of 140,765 fish in this latter area in 1957. In 1961, only 40,315 Chilko fish returned to the spawning ground from a moderate fishery indicating that the marine survival of the Chilko seaward migrants was alarmingly low, being approximately 1.0 per cent. The decline in the production of Chilko fish in 1961, while economically serious, is not believed to be serious in terms of total quadrennial production. The 1961 cycle represents one of the two off-years of production for the Chilko area, hence a small run to this area would approach what is believed to be a normal situation.

The Late Stuart and Quesnel spawning areas, both major producers on the 1961 cycle, had satisfactory escapements. The escapement of 411,000 sockeye to the Late Stuart spawning areas was down from the brood year figure of 527,000 but is still a substantial number compared with only 5,400 in 1941, five cycle years earlier. The Quesnel escapement reached a record of 302,000 sockeye compared with 229,000 in the brood year and only 1,100 in the 1941 cycle year.

Sockeye, principally three-year-old jacks, were observed in several locations in the Lower Fraser River area during December and January (1962). On December 13, 1961, twenty-six jacks and four adults were observed in Gallagher Creek, tributary to Sullivan Slough near Agassiz, B.C. An examination of sixteen scale samples indicated that the fish may have been of Adams River origin although no sockeye were observed above Hell's Gate during the period in question. On December 21, 1961, an observer of the Canada Department of Fisheries reported the presence of twenty to thirty jacks and three adult sockeye in Maria Slough. Significant numbers of jack sockeye obviously were present in the Hope-Yale area since an Indian reported taking fifteen to twenty jacks per week during December and a few were taken up to January 7, 1962. Another Indian reported catching twenty to fifty jack sockeye for an overnight set during December near Hope, B.C. The occurrence of a significant run of jack sockeye in the Lower Fraser River during December and early January has no recorded precedent and cannot be explained on the basis of the information available.

While the 1961 escapement was generally satisfactory in numbers, temperature conditions were decidedly adverse during the upstream migration of the late July and August runs and similar adverse temperatures existed on many of the spawning grounds. It was reported that average air temperatures in several interior areas reached an all time record high. To illustrate the high water temperatures prevailing in the main Fraser River during July and August the following table is presented:

Average Fraser River Water Temperatures at New Westminster

| <i>Years</i> | <i>July</i> | <i>August</i> | <i>September</i> |
|--------------|-------------|---------------|------------------|
| 1927-1939    | 60.9        | 63.0          | 59.4             |
| 1940-1949    | 61.6        | 63.5          | 60.2             |
| 1950-1961    | 60.7        | 63.3          | 59.4             |
| 1961         | 63.9        | 67.4          | 58.8             |

Maximum water temperatures at times exceeded 72°F in the Lower Horsefly River during the upstream migration of the run to that river system. The existence of adverse river temperatures was recognized during the fishery on the Horsefly run and extra fishing time was granted on July 26 in Canadian Convention waters to reduce the early escapement. Extra closures of the fishery were provided during the latter part of the run which would migrate upstream and arrive on the spawning grounds during the period when lower water temperatures would be expected. The specially designed closures of the fishery during the latter part of the Horsefly run prevented almost 100 per cent mortality of the escapement. All of the first half of the escapement died without spawning and it was only the majority of the later arriving fish that were able to spawn successfully.

The effect of adverse water temperatures on several of the racial escapements is illustrated below :

| <i>Race</i>        | <i>Percentage of Female Sockeye Died Without Spawning</i> | <i>Race</i>          | <i>Percentage of Female Sockeye Died Without Spawning</i> |
|--------------------|---|----------------------|---|
| Pitt River .....   | 5.0   | Horsefly River ..... | 62.0  |
| Bowron River ..... | 60.0  | Late Stuart Area ..  | 18.0  |
| Nadina River--     |   | Stellako River ..... | 31.0  |
| Early Run .....    | 86.0  | Raft River .....     | 25.0  |
| Late Run .....     | 5.0   | Birkenhead River ..  | 35.0  |
| Chilko River ..... | 31.0  | Harrison River ..... | 2.0   |

The actual cause of the mortality of the spawning ground escapements was a bacterial infection of the gills, apparently stimulated by the above-average water temperatures. The gills of the sockeye became eroded and covered with fungus resulting in a lethargic condition of the fish preceding death. In many cases the fish actually matured and were ready to spawn but did not have sufficient energy to do so.

A more detailed understanding of the pathology of the disease and the factors related to its occurrence as a "hot strain" is essential to avoiding future losses if possible by regulation of the fishery. Cultures of the existing organisms on the gills of the dying fish have been obtained for future laboratory research at the new Sweltzer Creek field station. Temperature changes are always inherent in any flood control or hydroelectric project so that a full understanding of the tolerance limits of Fraser sockeye to temperature changes during migration and spawning is obviously necessary for the protection of the species.

In summary, it may be stated that the number of eggs actually deposited in the spawning grounds was 11.0 per cent greater than in 1953 but only 63.5 per cent of those deposited in 1957. The loss of unspawned fish, while serious, was not necessarily sufficient to retard rehabilitation by more than one cycle year. If a more favorable rate of marine survival prevails during the marine existence of the 1965 run than the low survival rate controlling the size of the 1957 and 1961 runs, an increase could occur in the number of sockeye returning in 1965.

## Rehabilitation

The failure of the Pitt and Birkenhead sockeye runs to maintain themselves under existing fishing regulations, designed to permit the maximum allowable catch of other more important races migrating at the same time, has caused the Commission to place both of these river systems under experimental observation. Frequent staff observations revealed that the spawning grounds of Pitt River were extremely unstable. A decision was made to install an experimental hatchery for increasing fry production and thereby increasing the adult sockeye run to a size capable of withstanding the same fishing rate allowable on more productive upriver races migrating through the fishery at the same time.

The experimental hatchery located on Corbold or Seven Mile Creek, a natural sockeye spawning tributary of the main Pitt River, was completed in time for operation on the 1960 run. Certain faults known to exist in hatchery operations were eliminated in the design of the hatchery. On the basis of experiments conducted in earlier years at the Quesnel Field Station, light was eliminated during incubation and the young fry were allowed to release themselves from the hatchery. The usual initial operating difficulties of any hatchery occurred during 1960 with the result that the loss of eggs and fry totalled 23.0 per cent instead of the usual figure of less than 10.0 per cent.

In spite of the high hatchery mortality 2,508,000 fry were obtained from 3,257,000 eggs spawned artificially from 1,235 females for a survival rate of eggs to fry of 77.0 per cent. A calculated total of 11,664 female sockeye spawned naturally in the river system depositing an estimated 46,656,000 eggs. A fry enumeration program on the river in the spring of 1961 revealed that an estimated 2,071,000 fry resulted from natural spawning or an egg to fry survival rate of only 4.44 per cent. The relatively small number of eggs artificially spawned and incubated in the hatchery produced more fry than the natural spawning in the river.

The survival to the fry stage of only 4.44 per cent of the naturally deposited eggs substantiates the Commission's previous observations that the Pitt River spawning grounds are very unstable and the conclusion that the decline in the Pitt sockeye run is probably due to this fact. A greater release of fry from the hatchery than from natural spawning areas does not by itself prove that artificial propagation is the answer to the problem. Artificially propagated salmon fry are notably different from those produced naturally and the history of hatchery operation has amply demonstrated that hatchery fry do not survive at the same rate as those produced naturally. While the modifications in the usual hatchery methods, as incorporated in the Pitt River operation, are known to improve the condition of hatchery fry, extensive experiments are planned at the Sweltzer Creek field station—not only to detect any remaining difference in the condition of the two types of fry—but to determine the cause and a method for its elimination if such a difference is found to exist.

A total of 4,060,000 eggs were spawned from 1,218 female sockeye and placed in the hatchery during the period from September 5 to September 18, 1961. Natural fry hatch in the river system, resulting from the spawning of an estimated total of 5,400 females will be enumerated and compared with hatchery releases as was done in 1960. Sampling of natural fry for comparative studies with hatchery fry will be undertaken throughout the period of emergence.

A fry enumeration program was carried out in the Birkenhead River during the spring of 1961 to determine the success of natural spawning in this area which, like Pitt River, has a declining sockeye run. Surprisingly the fry hatch was 24.3 per cent of the estimated eggs deposited naturally in the river system as compared with only 4.4 per cent for Pitt River. On the basis of one year's data it would appear that the spawning grounds of Birkenhead River are quite efficient and that poor fry production may not be the cause of the decline in the Birkenhead run of sockeye. Observation of the success of incubation on the Birkenhead River will be continued for another three years, augmented by a more detailed observation of the Indian Fishery on this race of sockeye.

A transplant of 520,000 eyed eggs from Seymour River to the Upper Adams River in 1957 apparently failed to return any adult sockeye to the receiving area. Several examinations of Upper Adams River were made during late August and September and under favorable visibility conditions, but no sockeye were observed.

A return of 335 adult sockeye was observed in Barriere River. Although 38 sockeye spawned naturally in the Barriere in the brood year there was an added transplant of 550,000 eyed eggs from the Raft River which is believed responsible for the substantial increase in the 1961 run. Sockeye were also observed spawning at several places in the North Thompson River for the second consecutive year, indicating the possibility that some of the survivors from the transplanted eggs may be straying from the planted stream.

An experiment designed to start a sockeye run into Tezzeron Lake of the Stuart River System was almost a failure due to operational difficulties. A total of 1,370,000 eggs were spawned and incubated in Gluske Creek, tributary of Takla Lake, in August, 1961 but a flash flood caused a heavy mortality of eggs with the result that only 534,000 eggs reached the eyed stage for planting in Hatdudatehl Creek tributary to Tezzeron Lake. An attempt will be made in the spring of 1963 to determine if any downstream migrants leave Tezzeron Lake but the isolated nature of the area may make such observations difficult.

## PINK SALMON REPORT

The runs of Fraser River pink salmon were maintained at a relatively high level of abundance from 1947 through 1955, primarily because of excellent conditions for survival during their marine existence. Mean water temperatures in Georgia Strait were relatively low during the summer residence of the young fish and studies by the Commission have established an inverse relationship between these water temperatures and ultimate marine survival of Fraser River pink salmon. During the period of high sea survival an effective Canadian fishery was developed in Juan de Fuca Strait and there was a substantial increase in the efficiency of all gear in all fishing areas. Nylon gill nets, seine power blocks, seine power skiffs, and drum seines became operative during the above period.

When the Pink Salmon Protocol was ratified on July 3, 1957, responsibility for managing the pink salmon fishery was transferred immediately to the International Pacific Salmon Fisheries Commission. Preliminary studies by the Commission indicated that the 1957 run would be significantly less in size than the runs returning in the previous five cycle years. Water temperatures in Georgia Strait were higher during the period of residence of the young fish

destined to return in 1957 and during the incubation period the tributary spawning streams had been subjected to a severe flood. Reductions were made in fishing time and a substantial escapement of 2,425,000 fish was obtained. The 1957 escapement enjoyed excellent spawning and incubation conditions resulting in what was believed to be an unusually successful emergence of young fry.

In 1958 when the seaward migrating fry from the 1957 escapement entered Georgia Strait, they encountered record high water temperatures, the average for the summer period being 61.8°F, or about five degrees above the temperatures encountered by the young fish which produced the runs from 1947 to 1955. A small run returned in 1959 although it was larger than anticipated on the basis of the high water temperatures prevailing in Georgia Strait in 1958. Presumably the 1959 run was larger than expected because of the exceptional number of fry produced from the spawning in the brood year.

For some reason, yet to be understood, the fishing gear was unusually effective in 1959 in all fishing areas except the Fraser River area. As an example, unit efficiency increased 71 per cent for gill nets in Juan de Fuca Strait and a similar amount for purse seines in the San Juan Islands. Severe overfishing occurred, since fishing restrictions designed to obtain a favorable catch-escapement ratio were based on the catch per unit of effort which in this case provided a false impression as to the size of the run. The escapement for the early segment of the run declined 46 per cent over that of the brood year and the escapement of the late segment declined 75 per cent. These small escapements occurred in spite of the fact that fishing time was reduced substantially from that prevailing in any previous cycle year.

Spawning conditions for the early segment run were most unfavorable in 1959 because of the record high water flows in the Thompson and Fraser Rivers at the time of spawning. High water velocities forced fish to spawn in the shallow shoreline areas which were later exposed by receding waters during the winter months. The mortality of eggs deposited was so great that the very important early run to the Fraser River was almost exterminated; thus, the adverse effect of overfishing the early run was over-shadowed by the subsequent high mortality of eggs deposited by those fish which did escape. Spawning conditions for the late escapement in 1959, principally to the Vedder and Harrison Rivers, were excellent hence the substantial reduction in the fry produced reflected the effect of overfishing.

Drastic regulatory action was taken in 1961 to start the rehabilitation of the Fraser pink runs which obviously were in a dangerous condition. The greatly increased restrictions on the fishery resulted in 76 per cent of the total run escaping to spawn as compared with only 17 per cent in the brood year. The escapement of 1,094,000 fish (Table XIV), while actually no greater than the poor escapement in the brood year, enjoyed what appears to have been excellent spawning and incubation conditions. If the fry survival is as favorable as is now anticipated, and if the water temperature of Georgia Strait is relatively cool during the summer season of 1962, a substantial increase can be expected in the 1963 Fraser River pink salmon population. However, the serious effects resulting from the adverse conditions in 1959 must be recognized. The rehabilitation of the Fraser River pink salmon populations to the levels prevailing in the years prior to 1915 has been severely impaired and only rigid regulation of a highly effective fishery combined with favorable environment will correct the situation.

