INTERNATIONAL PACIFIC SALMON FISHERIES COMMISSION

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

ANNUAL REPORT

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COMMISSIONERS

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NEW WESTMINSTER, B. C.
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REPORT OF THE INTERNATIONAL PACIFIC SALMON FISHERIES COMMISSION FOR THE YEAR 1941

Although a general program of investigation has been followed during a four-year period, certain phases have been given special attention. The outstanding feature of the year 1941 was proof of the damage done by a recurring obstruction at Hell's Gate Canyon, and the initiation of steps for its removal.

This proof comes as the first result of scientific observations by the Commission which began in 1938. The program then begun was so framed as to conform with the terms of the Convention, by which the Commission is required "to make a thorough investigation into the natural history of the Fraser River sockeye salmon, into hatchery methods, spawning ground conditions, and other related matters." It may conduct fish cultural operations, improve spawning grounds, and stock the Fraser with sockeye by such methods as it may deem advisable. It has "authority to recommend to the Governments of the High Contracting Parties removing or otherwise overcoming obstructions to the ascent of sockeye salmon, that may now exist or may from time to time occur." The general program to accomplish these ends was discussed with an Advisory Board and a Scientific Council before adoption. It has necessarily been continued through a period corresponding to a life cycle of four years. Regulation is not to begin until two such cycles have elapsed.

A meeting of the Commission was held on June 12, 13, and 14, at which the program of investigation for the season was explained and approved. At this meeting Mr. W. T. Burgess was appointed to the Advisory Board, in place of Mr. M. E. Guest, to represent seine fishermen. The Advisory Board met with the Commission on June 13.

A further meeting of the Commission was held on November 30 and December 1 and 2, to consider the blockade at Hell's Gate Canyon. At this meeting Mr. Tom Reid was elected, and Mr. B. M. Brennan retired as Chairman, the term of two years having elapsed. Mr. Edward W. Allen was elected Secretary. It was decided to begin the two years' tenure of office for each of these positions on January 1 of each even numbered year, beginning with 1942. The situation at Hell's Gate was explained to and discussed by the Advisory Board on December 2.

The results secured this year at Hell's Gate Canyon have come from sound progress in the study of life history. It has been shown by tagging experiments that the different "races" of sockeye, each bound for its own section of the Fraser, pass up the river at certain times during the season. Certain of these have been successfully maintained, others have not. Slides at Hell's Gate in the Fraser River Canyon in 1913 and 1914 so injured the particular races making up the former "big years" in the cycle of years 1905, 1909, 1913, etc., that it is now no larger than a former "off year". This has meant a loss, at present prices, of an amount between thirty and thirty-five millions of dollars every fourth year since 1913.

Tagging experiments have been conducted below Hell's Gate Canyon for three years prior to 1941 to study these races. These experiments have shown, not only

the sequence of time of passage of certain races, but that certain of them were subject to much delay at particular water levels.

In 1941 an attempt was made to measure the mortalities during these delays and also to trace the races concerned to their home streams. One of the most extensive tagging experiments of its kind resulted in the marking of 13,537 sockeye immediately below the obstruction and 921 above, over a period of nearly six months. Long before the blockade developed, a major part of the staff had been concentrated at Hell's Gate.

The recovered tags showed that the river was blocked between levels of 25 and 50 feet as shown on the gauge established at Hell's Gate. The first period of blockade lasted over 36 days, and very few sockeye succeeded in passing at the end of that period if they had been delayed more than 12 days. The river became passable for a one or two day opening and in this brief period there passed the major share of all spawning fish to reach the upper Fraser in 1941. Thereafter no sockeye passed through during a further prolonged blockade. At present writing the numbers which died cannot be stated, but it has been estimated that more died than passed through.

By careful study of the returns it was possible to show clearly the effect of the blockades in eliminating portions of the runs to each spawning stream. Some races suffered severely, others less so. Many previously puzzling characteristics of these runs were explained.

It may well be true that the mortalities discovered at this obstruction have been the principal cause of continued depletion of the former "big year" on the Fraser. There can be no doubt of the very great importance of the findings. The results obtained were so clear cut and decisive that they were considered by the Commission and discussed with the Advisory Board in a meeting on November 30, long before the work was completed and while the staff was still following the blockaded salmon as they neared death.

