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
1947

COMMISSIONERS

EDWARD W. ALLEN
ALBERT M. DAY (December)
A. L. HAGER
TOM REID
A. J. WHITMORE
MILO MOORE
FRED J. FOSTER (January to November)

NEW WESTMINSTER,
CANADA,
1948

PERSONNEL

ADMINISTRATIVE

Director	B. M. Brennan

BIOLOGICAL

Chief Biologist	R. Van Cleve, PH.D.
Senior Biologist	C. E. Atkinson, B.S.
Associate Biologist	L. E. Whitesel, B.S.
Assistant Biologist	Wm. Tomkinson, M.A.
Assistant Biologist	A. E. Peterson, B.S.
Assistant Biologist	G. V. Howard, M.A.
Assistant Biologist	C. P. Idyll, M.A.
Assistant Biologist	G. B. Talbot, B.S.
Assistant Biologist	J. E. Mason, B.S.
Junior Biologist	J. A. R. Hamilton, M.A.
Junior Biologist	S. R. Killick, B.S.A.
Scientific Assistant-Librarian	A. M. A. Vlag, B.A.
Scientific Assistant	E. D. Knight, B.A.
Scientific Assistant	J. Weir, B.S.A.

ENGINEERING

Chief Engineer	M. C. Bell, B.S.[1]
Hydraulic Engineer	E. S. Pretious, M.Sc.[2 5]
Associate Engineer	J. Pyper, B.S.[6]
Assistant Engineer	R. I. Jackson, B.S.
Junior Engineer	A. C. Cooper, B.A.Sc.[3 7]
Junior Engineer	C. R. Walters
Junior Engineer	F. J. Andrew, B.A.Sc.[3]
Resident Engineer (Farwell Canyon Fishways)	C. H. Clay, B.A.Sc.[3 7]
Resident Engineer (Hell's Gate Fishways)	L. J. Bomberger, B.S.
Construction Engineer	R. A. Dick

CONSULTANTS

Mathematical Statistics	D. G. Chapman, M.A., A.M.[8]

---

[1] Registered Professional Engineers, State of Washington.
[2] Member, Association of Professional Engineers, B. C.
[3] Engineer in Training, Association of Professional Engineers, B. C.
[4] Member, American Society of Civil Engineers.
[5] Associate Member, American Society of Civil Engineers.
[6] Junior Member, American Society of Civil Engineers.
[7] Junior Member, Engineering Institute of Canada.
[8] Assistant Professor of Mathematics, University of British Columbia.

INTERNATIONAL PACIFIC SALMON
FISHERIES COMMISSION

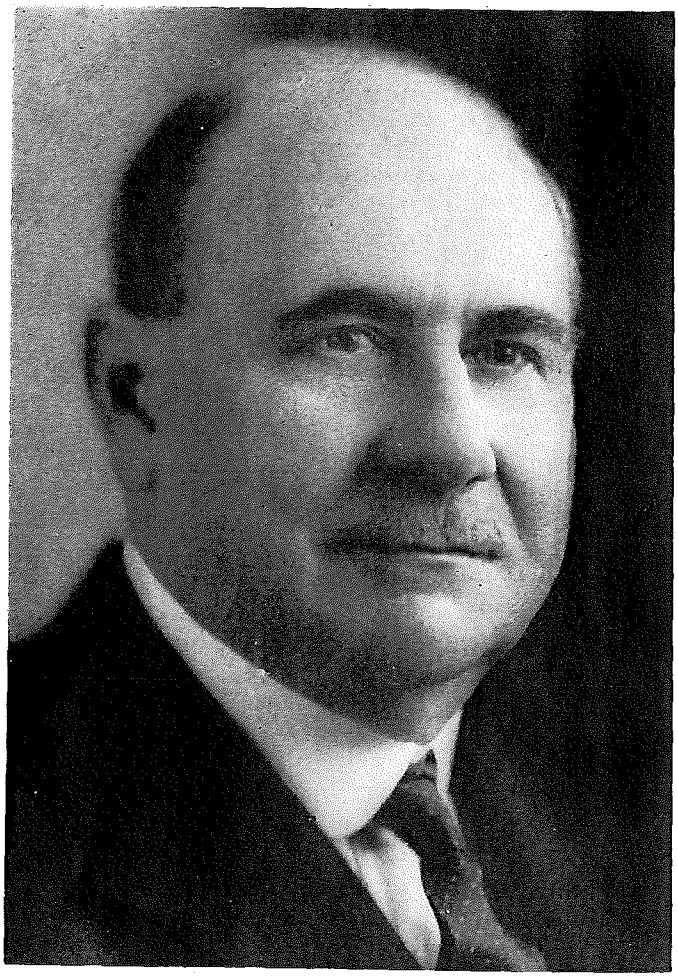
APPOINTED UNDER A CONVENTION
BETWEEN CANADA AND THE UNITED STATES FOR THE
PROTECTION, PRESERVATION AND EXTENSION OF
THE SOCKEYE SALMON FISHERIES IN
THE FRASER RIVER SYSTEM

ANNUAL REPORT
1947

COMMISSIONERS

EDWARD W. ALLEN
ALBERT M. DAY
(December)
A. L. HAGER
TOM REID
A. J. WHITMORE
MILO MOORE
FRED J. FOSTER
(January to November)

NEW WESTMINSTER,
CANADA,
1948



ALVAH L. HAGER

The grand old man of the International Pacific Salmon Fisheries Commission, who passed away Friday, January 16, 1948, while still active as the Commission's Chairman. His untiring efforts to further the work of the Commission will be an everlasting tribute to him.

FRED J. FOSTER

Secretary of the International Pacific Salmon Fisheries Commission, who passed away on November 11, 1947, left a vacancy on the Commission that will long be regretted. His great background in fishery administration made him most valuable to the Commission.