Listed below are preliminary estimates for the percentage catches and escapements of major pink salmon runs in Convention waters for the years 1957, 1959 and 1961. The estimates are based on information gained from the 1959 tagging program conducted under the jurisdiction of the Pink Salmon Co-ordinating Committee<sup>1</sup> and are subject to possible revision after final analyses of the collected data are completed.

Calculated Catches and Escapements of Major Pink Salmon Runs  
Entering Juan de Fuca Strait in 1957, 1959 and 1961  
(All figures in per cent of total for each run.)

| Area  | Washington |       |       | Fraser River** |       |        | Canadian Non-Fraser* |        |       |
|---|------------|-------|-------|----------------|-------|--------|----------------------|--------|-------|
|   | 1957       | 1959  | 1961  | 1957           | 1959  | 1961   | 1957                 | 1959   | 1961  |
| Canadian West Coast<br>Convention Waters..... | 20.8       | 19.7  | 12.8  | 21.1           | 31.6  | 9.2    | 17.3                 | 10.0** | 18.5  |
| United States<br>Convention Waters.....       | 11.7       | 12.7  | 9.1   | 39.4           | 42.8  | 9.7    | 29.0                 | 38.5   | 36.9  |
| Canadian Fraser<br>River Catch.....           | —          | —     | —     | 10.9           | 8.5   | 5.3*** | —                    | —      | 2.7   |
| Non-Convention Catch<br>Canada.....           | —          | —     | —     | —              | —     | —      | 2.4                  | 9.3    | 6.6   |
| Non-Convention Catch<br>United States.....    | 25.3       | 16.7  | 19.6  | —              | —     | —      | —                    | —      | —     |
| Escapement .....                              | 42.2       | 50.9  | 58.5  | 28.6           | 17.1  | 75.8   | 51.3                 | 42.2   | 35.3  |
| Total.....                                    | 100.0      | 100.0 | 100.0 | 100.0          | 100.0 | 100.0  | 100.0                | 100.0  | 100.0 |

\* The figures listed do not include catches or escapements of fish entering Convention waters from Johnstone Strait.

\*\* Strike of Canadian fishermen prevailed during part of run.

\*\*\* Catches in spring nets excluded.

The Commission carried out a co-ordinated pink salmon tagging program in 1961. The primary purpose of the tagging program was to provide additional information on the degree of spatial segregation of United States and Canadian pink salmon stocks during their passage through Juan de Fuca Strait. The results gave positive evidence that the run on the United States side of the Strait has a larger proportion of pink salmon destined for United States streams than has the run on the Canadian side. Conversely, the run on the Canadian side of the Strait has a larger proportion of fish destined for the Fraser and other Canadian streams.

Several parts of the management and research program for pink salmon initiated in 1957 and detailed in the 1959 Annual Report are either completed or approaching completion. Some items are of a continuing nature and other items now segregated for special consideration include a study of how water temperatures in Georgia Strait influence the population size and an analysis of the fishery to determine the historical abundance of pink salmon in the Fraser River watershed.

An artificial spawning ground adjacent to Seton Creek was completed during the summer of 1961. The spawning ground is 3,000 feet in length, 20 feet wide, is provided with a flow of 40 cubic feet per second, and has an estimated capacity of 10,000 fish. The natural population of pink salmon in Seton Creek was allowed unobstructed entry to the channel and 6,711 fish or

<sup>1</sup>Pursuant to the Pink Salmon Protocol as ratified July 3, 1957, the 1959 pink salmon program was organized and conducted under the jurisdiction of the Pink Salmon Co-ordinating Committee and its technical assistants. Membership in this committee consists of representatives of the Washington Department of Fisheries, the Canada Department of Fisheries, the Fisheries Research Board of Canada and the International Pacific Salmon Fisheries Commission.

11 per cent of the total run made use of the facility. Spawning efficiency was excellent and the number of fry emerging in the spring of 1962 will be counted to determine the productive efficiency of the area. A water supply failure occurred for two hours on October 18 and some mortality in the incubating eggs may have resulted. The cause of the failure in the water supply has since been corrected.

## GENERAL INVESTIGATIONS

Research activities related to the management of the Fraser River sockeye populations were continued during the year in accordance with the procedures published in the 1955 Annual Report. The program was expanded in 1957 where applicable, to include Fraser River pink salmon. One of the most important activities has been directed towards the establishment of mortality rates during each of the distinct periods of the sockeye's life. Measurement of the survival rate for the various stages of life of the Chilko population has been continued each year beginning with the 1949 brood. The data for Chilko has been augmented by more limited observations on other Fraser sockeye populations. In the case of such important producing areas as the Stuart, Quesnel and Shuswap Lake systems, approximations have been made of the number of seaward migrants resulting from a recorded number of spawners.

In general, the survival during the freshwater life of the Fraser sockeye has been remarkably consistent throughout the period of observation. There has been a definite increase in the total number of downstream migrants and because of this fact the potential of the adult runs has been increased accordingly. There have been exceptions such as the excessive mortality of unspawned adults in 1953 because of high water temperatures prevailing in the Stuart and Quesnel spawning areas, but up until 1961 at least, adverse conditions rarely occurred and did not have a major influence on the average freshwater production of sockeye.

While survival in fresh water has been relatively consistent the marine survival of each year's downstream migration of fingerlings has fluctuated rather violently. The adults of all ages surviving from each brood year spawning at Chilko has varied from 6.03 per cent of the seaward migrants in the case of the 1953 brood year to 20.82 per cent of the seaward migrants for the 1954 brood year. In 1961 preliminary estimates indicate that the adult survival of Chilko seaward migrants from the 1957 brood year will be one per cent or less.

Since the fluctuation in the marine survival has a direct relation to the number of adults returning, a large variation in the marine survival rate from year to year has an important impact on both the industry and management. It is obvious from the degree of variation in the marine survival rate of seaward migrant sockeye, as shown above, that the prediction of adult runs based on the number of brood year spawners, fry produced, or even the number of seaward migrants would be of little practical value. A possible error in predicting run size that has a factor of one to twenty, is too great to permit the formulation of intelligent fishing regulations in advance of the season or to permit the necessary economic planning of the year's fishing operation within the industry.

Since the first survival studies commenced with the brood year at Chilko in 1949 and the first marine survival rates were established in 1953 there were not sufficient data until the present time to determine if there was some recorded

factor related to, or responsible for the fluctuation in marine survival. The establishment of a statistical relationship between the flow of the Fraser River at the time the migrants enter the estuary and their rate of marine survival (Figure 2A) necessitates an immediate study of the reasons for such a relationship.

Extensive exploratory observations will be made during the spring and summer of 1962 to record:

1. The reactions and distribution of the migrants in relation to saline water and temperature at and after the time they enter the estuarial area of the Fraser.
2. Growth and feeding habits during migration to the ocean as related to place and time.
3. The existence and character of predation.

It is hoped that the observations in 1962 will provide information for planning a direct investigation into the cause of the flow-survival relationship for, as stated in the introduction, "The forecasting of salmon survival on the basis of past relationships incorporates a serious weakness as long as the functioning of the factors used is not thoroughly understood."

Another method has been devised for predicting the size of sockeye runs to the Fraser River one year in advance. It appears from a study of the growth rate of the young sockeye during their first year in the sea that the percentage of the total population returning as three-year-olds is related, within practical limits, to the growth during that period. By recording the total number of three-year-olds returning in any one year and measuring their growth as revealed on their scales during their first year of marine existence the number of adults which will return the following year can be approximated. Such a relationship was established for several races but for the purpose of illustration data are presented only for Chilko (Figure 2B). While this method of prediction involves a mechanism which is understood, the existence of occasional exceptions merits further study. For example, the established relationship as shown in Figure 2B does not appear to apply to the Birkenhead population.

In 1958 the Commission published a study of the factors affecting the abundance of pink salmon in the Fraser River. The study revealed a close relationship of adult survival or abundance with temperature and salinity in Georgia Strait during the first few months after the young pink salmon fry reached the sea.

Marine observations were started in 1960 to explore the possible reasons for the existence of the above relationship. Young pink salmon were found in the shallow tidal areas throughout the Gulf and San Juan Islands shortly after their departure from the Fraser River. As the fish grew they sought deeper water until by mid-summer they were in the deeper and cooler channel areas. Since conditions for favorable survival prevailed in 1960 it was assumed that the character of the pink fry distribution was normal throughout the period of observation. On the basis of the 1960 observations it could be concluded that waters warmer than those prevailing might have caused the fish to react in a different manner. Water temperatures in some habitat areas might have exceeded the tolerance limits of the young fish. Warmer waters might have forced the young fish to seek the deeper and cooler water before they were capable of avoiding predators.

On the basis of the observations conducted in 1960 a more direct investigation is planned for 1962:

1. To record the variation, if any, in the habits of the young pink salmon from those observed in 1960, during the first few months of their marine existence.
2. To measure the reactions of pink salmon fry to variable water temperatures.
3. To assess the origin and extent of predation in relation to time and place.

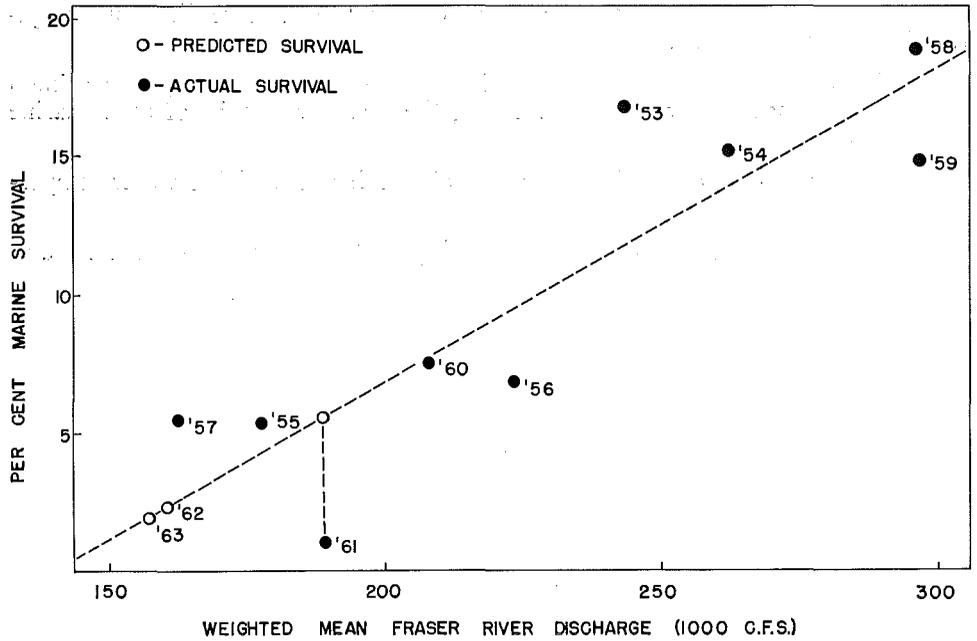


FIGURE 2A—Relationship between marine survival and Fraser River discharge, Chilko, (1953 - 1961).

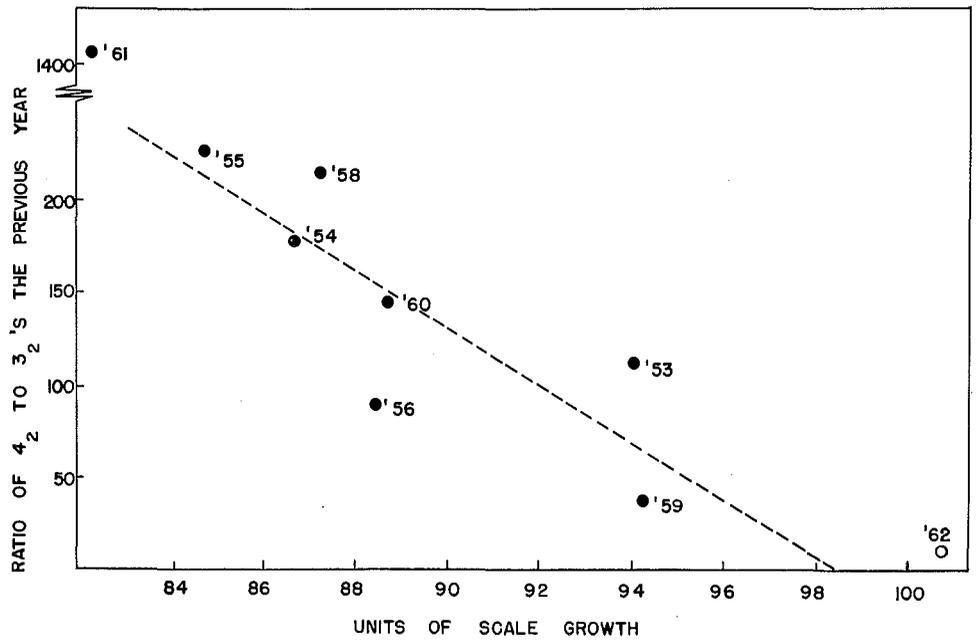


FIGURE 2B—Relationship between ratio of 4<sub>2</sub>/3<sub>2</sub> and first year marine growth—Chilko.