The Commission decided at this meeting to proceed with preparation of a recommendation for removal of the obstruction, with such enginering work as should prove necessary. Under the terms of the Sockeye Convention the Commission must submit its recommendation for the removal of the obstruction to the two governments. It cannot proceed on its own initiative to the removal.

The somewhat overwhelming success of the investigation had already required the use of all funds which could be spared from the regular program to complete the necessary evidence of damage. The program had accordingly already been reduced to bare essentials. It was now foreseen that certain parts of the engineering surveys would have to be made prior to the receipt of funds for the next fiscal year, which would begin April 1, 1942, for Canada, but not until July 1 for the United States. This would still further restrict the regular program. Accordingly, the Commission, at the close of the year, had asked that supplemental appropriations from both governments be made available.

The Commission regards its program of investigation to have been well justified by the results of this year. This program has been, and remains, the means of discovery of the blockade, determining its effects, and its manner of operation.

The study of the Hell's Gate obstruction shows clearly that each part of the present program is indispensable. While the effects of the obstruction were

determined by the extensive tagging experiments immediately below and above the obstructed point, these experiments required almost every other section of the program for their success.

As an illustration, their success depended upon recovery of the tags, en route to or in their home streams, and upon careful observations of the escapements to numerous spawning grounds throughout the Fraser River and in the Canyon below the obstruction. This required the staff of stream observers employed during the season, to watch spawning fish and Indian fishermen. The efficiency of these observers depended in good part upon the development by other staff members of accurate methods of observing and estimating numbers, through experiments in the Harrison system, Chilko, and elsewhere.

The effects of the blockade were understood and anticipated by planned observation only through a sound and extensive knowledge of the races of sockeye and their spawning streams. This was particularly true of the time of their departure from salt water, their arrival at the obstruction, their normal passage to the spawning ground, and the abnormal history after the blockade. The effects upon each race were understood only through a knowledge of the catch and its varying escapement as affected by blockade, of the river levels in past years, of the history of the obstruction, and of each race on its home stream.

It is, indeed, true that without the background of accurate knowledge which we now possess, we would still be unable to prove the damage which is done by the obstruction, or to show why certain races have been so damaged while others have increased or have been undepleted.

The Commission therefore regards its broad program of investigation to have been thoroughly justified by the results of this year. It anticipates that the program will prove indispensable to any further steps in rehabilitation of the races in the upper Fraser, in regulation of the fishery, and in further work on obstructions, whatever or wherever they may be. It recognizes that success can only come from continuity of effort, each year's findings depending upon those of past years.

The report of the Director of Investigations follows.

INTERNATIONAL PACIFIC SALMON FISHERIES COMMISSION

B. M. BRENNAN, *Chairman*
EDWARD W. ALLEN
A. L. HAGER
CHARLES E. JACKSON
A. J. WHITMORE
TOM REID, *Secretary*.

REPORT ON THE INVESTIGATIONS OF THE INTERNATIONAL PACIFIC SALMON FISHERIES COMMISSION ON THE FRASER RIVER SOCKEYE FOR THE YEAR 1941

W. F. THOMPSON, *Director*

The major problems and objectives of the Commission's research program have been outlined in previous annual reports. Fundamental to this is the existence of "races" or individual stocks of fish within the Fraser River, each of them associated with some particular spawning ground. The central problems of the Commission can be stated as threefold. The first is to determine what constitutes a sufficient escapement from the commercial catch and how this can be allowed; the second to see that the fish pass without obstruction from the sea to the spawning grounds; and the third to make the conditions on these spawning grounds as favorable as possible, even to the extent of introducing artificial propagation.

The proper treatment of this threefold problem requires a study of each phase of the life history of each individual race, or stock of sockeye salmon in the Fraser. That of the adults must include the time and place of migration, their mortalities, and their destinations. They can be traced through the commercial catch and up the river by statistical studies, by observation, and by tagging with celluloid tags which are later recovered by trained observers or by fishermen in return for rewards. As yet the Commission has centered the major share of its attention upon the adults for with regulation or with any system of assistance in migration and spawning, the adults must first be considered.

During the year 1941 some of the first results of the program have been obtained, particularly in the discovery and study of an obstruction at Hell's Gate Canyon. In these first results practically every phase of the program has played its part, illustrating clearly that each part is indispensable.