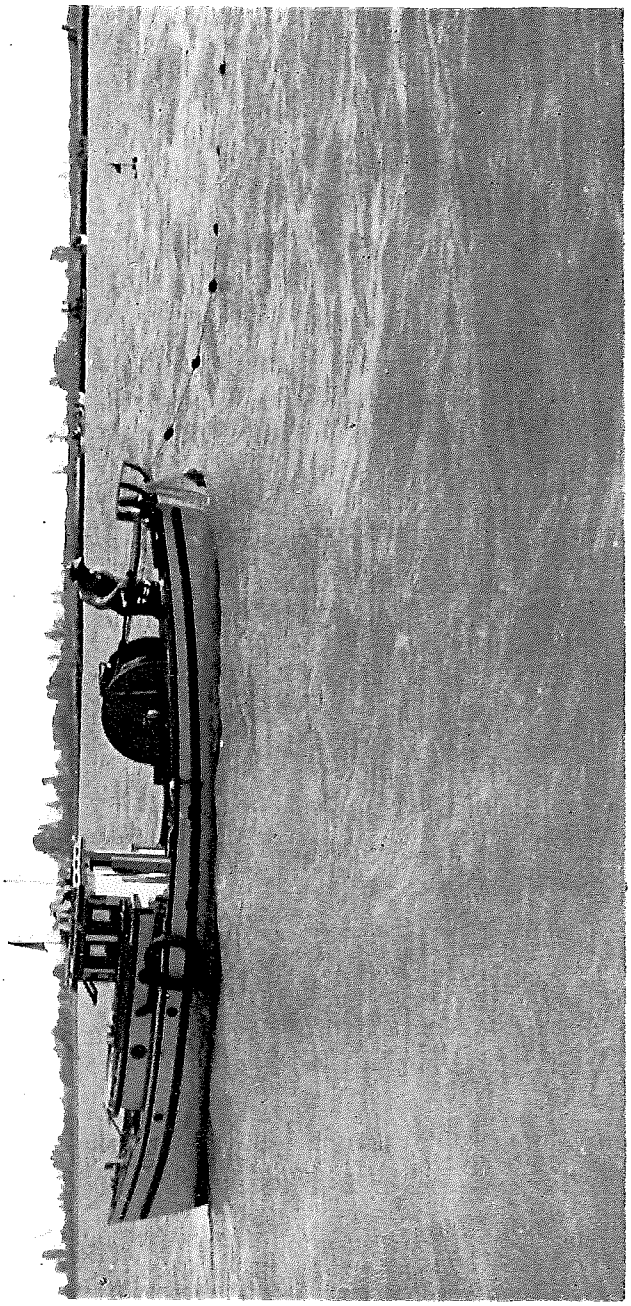


FIG. 1.—Gill net boat hauling its net, Fraser River, 1947.

ANNUAL REPORT FOR 1947

The International Pacific Salmon Fisheries Commission was created under the provisions of a treaty between the United States and Canada that was ratified on July 28, 1937 (see Annual Report for 1937 and 1938). During 1947 the Commission completed its second year of regulating the sockeye salmon fisheries within the waters outlined by the Convention. These fisheries are supported by sockeye salmon which spawn in the Fraser River watershed. Their regulation has been founded upon biological investigations which were begun in 1938 and were carried out in accordance with Article III of the Treaty which provides:

> "The Commission shall make a thorough investigation into the natural history of the Fraser River sockeye salmon, into hatchery methods, spawning ground conditions and other related matters . . . ."

In compliance with provisions of the Treaty included under the protocol of exchange, the investigations were carried on for eight years before regulation could be undertaken. This period of study, covering two four-year cycles, ended with the 1945 season and regulation was begun in 1946.

During the eight years of investigations between 1938 and 1946 the Commission established a biological staff and carried out a program designed to accomplish the purposes of the Treaty. Most of the Fraser River watershed was explored, in fact all of the tributaries of importance in the production of sockeye, either past or present, were thoroughly covered. Accurate measurements were made annually of the size of the spawning stocks in each of the tributaries and their existence as separate populations was established. The measurement of these separate populations was studied by means of tagging operations and the time that each stock passes through the fishery and through different parts of the river was determined. In addition, a statistical system was developed capable of furnishing accurate records of sockeye landings from both the U. S. and the Canadian fisheries within 24 hours of the time that the fish are caught.

By 1946 the Commission had proved the existence of blockades in the river at Hell's Gate, Bridge River Rapids, and Farwell Canyon. A fish ladder of new design was constructed on the right bank at Hell's Gate in 1945 and the principal left bank ladder was completed in 1946. Two ladders were also built along the right bank of the river, providing passage over the two falls at Bridge River Rapids in 1946, and surveys and plans have been made for the construction of a series of five fish ladders in Farwell Canyon on the Chilcotin River. Construction of these ladders was started in 1947.

The effect of the completion of even one ladder at Hell's Gate was plainly evident in 1945. An average increase of about 370% occurred in the runs

spawning in the northern district of the Fraser. In 1946 the increase was again noted and it was even more widespread. While it averaged only 240%, the numbers of fish involved were approximately 5 times greater than the year before. The most notable increase in 1946 was found in the Stellako River where a run of 48,600 fish in 1942 increased to 245,000 in 1946.

Investigations made at both Bridge River Rapids and Hell's Gate in 1946 proved that the movement of fish through those places has been completely altered through the levels covered by the fishways. After the construction of the fishways no delays could be detected in the movement of sockeye through the areas where previously complete or partial blocks had occurred.

The soundness of the basis upon which the Commission's regulations were founded was demonstrated in 1946. The increase in spawning escapement, noted above, occurred in the runs that were protected from fishing and was greater than it would have been if fishing had been permitted in the period that these runs were passing. In addition the escapement of the late run to the Adams River which bore the entire burden of the fishery in 1946 was maintained at the same level as in 1942.

The Commission met four times during the year 1947. Its first meeting was held in Vancouver, B. C., on January 17 and 18 and was devoted to a review of the 1946 program of regulation and to a discussion of biological investigations made during that year. Preliminary plans for rehabilitating the Quesnel sockeye runs were considered and the biological basis for regulation in 1947 were discussed.

The second meeting was held on April 2, 3 and 4 in Bellingham, Washington, at which a report was received covering progress on the engineering program. The Commission met with the Advisory Committee on April 3 and the results of regulation in 1946 and their influence on the commercial sockeye catch in treaty waters as well as on the escapement to the spawning grounds were reported to and discussed fully with them. After discussion with the Advisory Committee, the regulations for the 1947 season were adopted by the Commission on April 4. Due to the small spawning escapement of sockeye to the Fraser River in 1943 the Commission felt that it was necessary to give the greatest possible protection to the runs in 1947 in order to build up that cycle. At the same time it did not want to interfere with the fisheries for the other species of salmon—notably that for pink salmon. The 1947 regulations were designed to accomplish these two purposes.

The following members of the Advisory Committee met with the Commission on April 3:

Group Represented	*Canada*	*United States*
Packers	Richard Nelson	C. J. Collins
Gill Net Fishermen	Homer Stevens	Chester Karlson
Purse Seine Fishermen . . .	D. Hemow*	Nick Mladinich
Sport Fishermen	M. W. Black	Ken McLeod
Troll Fishermen	———	———

* Special representative temporarily replacing Mr. George Miller.

At the third meeting of the Commission which was held at Bellingham on August 9 and 10 progress was reported on the preliminary studies of the Quesnel rehabilitation program and on the most pressing engineering problems encountered at Hell's Gate, Barriere River, Nicola River, and Weaver Creek.

On August 10 the Commission met with the following members of the Advisory Committee to consider possible changes in the regulations for 1947.

Group Represented	*Canada*	*United States*
Salmon Packers	R. Nelson	C. J. Collins
Purse Seiners	———	Nick Mladinich
Gill Netters	Peter Jenewein*	———

* Special representative temporarily replacing Mr. Homer Stevens.

The size of the salmon catches made up to August 10 were close to those made in previous years of that cycle during the same period. In addition the escapement measured to that date through Hell's Gate was small. Therefore the Commission resolved at this meeting to leave unchanged the regulations adopted on April 4.