## WATERSHED PROTECTION

Industrial development continues at a rapid pace within the Fraser River Basin and the related fisheries problems require considerable attention. The Canada Department of Fisheries is vested with the legal authority to obtain any fish protective facilities required and the Commission co-operates at a technical level in such matters, providing any information collected by it that may be essential to the maintenance of the Fraser River sockeye and pink salmon.

During recent months several inquiries have been received by the Canada Department of Fisheries with respect to the waste disposal aspects of kraft pulp mills under consideration in the vicinity of Prince George on the Fraser River. As a result of the above inquiries a co-operative study was made of the waste treatment and disposal problems and an interim report on the subject was issued by the two agencies in collaboration with the British Columbia Department of Recreation and Conservation.

Observations during the upstream migration of the Horsefly River sockeye run indicated that a delay in migration of one or two days occurred on the left bank of the Fraser River at Bridge River Rapids. Further investigation showed that the accumulation of fish was the result of the limited passage on the left bank and that after the peak in migration had passed there was no further accumulation of fish. Some minor improvements for passage along the left bank were made at the time of the investigation.

A study was continued of the factors affecting passage of early sockeye runs through the Fraser Canyon at high river levels and conditions affecting passage of sockeye and pink salmon through the Thompson River Canyon at low river levels. Preliminary designs were prepared for the facilities necessary to eliminate obstructions in the Fraser Canyon and to improve passage facilities in the Thompson River Canyon. Construction funds have been requested and, if provided, it is planned to have all corrective measures completed in time for the 1963 runs. During the investigation of fish passage problems in the Fraser River Canyon it was found that a rock pinnacle located 1,000 feet upstream from the Yale fishway, was one of the critical points of difficult passage. The rock pinnacle was removed in April, 1961 and Figures 3A and 3B illustrate the successful elimination of this particular obstruction to migration.

Early in October, it was found that pink salmon attempting to ascend Bridge River, four miles upstream from Lillooet, B.C., were having difficulty surmounting a rapids near the mouth of the river. While the temporary measures taken were sufficient to allow completion of the 1961 migration, permanent remedial facilities will have to be provided for unimpeded migration in future years.

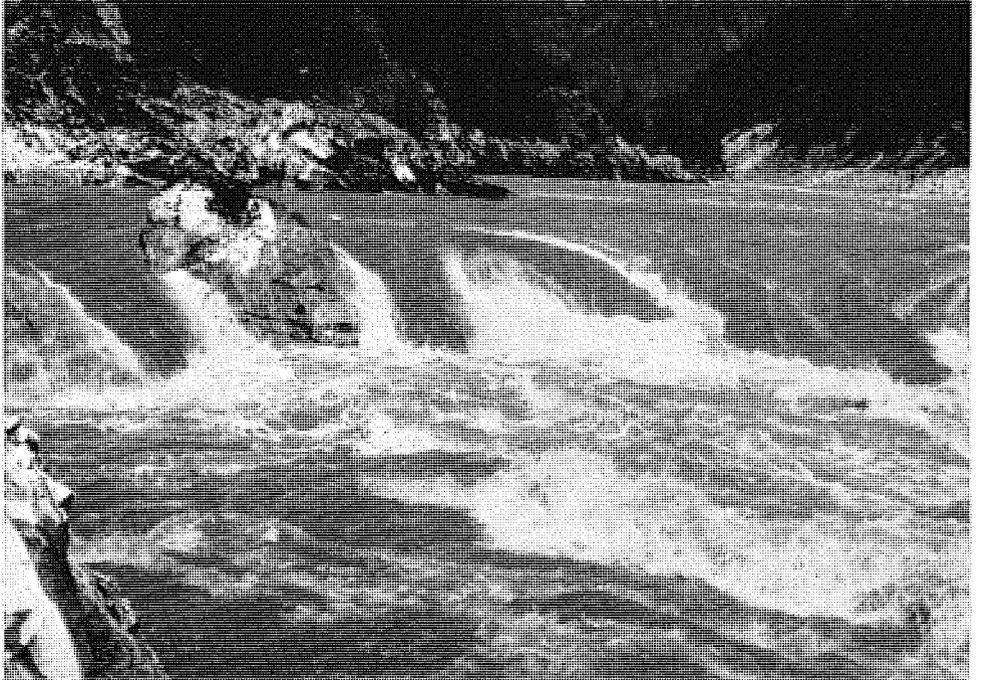


FIGURE 3A—A rock pinnacle located 1000 feet above the Yale fishway, which was found to be a critical point in the upstream passage of early runs of sockeye.



FIGURE 3B—A picture of the Fraser River taken after the removal of the rock pinnacle shown above, illustrating the successful removal of the obstruction.

## 1961 PUBLICATIONS

1. Annual Report of the International Pacific Salmon Fisheries Commission for 1960.
2. Progress Report Number 8.  
Limnological Changes in Seton Lake Resulting from Hydroelectric Diversions by G. H. Geen and F. J. Andrew.
3. Research Bulletin Number XII.  
Racial Identification of Fraser River Sockeye Salmon by Means of Scales and Its Application to Salmon Management by Kenneth A. Henry.
4. An Interim Report on Proposed Kraft Pulp Mills on the Fraser River near Prince George with Recommendations for the Treatment and Disposal of Wastes (Mimeographed). Prepared by the technical staffs of the Canada Department of Fisheries and the International Pacific Salmon Fisheries Commission in collaboration with the British Columbia Department of Recreation and Conservation (Issued by the Canada Department of Fisheries).

TABLE I  
SOCKEYE CATCH BY GEAR

| <i>United States Convention Waters</i> |                     |              |                   |                  |              |                   |                  |              |                   |                    |
|--|---------------------|--------------|-------------------|------------------|--------------|-------------------|------------------|--------------|-------------------|--------------------|
| <i>Year</i>                            | <i>Purse Seines</i> |              |                   | <i>Gill Nets</i> |              |                   | <i>Reef Nets</i> |              |                   | <i>Total Catch</i> |
|  | <i>Units</i>        | <i>Catch</i> | <i>Percentage</i> | <i>Units</i>     | <i>Catch</i> | <i>Percentage</i> | <i>Units</i>     | <i>Catch</i> | <i>Percentage</i> |                    |
| 1961.....                              | 273                 | 823,956      | 59.76             | 574              | 471,464      | 34.20             | 77               | 81,826       | 5.94              | 1,378,392          |
| 1957.....                              | 234                 | 1,237,665    | 73.27             | 638              | 286,614      | 16.97             | 87               | 164,951      | 9.76              | 1,689,265          |
| 1953.....                              | 247                 | 1,355,734    | 66.70             | 322              | 427,836      | 21.05             | 96               | 248,867      | 12.25             | 2,032,437          |
| 1949.....                              | 277                 | 850,451      | 80.48             | 248              | 123,048      | 11.64             | 116              | 83,293       | 7.88              | 1,056,792          |
| <i>Canadian Convention Waters</i>      |                     |              |                   |                  |              |                   |                  |              |                   |                    |
| <i>Year</i>                            | <i>Purse Seines</i> |              |                   | <i>Gill Nets</i> |              |                   | <i>Traps</i>     |              |                   | <i>Total Catch</i> |
|  | <i>Units</i>        | <i>Catch</i> | <i>Percentage</i> | <i>Units</i>     | <i>Catch</i> | <i>Percentage</i> | <i>Units</i>     | <i>Catch</i> | <i>Percentage</i> |                    |
| 1961.....                              | 101                 | 352,883      | 26.00             | 1,550            | 991,972      | 73.10             | 0                | 0            | 0                 | 1,357,099          |
| 1957.....                              | 104                 | 522,426      | 38.39             | 1,309            | 820,850      | 60.32             | 5                | 15,759       | 1.16              | 1,360,760          |
| 1953.....                              | 66                  | 600,449      | 30.14             | 1,482            | 1,331,823    | 66.85             | 4                | 60,071       | 3.01              | 1,992,343          |
| 1949.....                              | 40                  | 111,834      | 10.96             | 1,382            | 857,902      | 84.04             | 5                | 51,063       | 5.00              | 1,020,799          |

NOTE: Gear counts represent the maximum number of units delivering sockeye on any single day.  
Unlisted troll catches of sockeye included in figures for total catch.

TABLE II  
CYCLIC LANDINGS AND PACKS OF SOCKEYE  
FROM CONVENTION WATERS

|                                    | <i>United States</i> | <i>Canada</i> | <i>Total</i> |
|------------------------------------|----------------------|---------------|--------------|
| 1961                               |                      |               |              |
| Total Landings (No. Sockeye) ..... | 1,378,392            | 1,357,099     | 2,735,491    |
| Share in Fish .....                | 50.39%               | 49.61%        |              |
| Total Pack (48 lb. Cases) .....    | 119,197              | 116,231       | 235,428      |
| Share in Pack .....                | 50.63%               | 49.37%        |              |
| 1957                               |                      |               |              |
| Total Landings (No. Sockeye) ..... | 1,689,265            | 1,360,760     | 3,050,025    |
| Share in Fish .....                | 55.39%               | 44.61%        |              |
| Total Pack (48 lb. Cases) .....    | 119,985              | 99,398        | 219,383      |
| Share in Pack .....                | 54.69%               | 45.31%        |              |
| 1946 - 1961                        |                      |               |              |
| Total Landings (No. Sockeye) ..... | 29,343,433           | 29,220,014    | 58,563,447   |
| Share in Fish .....                | 50.11%               | 49.89%        |              |
| Total Pack (48 lb. Cases) .....    | 2,577,384            | 2,533,416     | 5,110,800    |
| Share in Pack .....                | 50.43%               | 49.57%        |              |
| 1961 <i>Cycle Catch</i>            |                      |               |              |
| 1961 .....                         | 1,378,392            | 1,357,099     | 2,735,491    |
| 1957 .....                         | 1,689,265            | 1,360,760     | 3,050,025    |
| 1953 .....                         | 2,032,437            | 1,992,343     | 4,024,780    |
| 1949 .....                         | 1,056,792            | 1,020,799     | 2,077,591    |
| 1945 .....                         | 706,464              | 969,444       | 1,675,908    |
| 1941 .....                         | 1,558,554            | 2,116,723     | 3,675,277    |
| 1937 .....                         | 897,022              | 1,075,986     | 1,973,008    |
| 1933 .....                         | 1,724,127            | 726,309       | 2,450,436    |
| 1929 .....                         | 1,334,141            | 725,037       | 2,059,178    |
| 1925 .....                         | 1,375,012            | 453,704       | 1,828,716    |
| 1921 .....                         | 1,199,929            | 486,312       | 1,686,241    |
| 1917 .....                         | 5,005,609            | 1,877,792     | 6,883,401    |
| 1913 .....                         | 21,736,398           | 9,606,641     | 31,343,039   |
| 1909 .....                         | 13,664,988           | 7,261,486     | 20,926,474   |
| 1905 .....                         | 10,330,277           | 10,350,959    | 20,681,236   |
| 1901 .....                         | 13,694,032           | 12,065,999    | 25,760,031   |