Further results of perhaps equal importance can be expected as the experiments are completed and their results analyzed. Several years' research were necessary to produce these first results, each year's findings being built upon those of the preceding years. For instance, the proper observation of the Hell's Gate obstruction could not have been planned without a knowledge of how it showed itself in the return of tags, and in the course of the run to each spawning ground. This is a story which has been built up during three years of thorough work. But to complete present experiments and to analyze the great mass of data already on hand is a major task, undoubtedly the most important and urgent that the Commission faces. Delay or diversion of attention to other temporarily attractive projects, may mean failure to attain the principal objectives of the Commission.

Pending proper analysis and a detailed report, a statement of the various

projects undertaken is hereby given, supplemented by brief comment on some of the most interesting results. The general program has been continued, but with special emphasis upon the very important study of the Hell's Gate obstruction.

The following report is contributed to by Dr. J. L. Kask, Assistant Director, Mr. M. B. Schaefer, Mr. C. E. Atkinson, and Mr. L. E. Whitesel—each with the help of various members of the scientific staff.

1. The tagging of sockeye at the Sooke traps at the southern end of Vancouver Island was carried on under the same arrangements as in former years, with the excellent cooperation of the Canadian Department of Fisheries and the trap operators.

The total number of sockeye tagged was 849 of which 485 or 57% were recovered.

The numbers tagged and recovered for the four years in which tagging has been done at this point are as follows:

Year	*Number Tagged*	*Number Recovered*	*Percentage Recovered*
1938	980	431	44
1939	1051	547	52
1940	930	417	45
1941	849	485*	57

The fish tagged in June and early July were again returned in large part from streams and areas other than the Fraser. Of the 249 fish tagged on and before July 10, 120 or approximately 48 per cent were returned. Of these recaptured fish, 57 or approximately 47 per cent, were taken in waters on the west coast of Vancouver Island, and in Washington streams such as the Skagit, Baker River, and minor streams. The remaining 63 fish recovered, or 53 per cent of the total, were taken in the Fraser River or presumably en route to it. One tagged on July 3 was recaptured near Pitt Island or not far south of the Skeena River, and one tagged on the same day was recaptured in Johnstone Straits.

2. In 1941 the Commission chartered three vessels, all of Canadian registry, for varying lengths of time. A small seine boat, the *Laila,* was chartered for a period of approximately three months to seine and tag sockeye at the mouth of the Fraser River. Another small vessel, the *Clara M.,* was chartered for one and one-half months to purchase sockeye from the purse seiners around the San Juan Islands and Lummi Island. A similar small vessel, the *Phylima,* was chartered for one month to purchase and tag fish in the Johnstone Straits area.

Altogether 4737 fish were tagged. Compared to former years the numbers tagged and recovered were as follows:

Year	*Number Tagged*	*Number Recovered*	*Percentage Recovered*
1938	2587	1231	47.6
1939	6152	3990	64.9
1940	3279	1614	49.2
1941	4737	2871	60.6

Recoveries from the various experiments are shown in the following tables:

*Recoveries as of March 31, 1942 only.

SAN JUAN ISLANDS. Number tagged 768; number recovered 481, or 62.6%.

Recovered from	*No.*	*%*
Canadian commercial catch	311	64.7
United States commercial catch	144	29.9
Fraser River above commercial fishery	16	3.3
Doubtful data	10	2.1

LUMMI ISLAND. Number tagged 843; number recovered 497, or 59.0%.

Recovered from	*No.*	*%*
Canadian commercial catch	372	74.8
United States commercial catch	103	20.7
Fraser River above commercial fishery	13	2.6
Doubtful data	9	1.8

JOHNSTONE STRAITS. Number tagged 1191; number recovered 773, or 64.9%.

Recovered from	*No.*	*%*
Canadian commercial catch	738	95.5
United States commercial catch	4	0.5
Fraser River above commercial fishery	19	2.5
Doubtful data	12	1.5

FRASER ESTUARY (Sandheads). Number tagged 1935; number recovered 1120, or 57.9%.

Recovered from	*No.*	*%*
Canadian commercial catch	971	86.7
United States commercial catch	2	0.2
Fraser River above commercial fishery	141	12.6
Doubtful data	6	0.5

3. The tagging experiments at Hell's Gate were the outstanding feature of the work in 1941, and much greater effort was devoted to them than in any previous year.

Investigations by the Commission on an extensive scale since 1938 have proved the presence of this blockade between certain water levels at Hell's Gate. The blockade occurred in 1938, 1939, 1940, and 1941 whenever the water level was between 25 and 50 feet on the gauge at Hell's Gate. Evidence in these successive years is convincing when examined in its entirety, but the investigation in 1941 was most complete and conclusive. It furnished the necessary proof. It will suffice to recapitulate the findings for that year.