The final Commission meeting of the year was held on November 24 and 25 in Bellingham, Washington. The Quesnel rehabilitation program was approved by resolution of the Commission. It was also resolved to request the Dominion Department of Fisheries to make a thorough survey of pollution in the lower Fraser River. A report was presented by the staff covering the sockeye runs in previous years of the 1948 cycle and proposals for regulating the fishery in 1948 were discussed.

THE U. S. ENABLING ACT

An Enabling Act (Public Law 255—80th Congress, Chapt. 345—1st Section) was passed by the Congress of the United States in 1947 which gives the force of law to the Commission's regulations in Treaty waters within the U. S. boundaries. This act, signed on July 29, 1947, became effective 30 days later on August 28. It provides penalties for infractions of the provisions of the Treaty or of regulations regularly adopted by the Commission for the protection, preservation and extension of the Fraser River sockeye. It also provides penalties for failure to keep accurate statistical records of the catch. Enforcement of the regulations in U. S. Treaty waters is to be carried out by a Federal agency designated by the President of the United States. This agency in turn may authorize officers and employees of the State of Washington to enforce the provisions of the Convention and of the Act as well as the regulations of the Commission. The text of the Enabling Act is reproduced herewith:

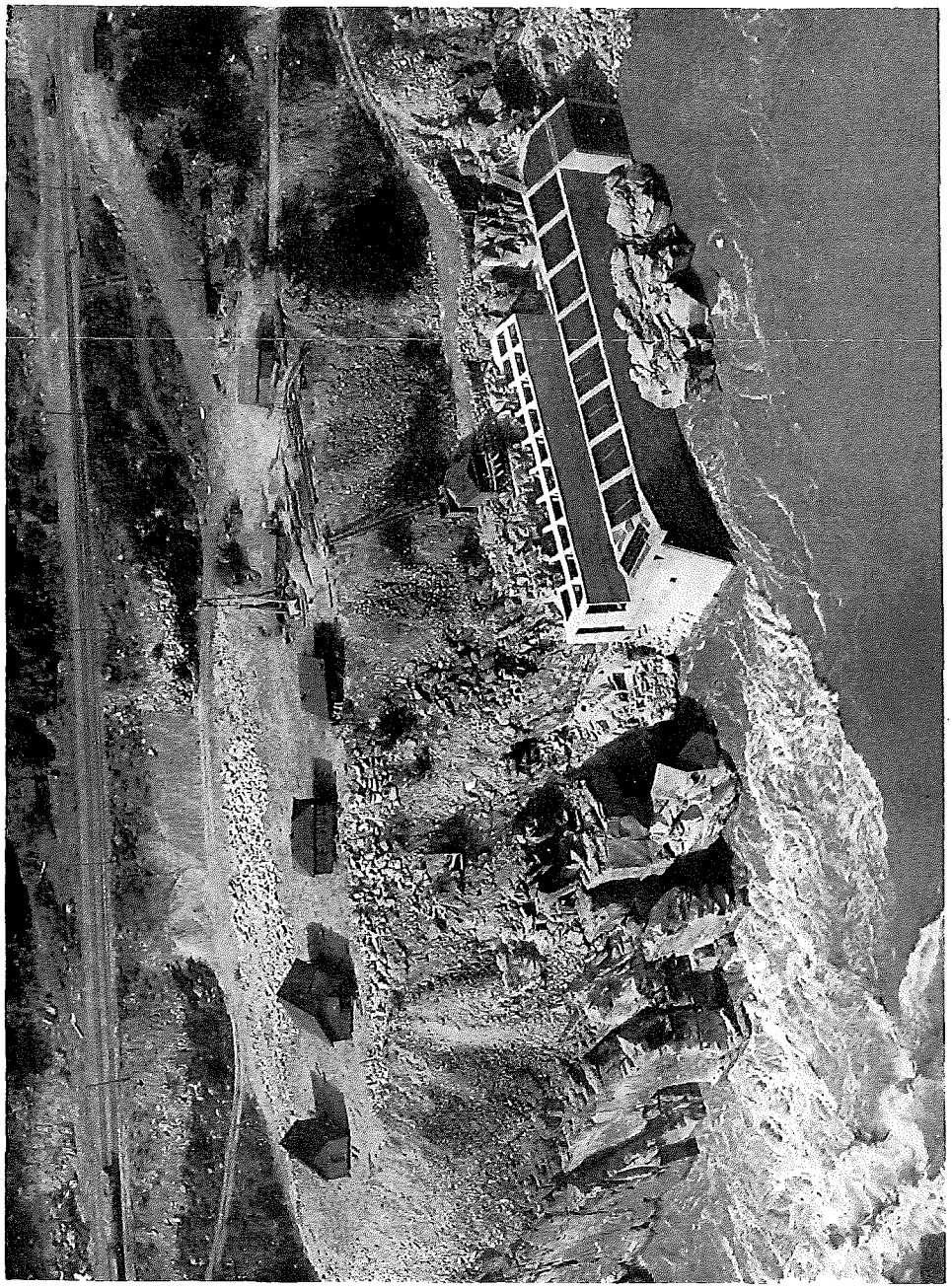


FIG. 2.—Hell's Gate, right bank fishways, showing location of permanent camp.

(PUBLIC LAW 255 — 80TH CONGRESS)

(CHAPTER 345 — 1ST SESSION)

(H. R. 3767)

AN ACT

To provide for the protection, preservation, and extension of the sockeye salmon fishery of the Fraser River system, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this Act may be cited as the "Sockeye Salmon Fishery Act of 1947".

SEC. 2. When used in this Act—

(a) Convention: The word "convention" means the convention between the United States of America and the Dominion of Canada for the protection, preservation, and extension of the sockeye salmon fishery of the Fraser River system, signed at Washington on the 26th day of May, 1930.

(b) Commission: The word "Commission" means the International Pacific Salmon Fisheries Commission provided for by article II of the convention.

(c) Person: The word "person" includes individuals, partnerships, associations, and corporations.

(d) Convention waters: The term "convention waters" means those waters described in article I of the convention.

(e) Sockeye salmon: The term "sockeye salmon" means that species of salmon known by the scientific name Oncorhynchus nerka.

(f) Vessel: The word "vessel" includes every type or description of water craft or other contrivance used, or capable of being used, as a means of transportation in water.

(g) Fishing: The word "fishing" means the fishing for, catching, or taking, or the attempted fishing for, catching, or taking, of any sockeye salmon in convention waters.

(h) Fishing gear: The term "fishing gear" means any net, trap, hook, or other device, appurtenance or equipment, of whatever kind or description, used or capable of being used, for the purpose of capturing fish or as an aid in capturing fish.

SEC. 3. (a) It shall be unlawful for any person to engage in fishing for sockeye salmon in convention waters in violation of the convention or of this Act or of any regulation of the Commission.

(b) It shall be unlawful for any person to ship, transport, purchase, sell, offer for sale, import, export, or have in possession any sockeye salmon taken in violation of the convention or of this Act or of any regulation of the Commission.

(c) It shall be unlawful for any person or vessel to use any port or harbor or other place subject to the jurisdiction of the United States for any purpose connected in any way with fishing in violation of the convention or of this Act or of any regulation made by the Commission.