TABLE III  
DAILY CATCH OF SOCKEYE, 1949-1953-1957-1961 FROM UNITED STATES CONVENTION WATERS

| Date                                | JULY    |           |         |           | AUGUST  |         |         |         | SEPTEMBER |           |           |           |
|-------------------------------------|---------|-----------|---------|-----------|---------|---------|---------|---------|-----------|-----------|-----------|-----------|
|                                     | 1949    | 1953      | 1957    | 1961      | 1949    | 1953    | 1957    | 1961    | 1949      | 1953      | 1957      | 1961      |
| 1 .....                             |         | 24,386    | 10,165  |           | 112,059 |         |         | 128,699 | 6,451     | 1,307     |           |           |
| 2 .....                             |         | 32,371    | 11,833  |           | 66,263  |         |         | 75,733  | 4,114     | 1,050     | 7,288     |           |
| 3 .....                             |         | 39,812    | 13,977  | 47,926    | 66,061  |         |         |         |           | 1,027     | 25,515    |           |
| 4 .....                             |         |           |         | 43,037    |         | 53,277  |         |         | 4,205     | 2,944     | 19,653    |           |
| 5 .....                             |         |           |         | 28,585    | 43,876  | 50,531  | 247,511 |         | 3,630     |           |           |           |
| 6 .....                             |         | 48,620    |         |           |         | 24,955  | 135,265 |         | 2,195     | 1,104     |           |           |
| 7 .....                             |         | 69,419    |         |           |         | 24,647  |         |         | 1,396     | 780       |           |           |
| 8 .....                             |         | 54,566    | 42,804  |           | 70,218  |         |         |         | 897       | 757       |           |           |
| 9 .....                             |         | 57,159    | 57,639  |           | 52,151  |         |         |         | 564       | 892       | 1,852     |           |
| 10 .....                            |         | 31,169    | 23,464  | 143,287   | 31,270  | 35,819  |         | 82,844  |           | 509       | 3,333     |           |
| 11 .....                            |         |           |         | 89,786    | 27,071  | 31,244  |         |         | 452       | 604       | 4,583     |           |
| 12 .....                            |         |           |         |           | 29,923  | 21,641  | 169,312 |         | 311       |           | 1,451     |           |
| 13 .....                            |         | 15,334    |         |           |         | 18,034  | 121,946 |         | 216       | 423       | 5         |           |
| 14 .....                            | CLOSED  | 26,643    |         |           |         | 16,328  | 71,364  |         | 47        | 331       |           |           |
| 15 .....                            |         | 33,817    | 39,662  |           | 31,651  |         |         | 18,748  | 28        | 339       |           |           |
| 16 .....                            |         | 35,230    | 37,687  |           | 21,509  |         |         | 5,241   | 22        | 228       | 109       |           |
| 17 .....                            |         | 21,961    | 33,138  | 49,754    | 22,065  | 18,173  |         |         |           | 637       | 610       |           |
| 18 .....                            |         |           |         | 43,233    | 21,059  | 14,384  |         |         | 92        | 17        | 170       | 22        |
| 19 .....                            |         |           |         | 34,815    | 17,864  | 16,544  | 49,619  |         | 119       |           |           | 10        |
| 20 .....                            |         |           |         |           |         | 8,017   | 45,223  |         | 94        | 60        |           | 6         |
| 21 .....                            |         | 175,068   |         |           | 19,173  | 14,939  | 28,689  | 11,491  | 41        | 22        |           |           |
| 22 .....                            |         | 109,925   | 95,124  |           | 15,040  |         | 27,606  | 6,038   | 16        | 5         |           |           |
| 23 .....                            |         | 165,742   | 78,735  |           | 16,475  |         |         |         | 28        | 8         | 24        |           |
| 24 .....                            |         |           | 52,762  | 199,232   | 12,852  | 14,521  |         |         |           | 9         | 29        |           |
| 25 .....                            | 3,916   |           |         | 117,345   | 9,725   | 8,796   |         |         | 23        |           | 8         | 11        |
| 26 .....                            | 43,196  |           |         | 73,843    | 12,924  | 6,949   | 22,237  | CLOSED  | 25        |           |           | 33        |
| 27 .....                            | 116,793 | 213,804   |         |           |         | 7,891   | 16,538  |         | 24        | 1         |           | 10        |
| 28 .....                            | 82,812  | 147,109   |         |           | 8,262   | 6,569   | 12,724  |         | 6         |           |           |           |
| 29 .....                            | 44,979  | 77,777    | 63,287  |           | 6,052   |         | 7,420   |         | 1         |           |           |           |
| 30 .....                            |         | 90,768    | 61,061  |           | 5,768   | 2,574   |         |         |           | 11        |           |           |
| 31 .....                            |         |           | 46,297  | 161,484   | 8,678   | 2,860   |         |         |           |           |           |           |
| Totals .....                        | 291,696 | 1,470,680 | 667,635 | 1,032,327 | 727,989 | 398,693 | 955,454 | 328,794 | 24,997    | 13,065    | 64,630    | 92        |
| Troll and<br>outside<br>seine ..... |         | 31,396    |         | 750       | 11,966  | 38,496  |         | 380     | 144       | 60        |           |           |
| Monthly<br>Totals .....             | 291,696 | 1,502,076 | 667,635 | 1,033,077 | 739,955 | 437,189 | 955,454 | 329,174 | 25,141    | 13,125    | 64,630    | 92        |
| June, Oct. & Nov. Totals            |         |           |         |           |         |         |         |         |           | 80,047    | 1,546     | 16,049    |
| Season Totals                       |         |           |         |           |         |         |         |         | 1,056,792 | 2,032,437 | 1,689,265 | 1,378,392 |

TABLE IV  
DAILY CATCH OF SOCKEYE, 1949-1953-1957-1961 FROM CANADIAN CONVENTION WATERS

| Date                       | JULY    |           |         |           | AUGUST  |         |         |         | SEPTEMBER |           |           |           |
|----------------------------|---------|-----------|---------|-----------|---------|---------|---------|---------|-----------|-----------|-----------|-----------|
|                            | 1949    | 1953      | 1957    | 1961      | 1949    | 1953    | 1957    | 1961    | 1949      | 1953      | 1957      | 1961      |
| 1                          |         | 33,417    | 19      |           | 154,935 |         | 36,393  | 109,677 | 4,683     | 4,397     |           |           |
| 2                          |         | 36,323    | 274     |           | 83,461  |         |         |         | 772       | 4,038     | 9,419     |           |
| 3                          |         | 2,287     | 1,658   | 36,879    | 68,945  | 91,326  |         |         |           | 4,797     | 4,956     |           |
| 4                          |         |           | 1,157   | 7,930     | 63,618  | 54,086  |         |         |           | 246       | 3,328     |           |
| 5                          |         |           |         |           | 50,283  | 48,611  | 83,204  |         | 5,622     |           | 1,920     | 53        |
| 6                          |         | 72,602    |         |           |         | 38,493  | 138,428 |         | 2,413     |           | 1,619     | 18        |
| 7                          |         | 36,926    |         |           |         | 6,820   | 52,297  |         | 1,704     | 6,321     |           |           |
| 8                          |         | 22,165    | 68      |           | 73,872  |         |         |         | 1,302     | 5,136     |           |           |
| 9                          |         | 27,665    |         |           | 35,418  |         |         | 28,636  | 177       | 6,556     | 67        |           |
| 10                         |         | 2,500     | 4,529   | 109,597   | 24,834  | 20,889  |         | 23,368  |           | 7,067     | 11,153    |           |
| 11                         |         |           | 67      | 27,730    | 36,180  | 60,670  |         |         |           | 89        | 6,060     |           |
| 12                         |         |           |         | 34,089    | 400     | 37,370  | 37,115  |         | 3,811     |           | 3,340     | 7         |
| 13                         |         | 28,227    |         | 46,966    |         | 36,956  | 104,138 | 52,261  | 3,558     |           | 1,833     | 4         |
| 14                         |         | 16,936    |         |           |         | 19,232  | 81,215  | 18,609  | 5,437     | 32        |           |           |
| 15                         |         | 21,295    |         |           | 32,850  |         | 85,221  | 21,972  | 4,373     | 14        |           |           |
| 16                         |         | 24,817    | 31,184  |           | 16,564  |         |         | 7,407   | 2,934     | 14,700    | 2,753     |           |
| 17                         |         | 4,809     | 17,143  | 86,946    | 15,140  | 31,843  |         |         |           | 8,126     | 4,224     |           |
| 18                         |         |           | 17,281  | 44,527    | 15,358  | 13,370  |         |         |           | 2         | 2,102     |           |
| 19                         | 2,043   |           |         |           | 1,419   | 10,734  | 24,722  |         | 2,084     |           | 763       | 2         |
| 20                         | 2,102   | 93,156    |         |           |         | 13,397  | 62,386  |         | 1,709     |           | 924       | 3         |
| 21                         | 1,443   | 128,664   |         |           |         | 7,066   | 40,463  | 17,815  | 1,689     |           |           | 2         |
| 22                         | 1,440   | 112,022   | 72,300  |           | 15,697  |         | 31,909  | 5,898   | 1,321     |           |           |           |
| 23                         |         | 87,223    | 82,253  |           | 7,780   |         |         |         |           |           |           |           |
| 24                         |         |           | 53,025  | 217,241   | 6,792   | 10,945  |         |         |           |           | 1         |           |
| 25                         | 38,191  |           | 20,679  | 153,593   | 6,699   | 4,916   |         |         |           |           |           |           |
| 26                         | 28,963  |           |         | 98,121    | 290     | 2,929   | 25,088  |         | 6,139     |           |           | 11        |
| 27                         | 49,822  | 40,629    |         |           |         | 4,860   | 12,623  |         | 1,544     |           |           |           |
| 28                         | 64,646  | 249,362   |         |           |         | 1,024   | 9,799   | 5,630   | 455       |           |           | 1         |
| 29                         | 4,425   | 130,898   | 13,254  |           | 12,778  |         | 1,836   | 1,831   | 1,266     |           |           |           |
| 30                         |         | 140,486   | 83,664  |           | 4,585   |         |         |         |           |           |           |           |
| 31                         |         | 7,932     | 75,599  | 179,254   | 4,189   | 6,869   |         |         |           |           |           |           |
| Totals                     | 193,075 | 1,320,341 | 474,154 | 1,042,837 | 732,087 | 522,406 | 826,837 | 293,104 | 52,993    | 61,521    | 54,462    | 101       |
| Troll and<br>outside seine | 1,995   |           | 662     | 4,976     | 22,716  | 474     | 1,001   | 2,363   | 114       |           | 37        | 4,236     |
| Spring Salmon<br>gill nets |         |           |         |           |         |         |         |         |           | 212       |           | 625       |
| Monthly<br>Totals          | 195,070 | 1,320,341 | 474,816 | 1,047,849 | 754,803 | 522,880 | 827,838 | 295,467 | 53,107    | 61,733    | 54,499    | 4,962     |
| June, Oct. & Nov. Totals   |         |           |         |           |         |         |         |         | 17,819    | 87,389    | 3,607     | 8,821     |
| Season Totals              |         |           |         |           |         |         |         |         | 1,020,799 | 1,992,343 | 1,360,760 | 1,357,099 |

STRIKE RELIEF FISHING

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REPORT FOR 1961

TABLE V  
THE INDIAN CATCHES OF SOCKEYE SALMON BY DISTRICTS  
AND THE VARIOUS AREAS WITHIN THESE DISTRICTS, 1957, 1961

| <i>District and Area</i>                  | 1957          |                         | 1961           |                         |
|---|---------------|-------------------------|----------------|-------------------------|
|   | <i>Catch</i>  | <i>No. of Fishermen</i> | <i>Catch</i>   | <i>No. of Fishermen</i> |
| <b>HARRISON-BIRKENHEAD</b>                |               |                         |                |                         |
| Skookumchuck and Douglas .....            | 1,180         |                         | 770            | 37                      |
| Birkenhead River and Lillooet Lake .....  | 3,830         |                         | 4,590          | 10+                     |
| Harrison and Chehalis .....               | 550           |                         | 1 290          | 25                      |
| <b>TOTALS</b> .....                       | <b>5,560</b>  |                         | <b>6,560</b>   |                         |
| <b>LOWER FRASER</b>                       |               |                         |                |                         |
| Coquitlam to Chilliwack .....             | 5,425         |                         | 20,016         | 115+                    |
| Chilliwack to Hope .....                  | 2,190         |                         | 15,170         | 140                     |
| Vedder River and Vicinity .....           |               |                         | 15,759         | 60                      |
| <b>TOTALS</b> .....                       | <b>7,615</b>  |                         | <b>50,945</b>  |                         |
| <b>CANYON</b>                             |               |                         |                |                         |
| Hope to Lytton .....                      | 15,200        |                         | 33,000         |                         |
| <b>TOTALS</b> .....                       | <b>15,200</b> |                         | <b>33,000</b>  | <b>120</b>              |
| <b>LYTTON-LILLOOET</b>                    |               |                         |                |                         |
| Lytton to Lillooet .....                  | 6,400         |                         | 5,600          |                         |
| <b>TOTALS</b> .....                       | <b>6,400</b>  |                         | <b>5,600</b>   | <b>67</b>               |
| <b>BRIDGE RIVER RAPIDS</b>                |               |                         |                |                         |
| Rapids .....                              | 11,100        |                         | 8,400          |                         |
| Pavillion .....                           | 600           |                         | 1,500          |                         |
| <b>TOTALS</b> .....                       | <b>11,700</b> |                         | <b>9,900</b>   | <b>135</b>              |
| <b>CHILCOTIN</b>                          |               |                         |                |                         |
| Farwell Canyon .....                      | 1,486         |                         | 942            |                         |
| Hances Canyon .....                       | 1,512         |                         | 1,337          |                         |
| Alexis Creek .....                        | 5,710         |                         | 630            |                         |
| Siwash Bridge .....                       | 4,394         |                         | 963            |                         |
| Keighley Holes .....                      | 1,590         |                         | 0              |                         |
| <b>TOTALS</b> .....                       | <b>14,692</b> | <b>63*</b>              | <b>3 872</b>   | <b>60</b>               |
| <b>UPPER FRASER</b>                       |               |                         |                |                         |
| Shelley .....                             | 180           |                         | 38             |                         |
| Alkali and Canoe Creek .....              | 400           |                         | 275            |                         |
| Chimney Creek .....                       | 3,823         |                         | 1,555          |                         |
| Soda Creek .....                          | 780           |                         | 550            |                         |
| Alexandria .....                          | 230           |                         | 425            |                         |
| Quesnel .....                             | 575           |                         | 400            |                         |
| <b>TOTALS</b> .....                       | <b>5,988</b>  | <b>82</b>               | <b>3,243</b>   | <b>73</b>               |
| <b>NECHAKO</b>                            |               |                         |                |                         |
| Nautley Reserve .....                     | 4,481         | 11                      | 4,136          | 19                      |
| Stella Reserve .....                      | 2,842         | 12                      | 1,881          | 16                      |
| <b>TOTALS</b> .....                       | <b>7,323</b>  | <b>23</b>               | <b>6,017</b>   | <b>35</b>               |
| <b>STUART</b>                             |               |                         |                |                         |
| Fort St. James .....                      | 11,628        | 57                      | 11,163         | 47                      |
| Tachie, Pinchi & Tremblcur Villages ..... | 6,421         | 23                      | 5,888          | 55                      |
| <b>TOTALS</b> .....                       | <b>18,049</b> | <b>80</b>               | <b>17,051</b>  | <b>102</b>              |
| <b>THOMPSON</b>                           |               |                         |                |                         |
| Main Thompson River .....                 | 2,045         |                         | 835            | 89                      |
| North Thompson River .....                | 1,685         |                         | 95             | 42                      |
| South Thompson River .....                | 240           |                         | 410            | 102                     |
| <b>TOTALS</b> .....                       | <b>3,970</b>  |                         | <b>1,340</b>   | <b>233</b>              |
| <b>GRAND TOTALS</b> .....                 | <b>96,497</b> |                         | <b>137,528</b> |                         |

\* Number of permits issued to Indians in district.