A total of 13,537 sockeye were tagged below and 921 above Hell's Gate in 1941. The recovered tags and supplemental investigations showed:

(*a*) Between water levels of 25 and 50 feet few fish passed through at the beginning of the period and none in the latter half.

(*b*) A delay of more than twelve days left sockeye unable to pass when the blockade became passable after the period August 15 to September 1. Later any delay whatever seemed fatal.

(*c*) The first period of blockade lasted 36 days. The second lasted 31 days, after a one or two day opening. In this short time there passed the major share of all spawners reaching the upper Fraser in 1941. After this opening no fish

passed through. Since a delay of twelve days resulted in failure to pass, the seriousness of the blockades in 1941 is obvious.

(*d*) Fish tagged immediately below the blockade twelve days or less prior to its opening, gave about 20% as many recoveries from upriver as did fish tagged 3000 feet above the blockade. This was undoubtedly due to the presence of a large body of fish below the blockade which had been delayed too long to resume their normal migration and which in tagging were mixed with those which were able to stand the delay or were recently arrived.

(*e*) Fish tagged below but which later passed, were in large part delayed and abnormal in their migration, in contrast to the direct speedy migration of those tagged above.

(*f*) As the result of the blockades, a great mass of sockeye estimated at a half to two-thirds of all reaching the blockade, failed to pass Hell's Gate. Their fate was followed by investigators through subsequent disappearance below the turbid waters of the Fraser until their death two to three months later, even as late as December. These fish passed through the normal physiological changes usually accompanying migration. They successively became less active, fell back into quieter water, assumed a bottom swimming habit thus disappearing from view, tried to spawn in unfavorable places, died and sank to the bottom. It was estimated by some observers that over a million sockeye died thus. The disappearance explains the failure to observe the effects of blockades in the years since 1913.

(*g*) Whereas a delay of twelve days was found to be too great in 1941, for the race concerned and the time of season in question, records of water levels at Hell's Gate show that since 1913 the average duration of a blockade is over 35 days, with a minimum of 9 to a maximum of 60. The average date of beginning of the blockade is August 10, at the height of the season of migration.

(*h*) Examination of the spawning runs to those grounds in the Fraser River which were populated by races which passed Hell's Gate at the time the blockade was effective, showed that these were seriously damaged, by elimination of sections of the run corresponding to the time of blockade as corrected for the time required for migration.

(*i*) Records for 1938, 1939, and 1940 confirm these findings of 1941, allowing for variations in conditions and the scope of the experiments.

4. As the result of the tagging experiments at Hell's Gate Canyon, engineering surveys were begun there in December, and were continued into 1942.

5. During 1941 there were again four observers stationed at the canneries at Steveston, Bellingham, and Anacortes. They recovered tagged fish, took representative samples of sockeye, and began a statistical system.

A system of log book records was begun during the year, with a high degree of success, and the collection of cannery records was continued. The work needs much greater development, however, as upon it will depend at least two important functions of the Commission. One of these is the proper division of the catch between the two nationalities, as provided for by the Convention; the other is the use of indices of abundance to determine the escapement which is to be allowed each year. In addition, much of the success of life history and tagging studies will depend upon the evidence collected through the commercial catch. Lack of proper statistics of this sort will cause serious difficulties as soon as regulation begins.

6. A survey of the spawning grounds was made by the observers in a manner similar to that of the past three seasons. All known sockeye streams were visited at least once during the season, and those containing sockeye were patrolled more frequently.

It was the purpose of each observer to recover all tags possible, to estimate as accurately as possible all sockeye present in the spawning areas, and to record the extent of spawning areas and the progress of the run throughout the season. Dead fish were recovered for information as to size, sex, and completeness of spawning. Samples were collected for the racial studies.

There are still errors in the visual counts which are difficult to evaluate. Reasonably satisfactory methods have been worked out for Chilko River and certain streams tributary to Stuart Lake, but runs to many of the other streams need to be further studied for definite methods of estimation.

Although each year the accuracy of these counts improves, it should be remembered that the estimates given for the live sockeye present are the best figures obtainable now, and may be subject to certain errors which later can be corrected.