(d) It shall be unlawful for any person or vessel to engage in fishing for sockeye salmon in convention waters without first having obtained such license or licenses as may be used by or required by the Commission, or to fail to produce such license, upon demand, for inspection by an authorized enforcement officer.

(e) It shall be unlawful for any person to fail to make, keep, submit, or furnish any record or report required of him by the Commission or to refuse to permit any officer authorized to enforce the convention, this Act, and the regulations of the Commission, or any authorized representative of the Commission, to inspect any such record or report at any reasonable time.

(f) It shall be unlawful for any person to molest, interfere with, tamper with, damage, or destroy any boat, net, equipment, stores, provisions, fish-cultural stations, rearing pond, weir, fishway, or any other structure, installation, experiment, property, or facility acquired, constructed, or maintained by the Commission.

(g) It shall be unlawful for any person or vessel to do any act prohibited or to fail to do any act required by the convention or by this Act or by any regulation of the Commission.

SEC. 4. Any person who fails to make, keep, or furnish any catch return, statistical record, or any report that may be required by the Commission, or any person who furnishes a false return, record, or report, upon conviction shall be subject to such fine as may be imposed by the court not to exceed $1,000, and shall in addition be prohibited from fishing for and from shipping, transporting, purchasing, selling, offering for sale, importing, exporting, or possessing sockeye salmon from the date of conviction until such time as any delinquent return, record, or report shall have been submitted or any false return, record, or report shall have been replaced by a duly certified correct and true return, record, or report to the satisfaction of the court. The penalties imposed by section 5 of this Act shall not be invoked for failure to comply with requirements respecting returns, records, and reports.

SEC. 5. (a) Except as provided in section 4, any person violating any provision of the convention or of this Act or the regulation of the Commission upon conviction shall be fined not more than $1,000 or be imprisoned not more than one year, or both, and the court may prohibit such person from fishing for, or from shipping, transporting, purchasing, selling, offering for sale, importing, exporting, or possessing sockeye salmon for such period of time as it may determine.

(b) The catch of fish of every vessel or of any fishing gear employed in any manner, or any fish caught, shipped, transported, purchased, sold, offered for sale, imported, exported, or possessed in violation of this Act or the regulations of the Commission shall be forfeited; and upon a second and subsequent violation the catch of fish shall be forfeited and every such vessel and any fishing gear and appurtenances involved in the violation may be forfeited.

(c) All procedures of law relating to the seizure, judicial forfeiture, and condemnation of a vessel for violation of the customs laws and the disposition of such vessel or the proceeds from the sale thereof shall apply to seizures, forfeitures, and condemnations incurred, or alleged to have been incurred, under the provisions of this Act insofar as such provisions of law are applicable and not inconsistent with this Act.

(d) In cases of minor violations of the provisions of the convention or of this Act or the regulations of the Commission, and in cases where immediate arrest of the person or seizure of fish, fishing gear, or of a vessel, together with its tackle, apparel, furniture, appurtenances, and cargo, would impose an unreasonable hardship, the person authorized to make such arrest or seizure or any court of competent jurisdiction may, in his or its discretion issue a citation requiring such person to appear before the proper official of the court having jurisdiction thereof within a specified time, not exceeding fifteen days; or in the case of property, post such citation upon said property and require its delivery to such court within such specified time. Upon the issuance of such citation and the filing of a copy thereof with the clerk of the appropriate court the person so cited and the property so seized and posted shall thereupon be subject to the jurisdiction of the court to answer the order of the court in such cause. Any property so seized shall not be disposed of except pursuant to the order of such court or the provisions of subsection (e) of this section.

(e) When a warrant of arrest or other process in rem, including that specified in subsection (d) of this section, is issued in any cause of admiralty jurisdiction under this section, the marshal or other officer shall stay the execution of such process, or discharge any property seized if the process has been levied, on receiving from the claimant of the property a bond or stipulation with sufficient sureties or approved corporate surety in such sum as the court shall order, conditioned to deliver the property seized, if condemned, without impairment in value (or, in the case of sockeye salmon, to pay its equivalent in money) or otherwise to answer the decree of the court in such cause. Such bond or stipulation shall be returned to the court and judgment thereon against both the principal and sureties may be recovered in the event of any breach of the conditions thereof as determined by the court.

SEC. 6. (a) The President of the United States shall designate a Federal agency which shall be responsible for the enforcement of the provisions of the convention and this Act and the regulations of the Commission, except to the extent otherwise provided for in the convention and this Act. It shall be the duty of the Federal agency so designated to take appropriate measures for enforcement at such times and to such extent as it may deem necessary to insure effective enforcement and for this purpose to co-operate with other Federal agencies, State officers, the Commission, and with the authorized officers of the Dominion of Canada.

(b) The Federal agency designated by the President for enforcement purposes may authorize officers and employees of the State of Washington to enforce the provisions of the convention and of this Act and the regulations of the Commission. When so authorized such officers may function as Federal law-enforcement officers for the purposes of this Act.

(c) Enforcement of the convention and this Act and the regulations of the Commission shall be subject to and in accordance with the provisions of article IX of the convention.

(d) Any duly authorized officer or employee of the Federal agency designated by the President for enforcement purposes under the provisions of subsection (a) of this section 6; any officer or employee of the State of Washington who is authorized by the Federal agency so designated by the President; any enforcement officer of the Fish and Wildlife Service of the Department of the Interior, any Coast Guard officer, any United States marshal or deputy United States marshal, any collector or deputy collector of

customs, and any other person authorized to enforce the provisions of the convention, this Act, and the regulations of the Commission, shall have power, without warrant or other process, but subject to the provisions of the convention, to arrest any person committing in his presence or view a violation of the convention or of this Act or of the regulations of the Commission and to take such person immediately for examination before an officer or trial before a court of competent jurisdiction; and shall have power without warrant or other process, to search any vessel within convention waters when he has reasonable cause to believe that such vessel is subject to seizure under the provisions of the convention or this Act, or the regulations of the Commission, and to search any place of business or any commercial vehicle when he has reasonable cause to believe that such place or vehicle contains fish taken, possessed, transported, purchased, or sold in violation of any of the provisions of the convention, this Act, or the regulations of the Commission. Any person authorized to enforce the provisions of the convention and of this Act and the regulations of the Commission shall have power to execute any warrant or process issued by an officer or court of competent jurisdiction for the enforcement of this Act, and shall have power with a search warrant to search any person, vessel, or place, at any time. The judges of the United States courts and the United States commissioners may, within their respective jurisdictions, upon proper oath or affirmation showing probable cause, issue warrants in all such cases. Subject to the provisions of the convention, any person authorized to enforce the convention and this Act and the regulations of the Commission may seize, whenever and wherever lawfully found, all fish caught, shipped, transported, purchased, sold, offered for sale, imported, exported, or possessed contrary to the provisions of the convention or this Act or the regulations of the Commission and may seize any vessel, together with its tackle, apparel, furniture, appurtenances and cargo, and all fishing gear, used or employed contrary to the provisions of the convention or this Act or the regulations of the Commission, or which it reasonably appears has been used or employed contrary to the provisions of the convention or this Act or the regulations of the Commission.