The Indian catch statistics detailed above are obtained principally from the Protection Officers of the Canadian Dept. of Fisheries. These officers control the taking of sockeye for food by the Indian population residing throughout the Fraser River watershed.

TABLE VI  
SUMMARY OF THE SOCKEYE ESCAPEMENT TO THE FRASER  
RIVER SPAWNING AREAS, 1949, 1953, 1957, 1961

| District and Streams       | 1961<br>Period of<br>Peak Spawning | Estimated Number of Sockeye |                  |                  |                  | Jacks         | Sex Ratio      |                |
|----------------------------|------------------------------------|-----------------------------|------------------|------------------|------------------|---------------|----------------|----------------|
|                            |                                    | 1949                        | 1953             | 1957             | 1961             |               | Males          | Females        |
|                            |                                    |                             |                  |                  |                  |               | 4-5 yr.        | 4-5 yr.        |
| <b>LOWER FRASER</b>        |                                    |                             |                  |                  |                  |               |                |                |
| Cultus Lake .....          | Nov. 25-28                         | 9,301                       | 13,000           | 20,647           | 15,428           | 2,032         | 6,363          | 7,033          |
| Upper Pitt River .....     | Sept. 12-18                        | 9,500                       | 18,693           | 12,338           | 11,162           | 4             | 4,540          | 6,618          |
| Pitt Lake .....            | -----                              | -----                       | 350              | -----            | -----            | -----         | -----          | -----          |
| Widgeon Slough .....       | Oct. 28-Nov. 1                     | 650                         | 1,518            | 1,200            | 1,293            | 2             | 681            | 610            |
| <b>LARRISON</b>            |                                    |                             |                  |                  |                  |               |                |                |
| Big Silver Creek .....     | Sept. 19-26                        | 2,100                       | 432              | 389              | 398              | 0             | 199            | 199            |
| Harrison River .....       | Nov. 10-18                         | 8,000                       | 21,328           | 3,812            | 42,778           | 5             | 20,829         | 21,944         |
| Weaver Creek .....         | Oct. 18-21                         | 12,520                      | 9,530            | 20,887           | 4,383            | 137           | 1,855          | 2,391          |
| Misc. Streams .....        | -----                              | 310                         | 86               | -----            | 11               | 0             | 5              | 6              |
| <b>ILLOOET</b>             |                                    |                             |                  |                  |                  |               |                |                |
| Birkenhead River .....     | Sept. 24-28                        | 74,300                      | 53,111           | 24,168           | 49,627           | 17,946        | 15,322         | 16,359         |
| <b>ETON-ANDERSON</b>       |                                    |                             |                  |                  |                  |               |                |                |
| Gates Creek .....          | Aug. 29-Sept. 3                    | -----                       | 78               | 1,112            | 252              | 4             | 124            | 124            |
| Portage Creek .....        | Oct. 25-28                         | -----                       | 200              | 470              | 527              | 504           | 11             | 12             |
| <b>SOUTH THOMPSON</b>      |                                    |                             |                  |                  |                  |               |                |                |
| Seymour River .....        | Aug. 31-Sept. 2                    | 10,772                      | 5,947            | 14,095           | 5,822            | 2,200         | 1,492          | 2,130          |
| Scotch Creek .....         | Aug. 30-Sept. 3                    | 1,000                       | 1,364            | 2,354            | 598              | 0             | 257            | 341            |
| Lower Adams River .....    | Oct. 21-23                         | 11,700                      | 177,000          | 257,614          | 57,796           | 56,364        | 616            | 816            |
| Little River .....         | Oct. 21-23                         | 9,615                       | 32,118           | 34,964           | 8,253            | 8,070         | 79             | 104            |
| South Thompson River ..... | Oct. 21-23                         | 5                           | 12,614           | 14,645           | 254              | 250           | 1              | 3              |
| <b>NORTH THOMPSON</b>      |                                    |                             |                  |                  |                  |               |                |                |
| Raft River .....           | Sept. 3-6                          | 5,900                       | 8,242            | 7,264            | 7,301            | 8             | 3,280          | 4,013          |
| Barriere River .....       | Sept. 6-8                          | -----                       | -----            | 38               | 335              | 0             | 163            | 172            |
| North Thompson River ..... | Oct. 1-3                           | -----                       | -----            | -----            | 225              | 0             | 112            | 113            |
| <b>HILCOTIN</b>            |                                    |                             |                  |                  |                  |               |                |                |
| Chilko River .....         | Sept. 24-27                        | 59,000                      | 197,660          | 140,765          | 40,315           | 1,214         | 15,515         | 23,586         |
| Taseko Lake .....          | -----                              | 100                         | 4,422            | 3,667            | 80               | 0             | 40             | 40             |
| <b>MUESNEL</b>             |                                    |                             |                  |                  |                  |               |                |                |
| Horsefly River .....       | Aug. 28-Aug. 31                    | 20,000                      | 105,218          | 226,378          | 295,705          | 9             | 115,826        | 179,870        |
| Mitchell River .....       | Sept. 4-6                          | 350                         | 2,344            | 2,677            | 6,601            | 0             | 2,574          | 4,027          |
| <b>VECHAKO</b>             |                                    |                             |                  |                  |                  |               |                |                |
| Endako River .....         | -----                              | 1,100                       | 605              | 110              | 0                | 0             | 0              | 0              |
| Nadina River (Early) ..... | Aug. 25-27                         | 21,600                      | 38,574           | 30,000           | 18,885           | 2             | 7,473          | 11,410         |
| Nadina River (Late) .....  | Sept. 20-23                        | -----                       | -----            | 29,146           | 17,544           | 2             | 8,768          | 8,774          |
| Nithi River .....          | Aug. 31-Sept. 3                    | 1,400                       | 1,208            | 1,186            | 146              | 0             | 67             | 79             |
| Ormonde Creek .....        | -----                              | 2,500                       | 956              | 450              | 0                | 0             | 0              | 0              |
| Stellako River .....       | Sept. 26-29                        | 104,800                     | 45,057           | 38,922           | 47,241           | 378           | 21,391         | 25,472         |
| <b>STUART</b>              |                                    |                             |                  |                  |                  |               |                |                |
| <i>Early Runs</i>          |                                    |                             |                  |                  |                  |               |                |                |
| Ankwil Creek .....         | Aug. 2-6                           | 750                         | 5,913            | 8,285            | 18,468           | 0             | 8,390          | 10,078         |
| Bivouac Creek .....        | Aug. 2-6                           | 12,900                      | 8,994            | 9,464            | 997              | 0             | 541            | 456            |
| Driftwood River .....      | Aug. 11-13                         | 450                         | 8,655            | 45,567           | 81,617           | 90            | 36,662         | 44,865         |
| Dust Creek .....           | Aug. 2-6                           | 7,800                       | 16,891           | 14,827           | 10,870           | 25            | 3,833          | 7,012          |
| Felix Creek .....          | Aug. 1-5                           | -----                       | 805              | 7,081            | 3,082            | 4             | 1,384          | 1,694          |
| 15 Mile Creek .....        | Aug. 2-6                           | 200                         | 794              | 511              | 922              | 0             | 395            | 527            |
| 5 Mile Creek .....         | Aug. 2-6                           | 600                         | 2,632            | 3,821            | 731              | 0             | 352            | 379            |
| Forfar Creek .....         | July 31-Aug. 3                     | 80,500                      | 18,054           | 17,975           | 13,599           | 26            | 6,171          | 7,402          |
| Forsythe Creek .....       | Aug. 2-6                           | 1,200                       | 4,500            | 6,385            | 5,836            | 0             | 2,738          | 3,098          |
| Frypan Creek .....         | Aug. 2-6                           | 750                         | 4,566            | 3,890            | 10,595           | 0             | 5,210          | 5,385          |
| Gluske Creek .....         | July 31-Aug. 3                     | 106,000                     | 16,074           | 21,899           | 5,652            | 6             | 2,801          | 2,845          |
| Kynoch Creek .....         | July 31-Aug. 3                     | 185,400                     | 16,676           | 13,473           | 16,170           | 38            | 6,579          | 9,553          |
| Leo Creek .....            | Aug. 2-6                           | 1,700                       | 6,361            | 10,620           | 1,624            | 0             | 743            | 881            |
| Narrows Creek .....        | Aug. 2-6                           | 20,700                      | 20,604           | 16,184           | 7,897            | 13            | 3,625          | 4,259          |
| Paula Creek .....          | Aug. 2-6                           | -----                       | 1,406            | 7,918            | 1,400            | 0             | 651            | 749            |
| Rossette Creek .....       | July 31-Aug. 3                     | 152,900                     | 6,355            | 7,087            | 4,993            | 21            | 2,080          | 2,892          |
| Sakeniche River .....      | Aug. 2-6                           | 150                         | 3,382            | 6,340            | 5,278            | 0             | 2,441          | 2,837          |
| Sandpoint Creek .....      | Aug. 2-6                           | -----                       | 2,092            | 20,914           | 3,523            | 4             | 1,635          | 1,884          |
| Shale Creek .....          | Aug. 2-6                           | 3,000                       | 3,809            | 1,606            | 2,392            | 0             | 804            | 1,588          |
| 25 Mile Creek .....        | Aug. 2-6                           | 3,300                       | 2,167            | 724              | 1,663            | 0             | 770            | 893            |
| Misc. Streams .....        | Aug. 2-6                           | 1,112                       | 3,392            | 10,462           | 3,911            | 4             | 1,764          | 2,143          |
| <i>Late Runs</i>           |                                    |                             |                  |                  |                  |               |                |                |
| Kazchek Creek .....        | Sept. 15-18                        | 1,500                       | 7,903            | 19,582           | 15,676           | 0             | 5,366          | 10,310         |
| Kuzkwa Creek .....         | Sept. 18-21                        | -----                       | 3,686            | 50,006           | 39,245           | 24            | 14,638         | 24,583         |
| Middle River .....         | Sept. 15-18                        | 126,400                     | 235,572          | 332,098          | 177,516          | 100           | 75,716         | 101,700        |
| Pinchi Creek .....         | Sept. 15-18                        | -----                       | 72               | 6,390            | 527              | 0             | 192            | 335            |
| Sakeniche River .....      | Sept. 15-18                        | -----                       | 104              | 592              | 1,094            | 0             | 440            | 654            |
| Tachie River .....         | Sept. 19-24                        | 20,000                      | 107,506          | 118,252          | 177,047          | 94            | 66,044         | 110,909        |
| <b>NORTHEAST</b>           |                                    |                             |                  |                  |                  |               |                |                |
| Upper Bowron River .....   | -----                              | 22,283                      | 13,517           | 12,069           | 7,460            | 11            | 3,286          | 4,163          |
| <b>TOTALS.....</b>         |                                    | <b>1,116,118</b>            | <b>1,274,346</b> | <b>1,663,320</b> | <b>1,253,012</b> | <b>89,591</b> | <b>482,939</b> | <b>680,482</b> |