From our estimate of the escapement the percentage of sockeye going to each of the important spawning areas is given to show the relative distribution of the runs over the watershed. It is interesting to note that the four important spawning areas for this year also furnished 92.7 per cent of the spawning escapement in 1940.

Chilko River and Lake	72.8%
Harrison River Rapids	8.5%
Birkenhead River	7.2%
Cultus Lake	2.8%
Other streams	8.7%

The 1941 run to Chilko River was estimated by tagging and other means to be approximately 464,000 (±90,000) sockeye, and furnished 72.8 per cent of the total escapement to the Fraser River. The same portion of the river was used for spawning this year as in 1940, and 103,232 dead fish were recovered and examined for tags and other data.

According to observers, this run was a definite increase over the cycle year, even though subsequent work has shown that the run of this year was seriously affected by the blockade conditions at Hell's Gate.

Favorable runs were found this year in two of the areas which for the past three years have experienced very few fish. The run to Stuart Lake accounted for 11,800 sockeye with approximately 4500 of these in the "late" run. The run to Quesnel had about 1100 sockeye present, which is a good showing for this badly depleted area. In both of these districts, the runs distributed themselves in many of the smaller tributaries.

The run to the North and South Thompson was exceedingly poor, and for the most part it must be conceded that the failure was the result of the Hell's Gate blockade. This year approximately only 300 fish reached the area.

The results of the Harrison-Lillooet district and Cultus Lake investigations are discussed in detail elsewhere in the report. Both of these areas furnished an important portion of the total escapement. Average runs were found in the remaining spawning areas.

Several tagging programs were carried out incidental to the regular spawning ground work. In Kynoch Creek, in the Stuart Lake area, 163 tags were released, of which 82.8 per cent were recovered from dead fish in the spawning area. In the Chilcotin district, 294 tags were released at Farwell Canyon, with 12.9 per cent returned from the Indian fishery and 19.0 per cent from the spawning grounds. From these experiments it was not only possible to get an estimate of the total number of sockeye present in the area, but also to gain a better understanding of the errors involved in the estimation of live fish.

7. The collection of the historical records of the sockeye salmon fishery and runs to the spawning grounds of the Fraser River has been continued. Although only a short part of each year can be devoted to this work, it has been possible to complete the examination of the newspaper, *British Columbian,* from 1868 to 1930, with the exception of a few missing years. Valuable assistance was given by the *British Columbian* and the Carnegie Libraries of New Westminster on whose premises the records were examined.

8. During 1941 additional quantities of material for age determination, racial studies, etc., were collected from the commercial fishery in international waters and from the numerous tributaries of the Fraser River. The work involved in examining this material is great, and to date limited help and time have prevented a complete examination and analysis of the collected data. The material collected in 1941 will be examined and compared with the previous years to see whether differences exist and whether they are constant from year to year.

9. During 1941 the intensive study of the Harrison system, for the purpose of developing methods of counting the escapement to the spawning grounds, was brought to completion and will be continued only in partial form next year. A trap was again operated at Harrison Mills, with results in general comparable to those of preceding years. A weir was operated at Weaver Creek, and on the Birkenhead River. A report on the entire experiment is in course of preparation.

10. The capture of predator fish, the counting into the lake of the adult spawning sockeye, and the counting out of the resulting fry were continued at Cultus Lake in 1941. The gill-nets used for the capture of predator fish were worked continuously from approximately the middle of January to the first of June, during which time 6676 coarse fish were removed from the lake.

The first adult sockeye of the Cultus Lake run arrived at the counting weir on September 9, 1941. The run continued in varying numbers to January 2, 1942, when the last sockeye of this season entered the lake. Altogether the run numbered 18,164 fish.

The number of first and second age group seaward migrants counted out of the lake was 3,959,490.