(e) Evidence of any regulation made by the Commission may be given in any court proceedings by the production of a copy of such regulation certified by the Secretary of the Commission to be a true copy and no proof of the signature of the Secretary on such certification shall be required.

(f) Any authorized representative of the Commission, or any person authorized to enforce this Act and the regulations of the Commission may inspect any licenses issued to persons or vessels engaging in fishing for sockeye salmon in convention waters and for this purpose may at any reasonable time board any vessel or enter upon any premises where such fishing is or may be conducted.

SEC. 7. (a) All agencies of the Federal Government are authorized, upon request by the Commission, to furnish facilities and personnel for the purpose of assisting the Commission in carrying out its duties of scientific investigation and improvement of the fishery, as specified in the convention.

(b) None of the prohibitions contained in this Act, or in the laws and regulations of the States, shall prevent the Commission from conducting or authorizing the conduct of fishing operations and biological experiments at any time for purposes of scientific investigation, or shall prevent the Commission from discharging any other duties prescribed by the convention.

SEC. 8. There is authorized to be appropriated, out of any moneys in the Treasury not otherwise appropriated, such sums, from time to time, as may be necessary to enable the Commission and agencies of the Federal Government to carry out the provisions of the convention and of this Act, including purchase, operation, maintenance, and repair of aircraft, motor vehicles (including passenger-carrying vehicles), boats, research vessels, and other necessary facilities; and printing.

SEC. 9. If any provision of this Act is held invalid for any cause, such invalidity shall not affect the other provisions hereof.

SEC. 10. This Act shall be effective thirty days from the date of its approval.

Approved July 29, 1947.

Executive order 9892 by the President of the United States issued on September 20, 1947, designated the U. S. Fish and Wildlife Service as the agency responsible for the enforcement of the sockeye salmon act of 1947.

REGULATIONS

As noted above, regulations to govern the sockeye fisheries in Treaty waters during the 1947 season were adopted by the Commission on April 4, 1947, in compliance with Articles IV and V of the Treaty. Since the U. S. enabling act was not approved until July 29 and since no such enabling act had been adopted as yet by Canada, the Commission's regulations were transmitted to the Departments of Fisheries of the Dominion of Canada and of the State of Washington. The regulations were implemented for Canadian Treaty waters by an order in council adopted on May 29, 1947, and for U. S. Treaty waters by order of the Director of the Washington State Department of Fisheries on May 6, 1947.

The recommendations of the Commission were as follows:

CANADIAN WATERS

The International Pacific Salmon Fisheries Commission appointed pursuant to The Convention relating to the protection, preservation and extension of the Sockeye Salmon Fisheries between the United States of America and Canada signed at Washington on the twenty-sixth day of May, 1930, hereby recommends to the Honorable the Minister of Fisheries 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 under authority of the Fisheries Act, namely:

1. That in the waters of Canada embraced in Paragraphs Nos. 2 and 3 of Article 1 of the Convention relating to the protection, preservation and extension of the Sockeye Salmon Fisheries between the United States of America and Canada signed at Washington on the twenty-sixth day of May, 1930, in order to secure a proper escapement of Sockeye salmon, no one shall fish for or take any kind of salmon by any gill-net having a mesh of less than eight inches extension measure when wet during the period in the Spring or Chinook salmon fishing season commencing on the 30th day of June, 1947, and extending up to 6:00 a.m. on the eighth day of September, 1947.

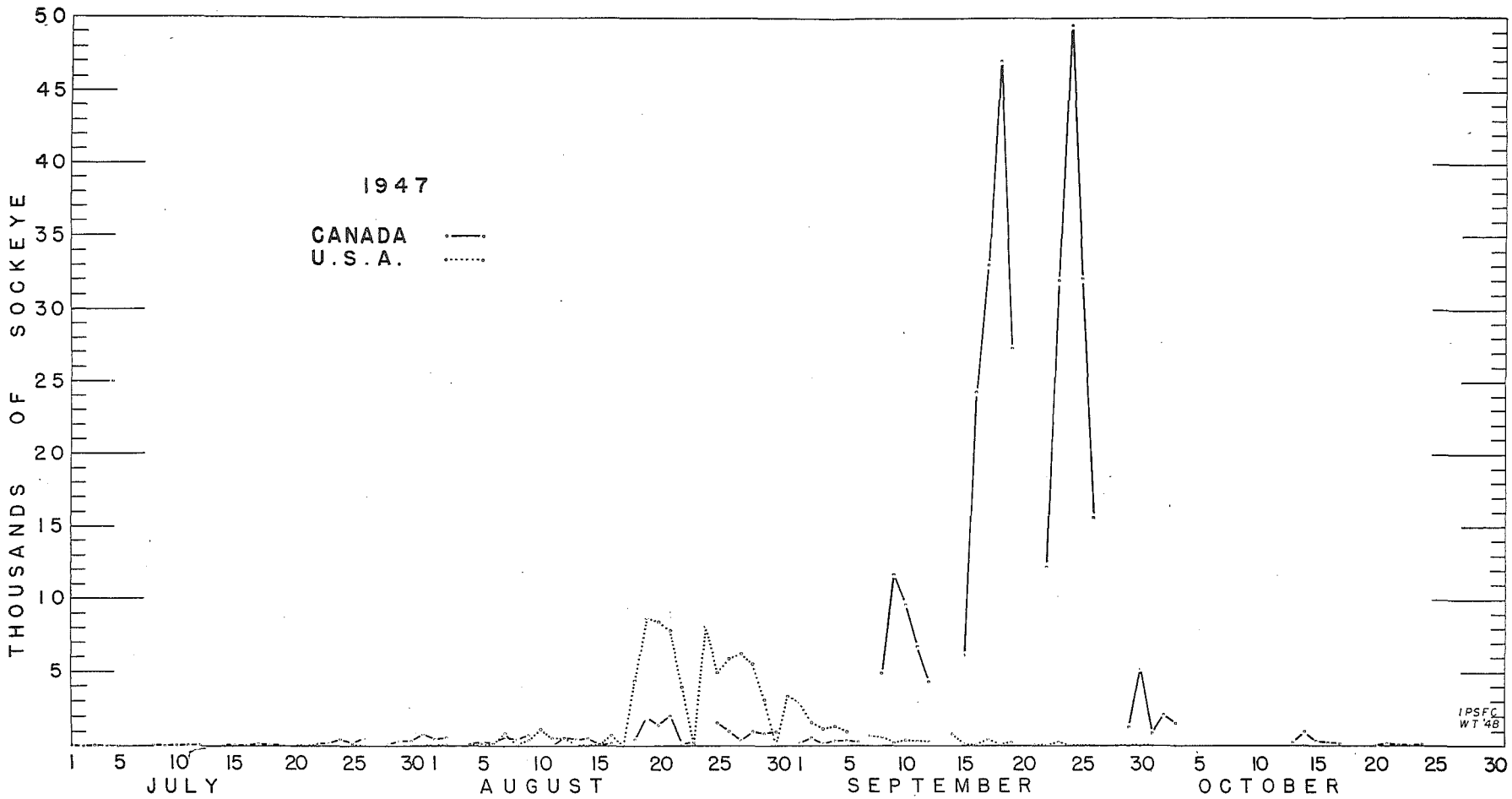


FIG. 3.—Total daily catch of sockeye in U. S. and Canadian waters during 1947. Swiftsure catches are included with U. S. landings and Sooke catches are included with Canadian landings.