TABLE VII  
DAILY CATCH OF SOCKEYE, 1946-1950-1954-1958 FROM UNITED STATES CONVENTION WATERS

| Date                                | JULY   |        |         |        | AUGUST    |           |           |           | SEPTEMBER |           |           |           |
|-------------------------------------|--------|--------|---------|--------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
|                                     | 1946   | 1950   | 1954    | 1958   | 1946      | 1950      | 1954      | 1958      | 1946      | 1950      | 1954      | 1958      |
| 1 .....                             |        |        | 1,332   |        | 10,836    | 15,403    |           |           | 53,804    |           | 472,636   | 170,818   |
| 2 .....                             |        |        | 6,000   |        | 8,874     | 20,880    | 30,780    |           | 131,748   |           | 446,988   | 326,983   |
| 3 .....                             |        |        |         |        |           | 25,058    | 39,131    |           | 92,579    |           | 173,977   | 218,732   |
| 4 .....                             |        |        |         |        | 12,163    |           | 40,284    | 27,722    | 71,241    |           |           | 182,785   |
| 5 .....                             |        |        | 16,232  |        | 7,745     |           | 29,590    | 17,753    | 62,452    |           |           | 255,742   |
| 6 .....                             |        |        | 8,509   |        | 15,543    | 16,961    | 33,758    | 9,482     | 79,725    |           | 117,704   | 361,549   |
| 7 .....                             |        |        | 6,623   |        | 34,586    | 34,588    |           |           |           | 951       | 115,016   | 278,614   |
| 8 .....                             |        |        | 12,660  |        | 47,960    | 48,134    |           |           | 41,085    | 712       | 66,966    | 251,967   |
| 9 .....                             |        |        | 8,676   |        | 38,902    | 41,470    | 91,674    |           | 94,111    |           | 71,330    | 270,105   |
| 10 .....                            |        |        |         |        |           | 36,990    | 105,771   |           | 103,522   | 206       | 42,100    | 99,657    |
| 11 .....                            |        |        |         |        | 23,838    |           | 90,326    | 47,540    | 92,895    | 392       | 10,441    | 83,545    |
| 12 .....                            | CLOSED | CLOSED | 22,095  |        | 23,799    |           | 97,704    | 52,692    | 13,347    | 296       | 7,646     | 74,324    |
| 13 .....                            |        |        | 18,854  |        | 29,522    | 55,865    | 46,749    | 48,236    | 7,562     | 52        | 8,952     | 71,025    |
| 14 .....                            |        |        | 10,979  |        | 35,193    | 26,563    |           |           |           | 62        | 8,796     | 100,305   |
| 15 .....                            |        |        | 10,248  |        | 34,903    | 18,115    |           |           | 8,342     | 40        | 10,409    | 44,837    |
| 16 .....                            |        |        | 12,450  |        | 43,047    | 36,042    | 36,495    |           | 8,599     |           | 2,412     | 22,421    |
| 17 .....                            |        |        |         |        |           | 52,889    | 72,456    |           | 21,893    | 898       | 1,229     | 80,171    |
| 18 .....                            |        |        |         |        | 27,381    |           | 39,634    |           | 9,173     | 483       | 635       | 13,319    |
| 19 .....                            |        |        | 58,708  |        | 43,713    |           | 28,883    |           | 11,005    | 2,427     | 397       | 4,598     |
| 20 .....                            |        |        | 30,317  |        | 63,070    | 138,217   | 58,703    | 51,984    | 705       | 365       | 1,328     |           |
| 21 .....                            |        |        | 27,814  | 4,014  | 64,503    | 153,568   |           | 67,331    |           | 124       | 1,399     |           |
| 22 .....                            |        |        | 24,719  | 6,199  | 55,089    |           | 91,515    | 62,943    | 4,882     | 67        | 1,239     | 22,260    |
| 23 .....                            |        |        | 32,708  | 4,346  | 54,416    | 100,173   | 114,790   |           | 2,197     |           | 457       | 277,405   |
| 24 .....                            |        |        |         |        |           | 131,748   | 83,238    |           | 1,696     | 12        | 308       | 6,769     |
| 25 .....                            | 305    |        |         |        | 89,452    | 107,788   | 131,074   | 162,816   | 1,846     | 21        | 24        | 17,815    |
| 26 .....                            | 87     |        |         |        | 134,956   |           | 154,114   | 116,752   |           | 14        | 358       |           |
| 27 .....                            |        |        | 74,196  |        | 290,642   | 83,504    | 232,693   | 156,081   |           | 17        | 401       |           |
| 28 .....                            | 172    |        | 51,039  | 19,972 | 542,836   | 38,212    |           | 195,990   |           | 18        | 430       |           |
| 29 .....                            | 321    |        | 43,155  | 10,697 | 366,879   |           | 406,321   | 218,385   |           | 11        | 159       | 42,564    |
| 30 .....                            | 189    |        | 35,233  | 8,253  | 531,426   | 16,818    | 291,987   | 249,106   |           |           | 96        | 145,499   |
| 31 .....                            | 4,302  | 14,286 |         |        |           |           | 359,793   | 173,652   |           |           |           |           |
| Totals .....                        | 5,376  | 14,286 | 492,547 | 53,481 | 2,631,274 | 1,198,986 | 2,707,463 | 1,658,465 | 914,409   | 7,168     | 1,563,833 | 3,423,809 |
| Troll and<br>outside<br>seine ..... |        |        | 3,566   | 26     | 247       |           | 32,348    | 1,092     |           | 453       |           | 109       |
| Monthly<br>Totals .....             | 5,376  | 14,286 | 496,113 | 53,507 | 2,631,521 | 1,198,986 | 2,739,811 | 1,659,557 | 914,409   | 7,621     | 1,563,833 | 3,423,918 |
| June, Oct. & Nov. Totals            |        |        |         |        |           |           |           |           | 4         |           | 6,501     | 120,334   |
| Season Totals                       |        |        |         |        |           |           |           |           | 3,551,310 | 1,220,893 | 4,806,258 | 5,257,316 |

TABLE VIII  
DAILY CATCH OF SOCKEYE, 1946-1950-1954-1958 FROM CANADIAN CONVENTION WATERS

| Date                                | JULY   |        |         |         | AUGUST  |         |           |           | SEPTEMBER |         |           |           |
|-------------------------------------|--------|--------|---------|---------|---------|---------|-----------|-----------|-----------|---------|-----------|-----------|
|                                     | 1946   | 1950   | 1954    | 1958    | 1946    | 1950    | 1954      | 1958      | 1946      | 1950    | 1954      | 1958      |
| 1 .....                             |        |        | 2,203   | 831     | 946     | 25,874  |           |           |           | 312     | 91,014    | 385,773   |
| 2 .....                             |        |        | 250     | 1,695   | 947     | 26,390  | 152,014   |           | 67,498    |         | 152,294   | 466,479   |
| 3 .....                             |        |        |         |         |         | 30,775  | 72,397    |           | 146,709   | 120     | 120,470   | 401,799   |
| 4 .....                             |        |        |         |         |         |         | 34,165    | 22,502    | 190,107   | 19,760  |           | 458,172   |
| 5 .....                             |        |        | 14,594  |         | 72      | 58,122  | 7,241     |           | 144,135   | 12,062  | 9,963     | 175,892   |
| 6 .....                             |        |        | 10,423  |         | 230     | 11,031  | 36,874    | 5,521     | 93,529    | 26,320  | 166,818   |           |
| 7 .....                             |        |        | 7,710   | 7,239   | 71      | 53,074  |           |           |           | 978     | 128,713   |           |
| 8 .....                             |        |        | 7,809   | 4,918   | 14,075  | 31,653  |           |           |           | 150     | 96,413    | 159,126   |
| 9 .....                             |        |        | 495     | 7,149   | 7,475   | 20,121  | 398       |           | 120,686   |         | 101,374   | 199,470   |
| 10 .....                            |        |        |         |         |         | 21,189  | 3,731     |           | 84,121    | 307     | 148,585   | 141,025   |
| 11 .....                            |        |        |         |         |         | 296     | 3,731     | 36,583    | 599,942   | 50      |           | 145,470   |
| 12 .....                            | CLOSED | CLOSED | 9,652   |         | 61,254  |         | 3,732     | 13,238    | 80,620    | 50      |           | 130,616   |
| 13 .....                            |        |        | 8,436   |         | 29,700  | 14,679  | 398       | 14,050    | 312,505   | 58      | 206,257   |           |
| 14 .....                            |        |        | 7,172   | 14,098  | 21,513  | 49,953  |           |           |           | 16      | 151,204   |           |
| 15 .....                            |        |        | 7,135   | 11,789  | 16,307  | 29,973  |           |           |           | 16      | 180,631   | 2,486     |
| 16 .....                            |        |        | 1,783   | 16,213  | 18,042  | 32,366  | 108,415   |           |           |         | 85        | 2,192     |
| 17 .....                            |        |        |         |         |         | 92,423  |           |           | 327,366   |         |           |           |
| 18 .....                            |        |        |         |         |         | 80,050  |           |           | 218,704   | 16      | 569       | 1,974     |
| 19 .....                            |        |        | 18,778  |         | 53,008  | 55,805  |           |           | 162,323   | 15      | 901       | 597       |
| 20 .....                            |        |        | 12,751  |         | 22,382  | 71,775  | 6,313     | 105,922   | 151,372   | 15      | 904       | 307       |
| 21 .....                            |        |        | 10,854  | 12,140  | 22,574  | 42,085  |           |           | 82        | 15      | 356       |           |
| 22 .....                            |        |        | 15,976  | 6,642   | 27,513  | 29,217  |           |           |           | 10      | 606       |           |
| 23 .....                            |        |        | 8,810   | 9,276   | 33,499  | 45,742  | 158,921   |           |           | 8       | 313       | 119       |
| 24 .....                            |        |        |         |         |         | 52,525  | 235,021   |           | 356,118   |         | 307       | 74        |
| 25 .....                            | 275    |        |         |         |         | 21,972  | 213,480   | 196,072   | 202,150   | 2       | 97        | 66        |
| 26 .....                            | 275    |        | 71,411  |         | 165,805 |         | 539,669   | 219,024   | 25        | 29,233  | 47,355    | 35        |
| 27 .....                            |        |        | 41,306  |         | 324,065 | 3,118   | 265,408   | 339,029   |           | 10,835  | 15,658    | 789       |
| 28 .....                            |        |        | 33,001  | 19,301  | 89,112  | 40,252  |           | 315,589   |           | 10,663  | 10,204    |           |
| 29 .....                            | 187    |        | 33,306  | 9,497   | 36,545  | 19,577  |           | 195,690   |           | 4,980   | 19,086    |           |
| 30 .....                            | 188    |        | 17,346  | 11,443  | 29,361  | 13,918  | 520,136   |           |           |         | 9,287     | 1,198     |
| 31 .....                            | 188    | 31,679 |         |         |         | 7,737   | 48,441    |           |           |         | 4,435     | 391       |
| Totals .....                        | 1,113  | 31,679 | 341,201 | 132,231 | 974,496 | 733,592 | 2,689,644 | 1,996,288 | 3,257,992 | 115,991 | 1,663,899 | 2,674,050 |
| Troll and<br>outside<br>seine ..... |        |        | 3,356   | 350     |         |         | 10,283    | 3,373     |           |         | 103       | 1,131     |
| Spring Salmon<br>gill nets .....    | 1,027  |        |         |         | 1,126   |         |           |           |           |         |           | 263       |
| Monthly<br>Totals .....             | 2,140  | 31,679 | 344,557 | 132,581 | 975,622 | 733,592 | 2,699,927 | 1,999,661 | 3,257,992 | 115,991 | 1,664,002 | 2,675,444 |
| June, Oct. & Nov. Totals            |        |        |         |         |         |         |           |           | 4,444     | 13,207  | 13,977    | 433,931   |
| Season Totals                       |        |        |         |         |         |         |           |           | 4,240,198 | 894,469 | 4,722,463 | 5,241,617 |