SUMMARY OF THE ESCAPEMENT TO THE VARIOUS SPAWNING AREAS, 1941

District and Stream	Dates of Run		Estimated No. Sockeye Present			Sex Ratio (%)			
						Males		Females	
	Arrival	End	Minimum	Maximum	Probable	3 Yr.	4 and 5 Yr.	3 Yr.	4 and 5 Yr.
LOWER FRASER									
Cultus Lake [1]	Sept. 13	Jan. 3	18,164	18,164	18,164	17.6	29.8	3.3	47.0
Lower Pitt River [5]					Present				
Upper Pitt River [4]	Sept. 1-10	Oct. 15-31	1,694		7,500		55.0		45.0
HARRISON									
Big Silver Creek			1,000	3,000	2,000				
Douglas Creek			700	1,500	1,100				
Hatchery Creek			100	200	150				
Harrison River Rapids [2]			26,500	79.500	53,000				
20 Mile Creek			5	150	75				
Weaver Creek [2]			8,300	10,100	9,200		28.3		71.7
LILLOOET									
Birkenhead River [2]			41,900	51,100	46,500	39.4	21.7		38.9
Upper Lillooet River streams (including Ryan, 25 Mile, Railroad Creek, etc.)			11,500	14,100	12,800				
CANYON									
Canyon streams (including Silver, Jones, Hunter Creeks, & Fraser River)	July 31	Jan. 12	Apparently this population was due to the result of the blockade at Hell's Gate and not normally resident in these streams.						
SETON-ANDERSON									
Portage Creek [1] (including lake spawning)	Sept. 17	Oct. 21	1,339	1,339	1,339		35.5		64.5
Seton Creek	Sept. 17	Nov. 1	500	1,000	750		34.8		65.2
SOUTH THOMPSON									
Adams River	Oct. 1	Nov. 9	25	75	50				
NORTH THOMPSON									
Raft River	Aug. 8	Sept. 12	180	320	250				
CHILCOTIN									
Chilko River and Lake [2]	Aug. 14	Nov. 4	374,000	554,000	464,000		49.8		50.2
QUESNEL									
Horsefly River	Aug. 24	Oct. 7	700	1,800	1,050		49.4		50.6
Horsefly Lake			30		Present				
Little Horsefly River	Sept. 20	Oct. 10	15	36	15				
Mitchell River	Sept. 20		23	100	40				
Quesnel River (South Fork)	Sept. 5		30	70	50				

SUMMARY OF THE ESCAPEMENT TO THE VARIOUS SPAWNING AREAS, 1941—(Continued)

District and Stream	Dates of Run		Estimated No. Sockeye Present			Sex Ratio (%)			
						Males		Females	
	Arrival	End	Minimum	Maximum	Probable	3 Yr.	4 and 5 Yr.	3 Yr.	4 and 5 Yr.
NECHAKO									
Bednesti Creek	Aug. 20	Sept. 30	15	45	15				
Endako River	Aug. 20	Sept. 30	24	70	45				
Nadina River	Aug. 22		100	500	200				
Nithi River	Aug. 24	Sept. 20	150	400	150		34.2		65.8
Ormonde Creek	Aug. 26	Oct. 1	60	130	90		33.3		66.7
Stellako River	Sept. 13	Nov. 3	5,000	14,400	5,230	0.2	43.0	0.2	56.1
STUART									
Ankwill Creek	Aug. 11	Aug. 21	9	50	25				
Driftwood River	Aug. 1		10	50	25				
Dust Creek	Aug. 1		87	300	150				
Fifteen Mile Creek	Aug. 1		1	5	5				
Five Mile Creek	Aug. 1		1	5	5				
Flemming Creek	Aug. 1	Sept. 2	5	10	10				
Forfar Creek [1]	July 23	Aug. 31	1,776	1,776	1,776		49.1		50.9
Gluske Creek	July 30	Sept. 5	332	700	500				
Gravel Creek	July 30		12	25	25				
Hoy Creek	Aug. 20		17	25	25				
Kynoch Creek [3]	July 25	Sept. 3	2,474	2,474	2,474	0.3	49.5		49.2
Middle River	Sept. 1	Oct. 18	4,000	6,000	4,500		47.9		52.1
Narrows Creek	Aug. 1		109	200	150				
Rossette Creek	July 25		663	1,200	1,066				
Shale Creek	Aug. 5	Aug. 24	20	50	30				
Souchi Creek	Aug. 15	Aug. 28	20	50	40				
Tachie River	Sept. 20	Oct. 21	500	1,500	1,000		51.9		48.1
Takla Lake					Present				
NORTHEAST									
Bowron River	Aug. 10	Oct. 12	900	2,500	1,050		58.4		41.6
Moose Creek	Aug. 14		91	200	130				
Sus Creek	Aug. 18	Sept. 8	12	36	19				

Total Sockeye Escapement accounted for, 636,768.

[1] All fish counted through weir.
[2] Estimated populations by tagging programs.
[3] Weir count plus fish spawning below weir.
[4] Best figure by T. Eaton, former employee Dominion Fisheries.
[5] Not sufficient visits for complete counts.