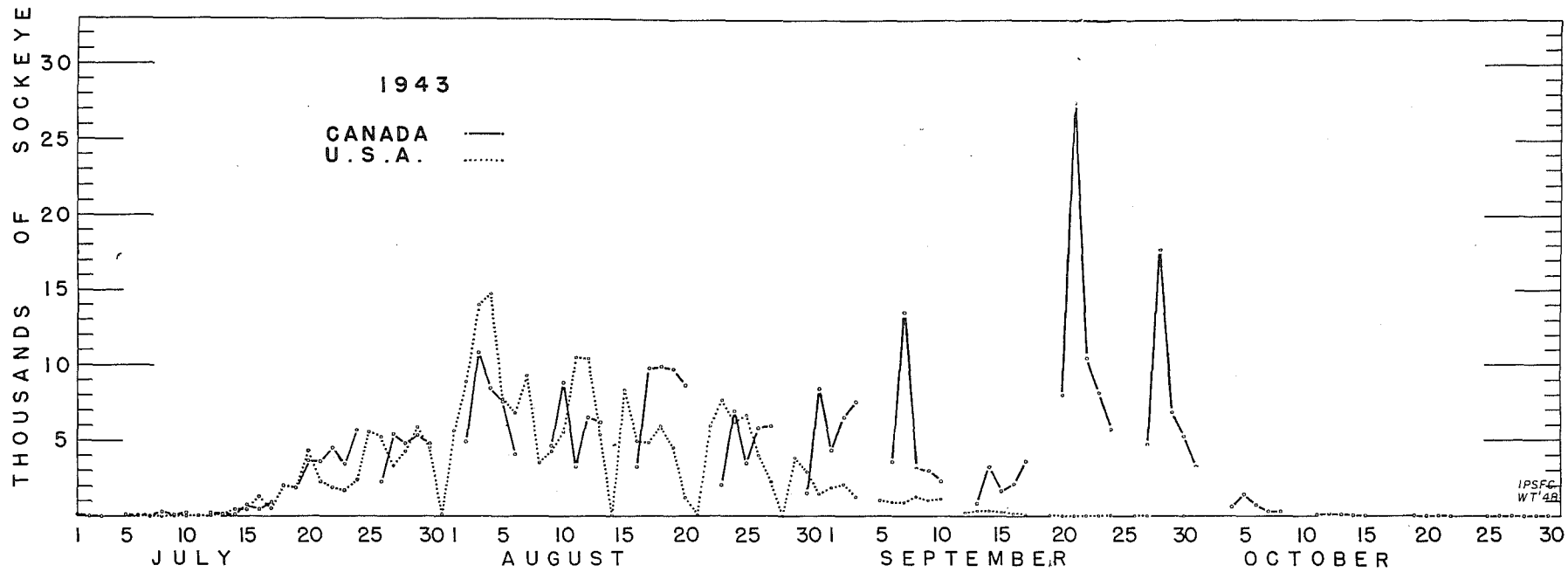


FIG. 4.—Total daily catch of sockeye in U. S. and Canadian waters during 1943. Swiftsure catches are included with U. S. landings and Sooke catches are included with Canadian landings.

2. That in the waters of Areas 19, 20 and 21 in District No. 3 as defined in the Special Fishery Regulations for British Columbia, the opening date for fishing for or taking Sockeye salmon shall be August 18th, 1947, at 6:00 a.m.

3. That in the waters of Canada embraced in Paragraphs Nos. 2 and 3 of Article 1 of the said Convention other than said Areas 19, 20 and 21, the opening day for fishing for or taking Sockeye salmon shall be the eighth day of September, 1947, at 6:00 a.m.

4. That in the waters of Canada embraced in Paragraphs Nos. 2 and 3 of Article 1 of the said Convention there shall be not less than a 72-hour weekly closure for each type of gear in the taking or fishing for Sockeye salmon during the period that the fishing for Sockeye salmon is not prohibited; and further the Commission recommends that consideration be given to representations which may be made from time to time by the Commission through its Chairman to the Chief Supervisor of Fisheries for British Columbia respecting additional closed time for fishing for Sockeye salmon.

5. Nothing contained in any Regulations made pursuant to the Fisheries Act shall apply to the taking of Sockeye salmon within the waters of Canada embraced in Paragraphs Nos. 2 and 3 of said Convention by the International Pacific Salmon Fisheries Commission or its servants or agents acting pursuant to its directions, for the purpose of exercising its objects under the said Convention.

UNITED STATES WATERS

The International Pacific Salmon Fisheries Commission appointed pursuant to The Convention relating to the protection, preservation and extension of the Sockeye Salmon Fisheries between the United States of America and Canada signed at Washington on the twenty-sixth day of May, 1930, 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 by virtue of authority in him vested by Section 5 of Chapter 3 of the laws of the State of Washington of 1933, namely:

1. That in the waters of the United States of America embraced in Paragraph No. 2 of Article 1 of the Convention relating to the protection, preservation and extension of the Sockeye Salmon Fisheries between the United States of America and Canada signed at Washington on the 26th day of May, 1930, no one shall fish for or take Sockeye salmon commercially prior to 6:00 a.m. on the 18th day of August, 1947.

2. Nothing contained in any Rules or Regulations relating to fishing for or taking Sockeye salmon shall apply to the taking of Sockeye salmon within the waters of the United States of America embraced in Paragraph No. 2 of Article 1 of said Convention by the International Pacific Salmon Fisheries Commission or its servants or agents acting pursuant to its directions for the purpose of exercising its objects under the said Convention.

3. That in the waters of the United States of America embraced in Paragraph No. 2 of Article 1 of the said Convention there shall be not less than a 36-hour weekly closure for each type of gear in the taking or fishing for Sockeye salmon during the period that the fishing for Sockeye salmon is not prohibited.

The Commission recommends that consideration be given to any representations that may be made from time to time by the Commission through

its Chairman to the Director of Fisheries of the State of Washington regarding additional closed time for fishing for Sockeye salmon.

4. That in the waters of the United States of America embraced in Paragraph No. 2 of Article 1 of the said Convention, in order to secure a proper escapement of Sockeye salmon, no one shall fish for or take any kind of salmon by any gill-net having a mesh of less than 8 inches extension measure when wet, during the period in the Spring or Chinook salmon fishing season, commencing on the 30th day of June, 1947, and extending up to 6:00 a.m. on the 18th day of August, 1947.