TABLE IX  
SUMMARY OF THE SOCKEYE ESCAPEMENT TO THE FRASER  
RIVER SPAWNING AREAS, 1946, 1950, 1954, 1958

| District and Streams        | 1958<br>Period of Peak<br>Spawning        | Estimated Number of Sockeye |                  |                  |                  |
|-----------------------------|---|-----------------------------|------------------|------------------|------------------|
|                             |   | 1946                        | 1950             | 1954             | 1958             |
| <b>LOWER FRASER</b>         |   |                             |                  |                  |                  |
| Cultus Lake .....           | Nov. 25-Dec. 1                            | 33,284                      | 30,595           | 23,756           | 14,097           |
| Upper Pitt River .....      | Sept. 15-23                               | 18,520                      | 42,800           | 17,624           | 10,385           |
| Widgeon Slough .....        | Nov. 5-10                                 | 1,404                       | 600              | 1,000            | 1,152            |
| <b>HARRISON</b>             |   |                             |                  |                  |                  |
| Big Silver Creek .....      |   | —                           | 25               | 279              | —                |
| Harrison River .....        | Nov. 10-15                                | 15,631                      | 33,860           | 28,800           | 14,701           |
| Weaver Creek .....          | Oct. 20-25                                | 36,000                      | 30,700           | 28,773           | 36,199           |
| Misc. Streams .....         |   | 1,200                       | 350              | —                | —                |
| <b>LILLOOET</b>             |   |                             |                  |                  |                  |
| Birkenhead River .....      | Sept. 26-29                               | 90,000                      | 72,767           | 41,201           | 33,055           |
| <b>SETON-ANDERSON</b>       |   |                             |                  |                  |                  |
| Gates Creek .....           | Sept. 12-14                               | —                           | —                | 47               | 81               |
| Portage Creek .....         | Nov. 7-11                                 | —                           | few              | 3,505            | 4,803            |
| <b>SOUTH THOMPSON</b>       |   |                             |                  |                  |                  |
| Seymour River .....         | Sept. 7-10                                | 2,600                       | 12,000           | 26,258           | 78,575           |
| Upper Adams River .....     | Sept. 9-12                                | 0                           | 0                | 205              | Present          |
| Lower Adams River .....     | Oct. 25-Nov. 5                            | 1,841,000                   | 850,500          | 1,532,820        | 1,730,609        |
| Little River .....          | Nov. 1-8                                  | 419,000                     | 376,000          | 427,850          | 409,480          |
| South Thompson River .....  | Nov. 1-8                                  | 92,000                      | 41,500           | 87,611           | 123,864          |
| Lower Shuswap River .....   | Nov. 3-5                                  | —                           | —                | 17,462           | 9,387            |
| Middle Shuswap River .....  | Oct. 28-Nov. 3                            | 0                           | 0                | 0                | 499              |
| Diverted Sockeye .....      |   | 0                           | 0                | 0                | 1,006,177        |
| <b>NORTH THOMPSON</b>       |   |                             |                  |                  |                  |
| Raft River .....            | Sept. 5-9                                 | 3,000                       | 6,400            | 10,551           | 10,215           |
| <b>CHILCOTIN</b>            |   |                             |                  |                  |                  |
| Chilko River .....          | Sept. 27-30                               | 58,950                      | 29,800           | 36,534           | 137,081          |
| Taseko Lake .....           | Sept. 3-6                                 | —                           | 500              | 3,500            | 7,538            |
| <b>QUESNEL</b>              |   |                             |                  |                  |                  |
| Horsefly River .....        | Sept. 7-10                                | 58                          | 400              | 279              | 1,784            |
| Mitchell River .....        | Sept. 23-25                               | 2                           | 0                | 18               | 65               |
| Little Horsefly River ..... | Oct. 15-20                                | —                           | —                | —                | 14               |
| <b>NECHAKO</b>              |   |                             |                  |                  |                  |
| Endako River .....          | Sept. 1-3                                 | 368                         | 900              | Present          | 522              |
| Nadina River .....          | Sept. 12-18 (Early)<br>Sept. 20-24 (Late) | 66                          | 1,950            | 2,219            | 804              |
| Nithi River .....           |   | 4                           | 125              | 46               | 5                |
| Ormonde Creek .....         | Sept. 5-7                                 | 193                         | 732              | 538              | 210              |
| Stellako River .....        | Sept. 29-Oct. 4                           | 245,200                     | 145,100          | 142,632          | 112,273          |
| Uncha Creek .....           | Sept. 24-26                               | —                           | —                | —                | 25               |
| <b>STUART LAKE</b>          |   |                             |                  |                  |                  |
| <i>Early Runs</i>           |   |                             |                  |                  |                  |
| Ankwil Creek .....          | Aug. 16-20                                | —                           | 67               | 56               | 461              |
| Bivouac Creek .....         |   | —                           | 2,320            | 387              | 3                |
| Driftwood River .....       | Aug. 16-22                                | 5                           | 144              | 387              | 1,897            |
| Dust Creek .....            | Aug. 4-12                                 | —                           | 1,125            | 1,168            | 3,017            |
| Felix Creek .....           | Aug. 3-6                                  | —                           | —                | 218              | 515              |
| 15 Mile Creek .....         | Aug. 16-20                                | —                           | 54               | 41               | 105              |
| 5 Mile Creek .....          | Aug. 16-20                                | —                           | 262              | 5                | 111              |
| Forfar Creek .....          | Aug. 4-12                                 | 1,822                       | 10,259           | 5,702            | 8,715            |
| Forsythe Creek .....        |   | —                           | 2                | 27               | 0                |
| Frypan Creek .....          | Aug. 16-20                                | —                           | 69               | 266              | 57               |
| Gluske Creek .....          | Aug. 4-12                                 | 2,905                       | 11,007           | 5,292            | 1,642            |
| Kynoch Creek .....          | Aug. 3-12                                 | 1,843                       | 24,644           | 14,088           | 9,477            |
| Leo Creek .....             | Aug. 9-12                                 | —                           | 97               | 4                | 234              |
| Narrows Creek .....         | Aug. 4-12                                 | 277                         | 2,265            | 2,756            | 1,823            |
| Paula Creek .....           | Aug. 3-6                                  | —                           | —                | 36               | 333              |
| Rossette Creek .....        | Aug. 3-12                                 | 2,641                       | 6,260            | 3,836            | 3,735            |
| Sakeniche River .....       | Aug. 9-12                                 | —                           | 234              | —                | 500              |
| Sandpoint Creek .....       | Aug. 4-12                                 | —                           | —                | 508              | 875              |
| Shale Creek .....           | Aug. 16-20                                | 61                          | 628              | 279              | 657              |
| 25 Mile Creek .....         | Aug. 16-20                                | —                           | 521              | 207              | 218              |
| Misc. Streams .....         | Aug. 4-20                                 | —                           | 42               | 23               | 258              |
| <i>Late Runs</i>            |   |                             |                  |                  |                  |
| Kazcheck Creek .....        | Sept. 17-20                               | 60                          | 243              | 83               | 369              |
| Middle River .....          | Sept. 17-24                               | 488                         | 2,600            | 3,927            | 7,762            |
| Pinchi Creek .....          | Oct. 6-12                                 | —                           | —                | 5                | 850              |
| Tachie River .....          | Sept. 18-24                               | 14                          | 200              | 1,529            | 13,738           |
| <b>NORTHEAST</b>            |   |                             |                  |                  |                  |
| Upper Bowron River .....    |   | 6,951                       | 16,266           | 10,774           | 14,871           |
| <b>TOTALS</b> .....         |   | <b>2,875,547</b>            | <b>1,756,913</b> | <b>2,485,112</b> | <b>3,815,823</b> |

TABLE X  
PINK CATCH BY GEAR

| <i>United States Convention Waters</i> |                     |              |                   |                  |              |                   |                  |              |                   |              |                   |                    |
|--|---------------------|--------------|-------------------|------------------|--------------|-------------------|------------------|--------------|-------------------|--------------|-------------------|--------------------|
| <i>Year</i>                            | <i>Purse Seines</i> |              |                   | <i>Gill Nets</i> |              |                   | <i>Reef Nets</i> |              |                   | <i>Troll</i> |                   | <i>Total Catch</i> |
|  | <i>Units</i>        | <i>Catch</i> | <i>Percentage</i> | <i>Units</i>     | <i>Catch</i> | <i>Percentage</i> | <i>Units</i>     | <i>Catch</i> | <i>Percentage</i> | <i>Catch</i> | <i>Percentage</i> |                    |
| 1961 .....                             | 199                 | 344,214      | 67.69             | 360              | 71,924       | 14.14             | 79               | 28,513       | 5.61              | 63,893       | 12.56             | 508,544            |
| 1959 .....                             | 317                 | 1,913,555    | 78.83             | 446              | 227,643      | 9.38              | 81               | 110,416      | 4.55              | 175,921      | 7.24              | 2,427,535          |
| 1957 .....                             | 351                 | 2,216,119    | 79.79             | 638              | 246,296      | 8.87              | 99               | 149,094      | 5.37              | 165,248      | 5.95              | 2,777,366          |
| 1955 .....                             | 359                 | 4,037,448    | 86.15             | 395              | 306,744      | 6.55              | 95               | 276,848      | 5.91              | 64,932       | 1.39              | 4,685,984          |
| <i>Canadian Convention Waters</i>      |                     |              |                   |                  |              |                   |                  |              |                   |              |                   |                    |
| <i>Year</i>                            | <i>Purse Seines</i> |              |                   | <i>Gill Nets</i> |              |                   | <i>Traps</i>     |              |                   | <i>Troll</i> |                   | <i>Total Catch</i> |
|  | <i>Units</i>        | <i>Catch</i> | <i>Percentage</i> | <i>Units</i>     | <i>Catch</i> | <i>Percentage</i> | <i>Units</i>     | <i>Catch</i> | <i>Percentage</i> | <i>Catch</i> | <i>Percentage</i> |                    |
| 1961 .....                             | 82                  | 313,636      | 57.53             | 1,116            | 142,518      | 26.14             | 0                | 0            | 0                 | 88,974       | 16.33             | 545,128            |
| 1959 .....                             | 133                 | 1,357,088    | 58.68             | 1,291            | 693,977      | 30.00             | 0                | 0            | 0                 | 261,841      | 11.32             | 2,312,906          |
| 1957 .....                             | 105                 | 1,435,924    | 54.50             | 1,473            | 1,126,085    | 42.74             | 5                | 31,309       | 1.19              | 41,402       | 1.57              | 2,634,720          |
| 1955 .....                             | 104                 | 2,931,552    | 71.00             | 1,400            | 1,039,406    | 25.17             | 5                | 126,036      | 3.05              | 32,069       | 0.78              | 4,129,063          |

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

TABLE XI  
 LANDINGS AND PACKS OF PINK SALMON  
 FROM CONVENTION WATERS

|                                     | <i>United States</i> | <i>Canada</i> | <i>Total</i> |
|-------------------------------------|----------------------|---------------|--------------|
| 1961                                |                      |               |              |
| Total Landings (No. of Pinks) ..... | 508,544              | 544,719       | 1,053,263    |
| Share in Fish .....                 | 48.28%               | 51.72%        |              |
| Total Pack (48 lb. Cases) .....     | 49,129               | 52,273        | 101,402      |
| Share in Pack .....                 | 48.45%               | 51.55%        |              |
| 1961 Catch .....                    | 508,544              | 544,719       | 1,053,263    |
| 1959 .....                          | 2,427,535            | 2,312,906     | 4,740,441    |
| 1957 .....                          | 2,777,366            | 2,634,720     | 5,412,086    |
| 1955 .....                          | 4,685,984            | 4,129,063     | 8,815,047    |
| 1953 .....                          | 4,951,429            | 4,142,117     | 9,093,546    |
| 1951 .....                          | 5,086,284            | 2,885,514     | 7,971,798    |
| 1949 .....                          | 6,235,400            | 3,189,662     | 9,425,062    |
| 1947 .....                          | 8,801,595            | 3,491,416     | 12,293,011   |
| 1945 .....                          | 5,458,890            | 1,279,849     | 6,738,739    |

TABLE XII  
DAILY CATCH OF PINKS, 1955-1957-1959-1961 FROM UNITED STATES CONVENTION WATERS

| Date                     | JULY   |        |        |         | AUGUST    |           |           |         | SEPTEMBER |           |           |         |
|--------------------------|--------|--------|--------|---------|-----------|-----------|-----------|---------|-----------|-----------|-----------|---------|
|                          | 1955   | 1957   | 1959   | 1961    | 1955      | 1957      | 1959      | 1961    | 1955      | 1957      | 1959      | 1961    |
| 1                        |        | 1      |        |         | 9,370     |           |           | 34,070  | 144,389   |           | 187,274   |         |
| 2                        |        |        |        |         | 16,341    |           |           | 27,621  |           | 308,214   | 157,077   |         |
| 3                        |        |        |        | 34      | 10,279    |           | 6,110     |         |           | 344,634   |           |         |
| 4                        | 6      |        |        | 61      |           |           | 10,378    |         | 154,128   | 198,795   |           |         |
| 5                        | 17     |        |        | 38      |           | 17,545    | 13,181    |         | 113,207   |           |           |         |
| 6                        | 10     |        |        |         |           | 12,487    | 12,221    |         | 167,703   |           |           |         |
| 7                        | 4      |        |        |         | 10,114    |           | 13,229    |         | 137,636   |           | 108,145   |         |
| 8                        |        |        |        |         | 24,948    |           | 9,036     |         | 55,612    |           | 153,233   |         |
| 9                        |        | 7      |        |         | 19,202    |           |           |         |           | 143,732   | 133,600   |         |
| 10                       |        | 1      |        | 494     | 16,197    |           | 10,105    | 64,389  |           | 82,101    | 132,028   |         |
| 11                       | 36     |        |        | 398     | 10,225    |           | 16,642    |         | 141,602   | 115,338   |           |         |
| 12                       | 106    |        |        |         |           | 24,436    | 17,634    |         | 131,375   | 56,951    |           |         |
| 13                       | 111    |        |        |         |           | 43,316    | 19,633    |         | 24,818    | 786       |           |         |
| 14                       | 122    |        |        |         | 20,165    | 57,329    |           |         | 76,532    |           |           |         |
| 15                       |        | 108    |        |         | 23,491    |           |           | 45,358  |           |           | 41,645    |         |
| 16                       |        | 235    |        |         | 26,193    |           |           | 21,451  |           | 40,133    | 30,919    |         |
| 17                       |        | 164    |        | 6,592   | 47,162    |           | 57,658    |         |           | 50,380    | 14,021    |         |
| 18                       | 583    |        |        | 8,234   | 38,138    |           | 41,664    |         | 149,735   | 35,730    |           | 4,023   |
| 19                       | 736    |        |        | 12,592  | 2,488     | 99,644    | 36,950    |         | 104,360   | 146       |           | 1,790   |
| 20                       | 658    |        | 1,063  |         |           | 89,534    |           |         | 81,676    | 49        |           | 1,265   |
| 21                       | 515    |        | 1,533  |         | 66,618    | 80,747    |           | 72,620  | 68,999    |           |           |         |
| 22                       |        | 1,423  | 1,127  |         | 65,570    | 110,833   |           | 51,641  | 66,773    |           | 8,427     |         |
| 23                       |        | 1,371  |        |         | 136,472   |           | 10,524    |         |           | 18,459    | 8,204     |         |
| 24                       |        | 1,193  |        | 25,288  | 122,729   |           | 316,210   |         |           | 12,369    | 4,195     |         |
| 25                       | 1,737  |        |        | 20,603  | 91,280    |           | 232,534   |         | 102,199   | 5,890     | 1,134     | 540     |
| 26                       | 890    |        |        | 18,595  |           | 228,828   | 59,823    |         | 29,277    |           |           | 463     |
| 27                       | 1,785  |        | 3,545  |         |           | 189,603   | 125,179   |         | 43,543    |           |           | 76      |
| 28                       | 1,827  |        | 5,506  |         | 228,497   | 133,673   |           |         | 46,725    |           |           |         |
| 29                       |        | 1,837  | 5,114  |         | 135,610   | 97,861    |           |         | 15,696    |           | 3,790     |         |
| 30                       |        | 3,386  | 4,276  |         | 162,752   |           |           |         |           |           | 2,106     |         |
| 31                       |        | 2,848  |        | 24,759  | 161,889   |           | 232,046   |         |           |           | 2,252     |         |
| Totals                   | 9,143  | 12,574 | 22,164 | 117,688 | 1,445,730 | 1,185,836 | 1,240,757 | 317,150 | 1,894,354 | 1,413,707 | 988,050   | 8,157   |
| Troll and outside seine  | 4,830  | 42,145 | 40,259 | 20,449  | 778,434   | 102,386   | 126,019   | 40,671  | 540,117   | 10,748    | 6,545     | 1,683   |
| Monthly                  |        |        |        |         |           |           |           |         |           |           |           |         |
| Totals                   | 13,973 | 54,719 | 62,423 | 138,137 | 2,224,164 | 1,288,222 | 1,366,776 | 357,821 | 2,434,471 | 1,424,455 | 994,595   | 9,840   |
| June, Oct. & Nov. Totals |        |        |        |         |           |           |           |         | 13,376    | 9,970     | 3,741     | 2,746   |
| Season Totals            |        |        |        |         |           |           |           |         | 4,685,984 | 2,777,366 | 2,427,535 | 508,544 |