PUGET SOUND FISHERY

Daily catch records of the number of sockeye taken in Puget Sound were collected in the same manner as in 1946. The telephoned reports from the canneries were checked against copies of the ticket reports of sales. Due to the need for concentrating effort to obtain accurate records quickly, logbooks were collected from the U. S. purse seine fleet only and no attempt was made to obtain such records of operations from either the gill-net or reef-net operators on the U. S. side.

Twenty-two firms reported canning sockeye in the Puget Sound area during 1947. The total landings and the canned pack are shown in Table I. The U. S.

TABLE I

LANDINGS AND PACK, 1943-1947

1943	*U. S.*	*Canada*	*Total*
Total Landings (no. of fish)	243,000	349,000	592,000
Total Pack (cases)	19,060	30,280	49,340
1947			
Total Landings (no. of fish)	88,000	354,000	442,000
Total Pack (cases)	6,760	29,170	35,930

landings of 1947 were approximately 36% of the total sockeye taken in 1943. The decrease in catch as compared with that of the cycle year was caused by the regulations which shortened the season more than one month over that of the previous years of this cycle.

The daily landings for 1947 are shown in Figure 3 and compared with those for 1943, shown in Figure 4, demonstrate that the expectations upon which the regulations were based were in fact realized. In 1947 the main bulk of the sockeye apparently had moved through the fishing area before the opening date and most of the sockeye run was therefore protected. The pink salmon fishery yielded over 4 million more fish than were taken two years previously and the catch of that species showed no indication that it had suffered any curtailment from the Commission's regulations.

No regulations were adopted by the Commission to govern fishing at Swiftsure Banks. Fishing began there on August 1 after a delay of approximately three weeks due to a price dispute. The catches at Swiftsure were small and the seiners

FIG. 5.—Block area in the Thompson River Canyon which developed at low water in 1946. Considerable numbers of the South Thompson run were held up below this area.

left that area several days before the opening of the Inside waters. The fishing at Swiftsure was closely watched by an observer who worked out of Neah Bay during the period when boats were operating there.

Purse seiners began fishing the Inside waters on August 18 and a peak day on which only about 8700 sockeye were landed occurred on August 19. In the brood year of 1943 the peak of sockeye landings from Inside waters occurred on August 12. The size of the American purse seine fleet was over twice as large as in 1943 with 215 boats operating during the past season as compared with the 105 boats in the previous cycle year.

THE CANADIAN FISHERY

Total landings of sockeye from Canadian Treaty waters are shown in Table I. It is seen that there was a slight increase in the number of sockeye taken in 1947 over the catch for 1943 amounting to approximately 5000 fish.

As in previous years Canadian records were based solely upon the co-operation of the fishermen and canners. This co-operation continued at a high level but owing to the lack of an official system for collecting records many unavoidable delays occurred. The landings were obtained daily directly from the buyers and canners during the sockeye season. Logs were obtained from as many gill-net fishermen as possible and these logs were supplemented by personal interviews of many more gill-net fishermen. Careful observations were made of the gill-net fishing operations in the period prior to the legal opening.

The closed season established by the Commission for sockeye in Canadian Treaty waters did not begin until July 1, 1947. Before this date a minimum mesh of 6½ inches was established by the Dominion Department of Fisheries.

SOOKE TRAP FISHERY

Sockeye taken in the Sooke traps before July 1 were used commercially. After closure of the sockeye season on July 1 all sockeye taken in the Sooke traps were either tagged or released alive. The sockeye season officially opened in this area on August 18, the same date on which it opened in American waters. The peak of the sockeye run in the Sooke area occurred about August 7.

PURSE SEINE FISHERY

Purse seine fishing again took place in the waters off the southwest coast of Vancouver Island beginning August 18 and the earliest recorded landings by purse seines in this area were on August 19. These boats fished further westward than in the previous year and their landings, most of which came from areas west of the Sooke traps, contained few sockeye. The extended Area 17 was opened on September 15 and the purse seiners moved into that area and into Area 18 at that time. Most of the purse seine catches were made in Area 17 after this area opened, but bad weather especially during the first week hampered fishing operations. It was reported that about 120 seiners worked in this area when it first opened. Poor fishing caused most of them to return to Johnstone

TABLE II

THE INDIAN CATCHES OF SOCKEYE SALMON BY DISTRICTS AND THE AREAS WITHIN THESE DISTRICTS, 1943 AND 1947

District and Areas	1947 *Catch*	1947 *Per Cent of Total Catch*	1947 *No. of Fishermen*	1943 *Catch*	1943 *Per Cent of Total Catch*	1943 *No. of Fishermen*
HARRISON-BIRKENHEAD						
Skookumchuck	—					
Lillooet Lake	600					
Birkenhead River	5,500					
TOTAL	6,100	14.4	—	3,113	11.5	15
LOWER FRASER						
Seabird Island	500					
Katz and Ruby Creeks	500					
TOTAL	1,000	2.4	—	755	2.8	6
CANYON						
Union and American Bars	450		3			
Yale	2,500		12			
Spuzzum	500		3			
Lower Gorge	250		1			
Upper Gorge	200		3			
Boston Bar	200		1			
Boothroyd	3,000		10			
Cisco	4,000		16			
TOTAL	11,100	26.3	49	7,360	27.2	66
LYTTON TO LILLOOET	4,500	10.6	21	4,224	15.6	49
BRIDGE RIVER RAPIDS						
Lillooet	3,500		16			
Rapids	7,500		27			
Pavilion	1,500		9			
TOTAL	12,500	29.6	52	6,299	23.3	66
CHILCOTIN	No fishing			No fishing		
UPPER FRASER						
Alkali Lake	—					
Chimney Creek	600		4			
Soda Creek	600		5			
Alexandria	35		1			
Quesnel	250		2			
Shelley	600		5			
TOTAL	2,085	4.9	17	1,562	5.8	102
NECHAKO						
Nautley Reserve	600		5			
Stella Reserve	600		3			
TOTAL	1,200	2.8	8	1,660	6.2	—
STUART LAKE						
Fort St. James	1,000		12			
Tachie Reserve	800		8			
Trembleur and Takla Lakes	40		1			
TOTAL	1,840	4.4	21	194	0.7	—
THOMPSON						
Thompson River	1,000					
North Thompson River	150					
South Thompson River	800					
TOTAL	1,950	4.6		1,875	6.9	16
GRAND TOTAL	42,275			27,042		

Strait so that only a few boats were left by the end of September. Approximately 5000 sockeye were taken by the purse seiners in the Sooke area and 39,000 in Areas 17 and 18. Except for the small catch of the Sooke traps the rest of the Canadian sockeye catch was taken by the gill-net fishermen in the Fraser River.

FRASER RIVER GILL-NET FISHERY

The sockeye season opened in the Fraser River on September 8, however about 15,000 sockeye were landed between July 1 and the opening date. These fish were taken during the closed season with nets which complied with the minimum mesh requirements of 8 inches, but were made of light weight twine or were "hung in". By hanging two or three times more web than is normally used on a given length of cork line, the sockeye catches of some of the large mesh nets were greatly increased. Many sockeye were caught by operating the normally hung nets in such a manner as to entangle rather than gill the fish. Consideration is being given by the Commission to prohibiting possession and sale of sockeye in Treaty waters during the closed season to discourage these practices.