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REPORT FOR 1961

TABLE XIII  
DAILY CATCH OF PINKS, 1955-1957-1959-1961 FROM CANADIAN CONVENTION WATERS

| Date                          | JULY   |        |        |         | AUGUST    |           |           |         | SEPTEMBER |           |           |         |
|-------------------------------|--------|--------|--------|---------|-----------|-----------|-----------|---------|-----------|-----------|-----------|---------|
|                               | 1955   | 1957   | 1959   | 1961    | 1955      | 1957      | 1959      | 1961    | 1955      | 1957      | 1959      | 1961    |
| 1                             |        | 2      |        |         | 7,169     | 343       |           | 14,821  | 137,320   |           | 117,313   |         |
| 2                             |        | 1      |        |         | 6,943     |           |           |         | 67,163    | 192,149   | 89,335    |         |
| 3                             |        | 1      |        | 1       | 16,178    |           |           |         |           | 180,181   | 99,848    |         |
| 4                             | 17     | 6      |        | 1       | 11,082    |           | 13        |         |           | 147,730   | 19,653    |         |
| 5                             | 5      | 7      |        |         |           | 20,779    |           |         | 299,702   | 91,813    |           | 3,335   |
| 6                             | 6      |        |        |         |           | 41,304    |           |         | 175,474   | 58,796    | 95,733    | 2,198   |
| 7                             | 13     |        |        |         |           | 43,086    |           |         | 182,104   |           | 52,704    |         |
| 8                             |        | 6      |        |         |           | 162       |           |         | 136,765   |           | 92,362    |         |
| 9                             |        | 6      |        |         | 32,507    | 163       |           | 18,773  | 117,875   | 20,398    | 131,918   |         |
| 10                            |        | 6      |        | 4       | 45,148    |           | 25,687    | 22,031  |           | 113,427   | 88,337    |         |
| 11                            | 51     | 10     |        | 4       | 52,906    |           | 24,563    |         |           | 96,826    | 9,774     |         |
| 12                            | 115    | 10     |        | 6       | 40,857    | 88,365    | 24,718    |         | 94,543    | 57,295    |           | 936     |
| 13                            | 93     |        |        | 29      |           | 53,273    | 34,625    | 4,954   | 228,496   | 40,518    |           | 569     |
| 14                            | 181    |        |        |         |           | 116,580   |           | 3,753   | 191,906   |           | 29,041    |         |
| 15                            |        | 22     |        |         | 67,273    | 79,958    |           | 80,913  | 31,326    |           | 57,720    |         |
| 16                            |        | 33     |        |         | 72,500    |           |           | 56,892  | 4,719     | 44,764    | 45,086    |         |
| 17                            |        | 55     |        | 13,807  | 76,519    |           | 40,111    |         |           | 70,693    | 37,960    |         |
| 18                            | 818    | 101    |        | 8,909   | 63,697    |           | 29,604    |         |           | 33,112    | 1,169     |         |
| 19                            | 522    | 19     |        |         | 94,825    | 79,913    | 1,749     |         | 19,245    | 42,847    |           | 344     |
| 20                            | 1,020  |        | 1,603  |         |           | 77,578    |           |         | 10,069    | 66,096    |           | 260     |
| 21                            | 1,494  |        | 1,807  |         |           | 91,077    |           | 15,144  | 4,989     |           | 20,122    | 431     |
| 22                            |        | 3,091  | 2,880  |         | 154,777   | 110,547   |           | 39,029  | 4,543     |           | 17,566    |         |
| 23                            |        | 7,849  |        |         | 163,202   |           | 201,421   |         | 3,112     | 1,455     | 36,721    |         |
| 24                            |        | 5,078  |        | 27,564  | 212,995   |           | 225,659   |         |           | 1,628     | 22,104    |         |
| 25                            | 4,684  | 206    |        | 22,427  | 211,931   |           | 146,148   |         |           | 1,498     |           |         |
| 26                            | 6,145  |        |        | 18,841  | 267,348   | 113,470   | 98,483    |         | 1,046     | 226       |           | 89      |
| 27                            | 3,838  |        |        |         |           | 84,368    |           |         | 671       | 139       |           | 30      |
| 28                            | 3,097  |        |        |         |           | 114,618   |           | 5,480   | 1,060     |           | 93        | 22      |
| 29                            |        | 2,078  |        |         | 251,150   | 164,983   |           | 12,061  | 240       |           | 202       |         |
| 30                            |        | 8,170  |        |         | 238,032   |           |           |         | 373       | 10        | 63        |         |
| 31                            |        | 14,928 |        | 9,097   | 170,565   |           | 123,443   |         |           |           |           |         |
| Totals                        | 22,099 | 41,685 | 6,290  | 100,690 | 2,257,604 | 1,280,567 | 976,224   | 273,851 | 1,712,741 | 1,261,601 | 1,064,824 | 8,214   |
| Troll and<br>outside<br>seine | 2,216  | 3,398  | 27,542 | 26,208  | 46,117    | 30,460    | 179,795   | 34,659  | 12,052    | 4,788     | 44,467    | 20,038  |
| Spring salmon<br>Gill Net     |        |        |        |         |           |           |           |         | 6,888     |           | 482       | 37,330  |
| Monthly<br>Totals             | 24,315 | 45,083 | 33,832 | 126,898 | 2,303,721 | 1,311,027 | 1,156,019 | 308,510 | 1,731,681 | 1,266,389 | 1,109,773 | 65,582  |
| June, Oct. & Nov. Totals      |        |        |        |         |           |           |           |         | 69,346    | 12,221    | 13,282    | 44,138  |
| Season Totals                 |        |        |        |         |           |           |           |         | 4,129,063 | 2,634,720 | 2,312,906 | 545,128 |

TABLE XIV  
SUMMARY OF THE PINK SALMON ESCAPEMENT TO THE  
FRASER RIVER SPAWNING AREAS

| District and Streams         | Period of Peak Spawning | Estimated Number of Pink Salmon |                  |                  |
|------------------------------|-------------------------|---------------------------------|------------------|------------------|
|                              |                         | 1957                            | 1959             | 1961             |
| <b>EARLY RUNS</b>            |                         |                                 |                  |                  |
| LOWER FRASER                 |                         |                                 |                  |                  |
| Main Fraser .....            | Sept. 25-Oct. 5         | 1,263,651                       | 733,933          | 549,400          |
| HARRISON                     |                         |                                 |                  |                  |
| Chehalis River .....         | Oct. 5-12               | 9,336                           | 6,729            | 11,921           |
| FRASER CANYON                |                         |                                 |                  |                  |
| Coquihalla River .....       | Oct. 2-7                | 4,433                           | 16,088           | 7,316            |
| Jones Creek .....            | Sept. 23-30             | 1,493                           | 2,604            | 5,088            |
| Lorenzetti Creek .....       | Oct. 1-10               | 6                               | 991              | 218              |
| Silver Creek .....           | Oct. 1-5                | 549                             | 1,914            | 705              |
| Hunter Creek .....           | Oct. 1-10               | 13                              | 234              | 140              |
| American Creek .....         | Oct. 1-10               | 4                               | 790              | 147              |
| Spuzzum Creek .....          | Oct. 2-20               | 1,076                           | 2,111            | 263              |
| Nahatlatch River .....       | Oct. 2-5                | 208                             | 216              | 244              |
| Anderson Creek .....         | Oct. 1-10               | 824                             | 567              | 166              |
| Stein River .....            | Oct. 2-5                | 185                             | 62               | 83               |
| Churn Creek .....            | —                       | 8                               | 0                | 0                |
| Texas Creek .....            | —                       | 0                               | 195              | 0                |
| Popkum Creek .....           | —                       | 0                               | 57               | 0                |
| Flood Creek .....            | —                       | 0                               | 8                | 0                |
| Yale Creek .....             | Oct. 1-10               | 0                               | 510              | 31               |
| Emory Creek .....            | Oct. 1-10               | 0                               | 728              | 22               |
| Stoyoma Creek .....          | —                       | 0                               | 42               | 0                |
| Kawkaawa Creek .....         | Oct. 13-20              | 317                             | 1,279            | 502              |
| Ruby Creek .....             | Oct. 5-12               | 0                               | 528              | 448              |
| SETON-ANDERSON               |                         |                                 |                  |                  |
| Seton Creek .....            | Oct. 1-8                | 58,810                          | 14,887           | 58,717           |
| Portage Creek .....          | Oct. 1-5                | 1,867                           | 52               | 1,550            |
| Bridge River .....           | Oct. 5-10               | 0                               | 1,201            | 1,895            |
| Yalakom River .....          | —                       | 0                               | 13               | 0                |
| THOMPSON                     |                         |                                 |                  |                  |
| Thompson River .....         | Sept. 28-Oct. 8         | 266,329                         | 86,342           | 69,179           |
| Nicola River .....           | Oct. 4-10               | 1,560                           | 806              | 216              |
| Bonaparte River .....        | Sept. 27-29             | 653                             | 3                | 8                |
| Deadman River .....          | Sept. 18-20             | 564                             | 0                | 8                |
| Nicoamen River .....         | —                       | 0                               | 73               | 0                |
| <b>TOTAL</b> .....           |                         | <b>1,611,886</b>                | <b>872,963</b>   | <b>708,267</b>   |
| <b>LATE RUNS</b>             |                         |                                 |                  |                  |
| LOWER FRASER                 |                         |                                 |                  |                  |
| Stave River .....            | Oct. 20-25              | 6,500                           | 1,383            | 3,994            |
| Whonnock Creek .....         | Oct. 20-25              | 549                             | 57               | 278              |
| Suicide Creek .....          | —                       | 2                               | 0                | 0                |
| Silverdale Creek .....       | Oct. 20-25              | 52                              | 68               | 88               |
| Kanaka Creek .....           | Oct. 20-25              | 153                             | 18               | 23               |
| South Alouette River .....   | —                       | 8                               | 0                | 0                |
| North Alouette River .....   | —                       | 8                               | 0                | 0                |
| Silver Creek (Pitt Lake).... | —                       | 239                             | 0                | 0                |
| Coquitlam River .....        | —                       | 6                               | 0                | 0                |
| HARRISON                     |                         |                                 |                  |                  |
| Harrison River .....         | Oct. 13-20              | 585,798                         | 110,311          | 186,137          |
| Weaver Creek .....           | Oct. 8-14               | 346                             | 87               | 539              |
| CHILLIWACK-VEDDER            |                         |                                 |                  |                  |
| Chilliwack-Vedder River....  | Oct. 15-20              | 212,334                         | 91,517           | 188,066          |
| Sweltzer Creek .....         | Oct. 15-18              | 6,874                           | 751              | 6,224            |
| Little Chilliwack Creek....  | —                       | 68                              | 0                | 0                |
| Brown Creek .....            | —                       | 44                              | 0                | 0                |
| Slesse Creek .....           | Oct. 15-20              | —                               | 317              | 55               |
| Middle Creek .....           | Oct. 12-15              | —                               | 528              | 434              |
| <b>TOTAL</b> .....           |                         | <b>812,981</b>                  | <b>205,037</b>   | <b>385,838</b>   |
| <b>GRAND TOTAL</b> .....     |                         | <b>2,424,867</b>                | <b>1,078,000</b> | <b>1,094,105</b> |