After the 8th of September sockeye fishing was good, compared with the cycle year, with the daily landings throughout the middle of the season higher than in 1943. The gill-net fishery closed on October 3 primarily to allow the escapement of some of the pink salmon run. It reopened October 13 with a minimum mesh of 6½ inches established by the Dominion Fisheries Department.

The landings indicate that there was no interference of the Commission's regulations with the pink salmon catch.

The number of gillnets operating in the Fraser River was calculated for the two years 1947 and 1943 from the average catch of a number of boats from which detailed catch records had been obtained. According to these calculations there were 1600 boats operating in 1947 or 360 fewer than the 1960 boats which fished this area in 1943.

INDIAN CATCH

Records were again kept of the sockeye catches made by the Indians in different districts of the Fraser River watershed. These records were collected incidentally to the recovery of tagged fish. They were compiled from the fish actually seen on the drying racks or in some cases the numbers were computed from tag ratios and numbers of tags recovered. In both cases the numbers are a minimum. The records of catches for the different districts are shown in Table II for both 1943 and 1947. The total catch of 1947 was approximately 16,000 greater than that for the previous year of the cycle, an increase of almost 38%. Most of this increase came from the early runs that were protected from the commercial fishery.

SALT WATER TAGGING

The program of tagging sockeye at the Sooke traps on the southern end of Vancouver Island was continued. Since previous operations there proved that

TABLE III

SUMMARY OF THE ESTIMATED SOCKEYE ESCAPEMENT TO THE FRASER RIVER SPAWNING AREAS, 1947

District and Streams	Dates of Run		Estimated No. Sockeye Present	Sex Ratio (%)			
	Arrival	End		Males		Females	
				3-Yr.	4 & 5-Yr.	3-Yr.	4 & 5-Yr.
LOWER FRASER							
Cultus Lake*	Sept. 26	Dec. 29	8,898	2.0	32.2	0.3	65.5
Upper Pitt River (incl. tributaries)†	Sept. 1	Oct. 5	90,000		41.0		59.0
Widgeon Slough†			750		45.0		55.0
HARRISON							
Big Silver Creek§							
Douglas Creek§							
East Creek§							
Harrison River†	Nov. 10	Dec. 4	16,000	0.7	37.1	0.0	62.2
Hatchery Creek	Oct.	Nov.	500				
Weaver Creek†	Oct. 1	Nov. 18	6,500	0.5	28.8		70.7
LILLOOET							
Birkenhead River†	Aug. 25	Oct. 31	120,000	29.3	28.1		42.6
Upper Lillooet streams			Present				
SOUTH THOMPSON							
Seymour River†	Aug. 12	Sept. 15	10,000		46.0		54.0
Adams Lake and Tribs.†			Nil				
Adams River, Little Shuswap Lake and Little River†	Sept. 20	Nov. 19	200,000	1.0	35.4	0.2	63.4
Shuswap Lake and Tribs.			Nil				
South Thompson River	Sept.	Nov.	100				
NORTH THOMPSON							
Raft River†	Aug. 10	Sept. 8	8,000		46.0		54.0
SETON-ANDERSON							
Cayoosh Creek			Nil				
Portage Creek	Aug.		50				
Seton Creek			Nil				
CHILCOTIN							
Chilko River†	Aug. 18	Oct. 18	55,000	9.1	38.4		52.5
Chilko Lake	Aug. 18	Oct. 10	Present				
QUESNEL							
Horsefly River	Aug.	Sept.	6				
Little Horsefly River			Nil				
Mitchell River			Nil				
NECHAKO							
Endako River‡	Aug. 20	Sept. 20	450				
Francois Lake	Sept.	Oct.	Present				
Nadina River‡	Aug. 25	Sept. 25	90				
Nithi River‡	Aug. 20	Sept. 5	60				
Ormonde Creek	Aug. 20	Sept. 5	40				
Stellako River†	Sept. 1	Nov. 1	55,000		43.9		56.1
Uncha Creek	Oct. 1	Oct. 20	2				
STUART LAKE							
Driftwood River			Nil				
Forfar Creek‡	July 28	Sept. 1	1,500		45.4		54.6
Gluske Creek‡	Aug. 5	Aug. 25	200				
Kazchek Creek							
Kynoch Creek‡	July 28	Sept. 1	10,000		69.3		30.7
Middle River‡	Sept. 5	Sept. 30	60				
Narrows Creek			Nil				
Rossette Creek‡	July 28	Sept. 1	2,500		43.6		56.4
Shale Creek			Nil				
Tachie River			Nil				
NORTHEAST							
Antler Creek	Aug.	Sept.	50				
Upper Bowron River* (incl. Moose Creek)	July 26	Sept. 12	23,945		45.6		54.4

* All fish counted through weir.
† Population estimated from tagging program.
‡ Population estimated from indices.
§ Streams not visited in 1947.

sockeye taken in that area prior to July 1 were for the most part not Fraser River fish, tagging was not begun until June 30. Arrangements were made with the trap owners to tag sockeye that had to be released during the closed season extending from July 1 to August 18. After this date fish were taken for tagging under the same arrangements as in previous years. Operations were concluded here on September 15 at which time a total of 3,447 tagged sockeye had been released. A total of 1,120 or 32.5% were recovered in the U. S. and Canadian fisheries and on the spawning grounds.

ESCAPEMENT

The estimated escapement of sockeye to the various streams of the Fraser River system is shown in Table III. The success of the 1947 regulations was again demonstrated in the escapement of the early runs, especially to the upper areas. Runs for which accurate figures are available from 1943 are compared in size for the two years in Table IV. In addition to the streams included in this table, large increases were reported for the Seymour River, Adams River, Little River and Little Shuswap Lake; however the 1943 records of these runs preclude accurate comparisons.

The largest increase of those streams for which accurate records are available for both years was shown in the Nechako area and most of this increase occurred in the Stellako River run. The Stuart area came next in its gain over 1943, with the Chilko and Bowron showing approximately the same percentage increase. The streams included in Table IV showed an average escapement in 1947 over four times that of 1943. An examination of Table III reveals, however, that none of the early up-river runs can as yet be considered of a size sufficient to support a significant fishery. It will be noted that only six sockeye were found in a careful examination of the entire Quesnel-Horsefly area. Some encouragement is seen in the case of the late run into the Adams River, although it is possible that these fish were composed primarily of 5-year-old fish and came from the large Adams River run in 1942.

The runs to the upper Pitt River and the Birkenhead are of interest in the picture of the 1947 escapement since they are large enough so that they can be expected to add to the annual catch in the future.

TABLE IV

COMPARISON OF UPRIVER ESCAPEMENT
1947 AND 1943

	1943	*1947*	*Percentage 1947/1943*
Raft River	4,000	8,000	200%
Chilko River and Lake	14,000	55,000	390%
Quesnel	0	6	
Nechako	9,000	56,000	620%
Stuart	3,000	15,000	500%
Bowron	6,360	23,995	375%

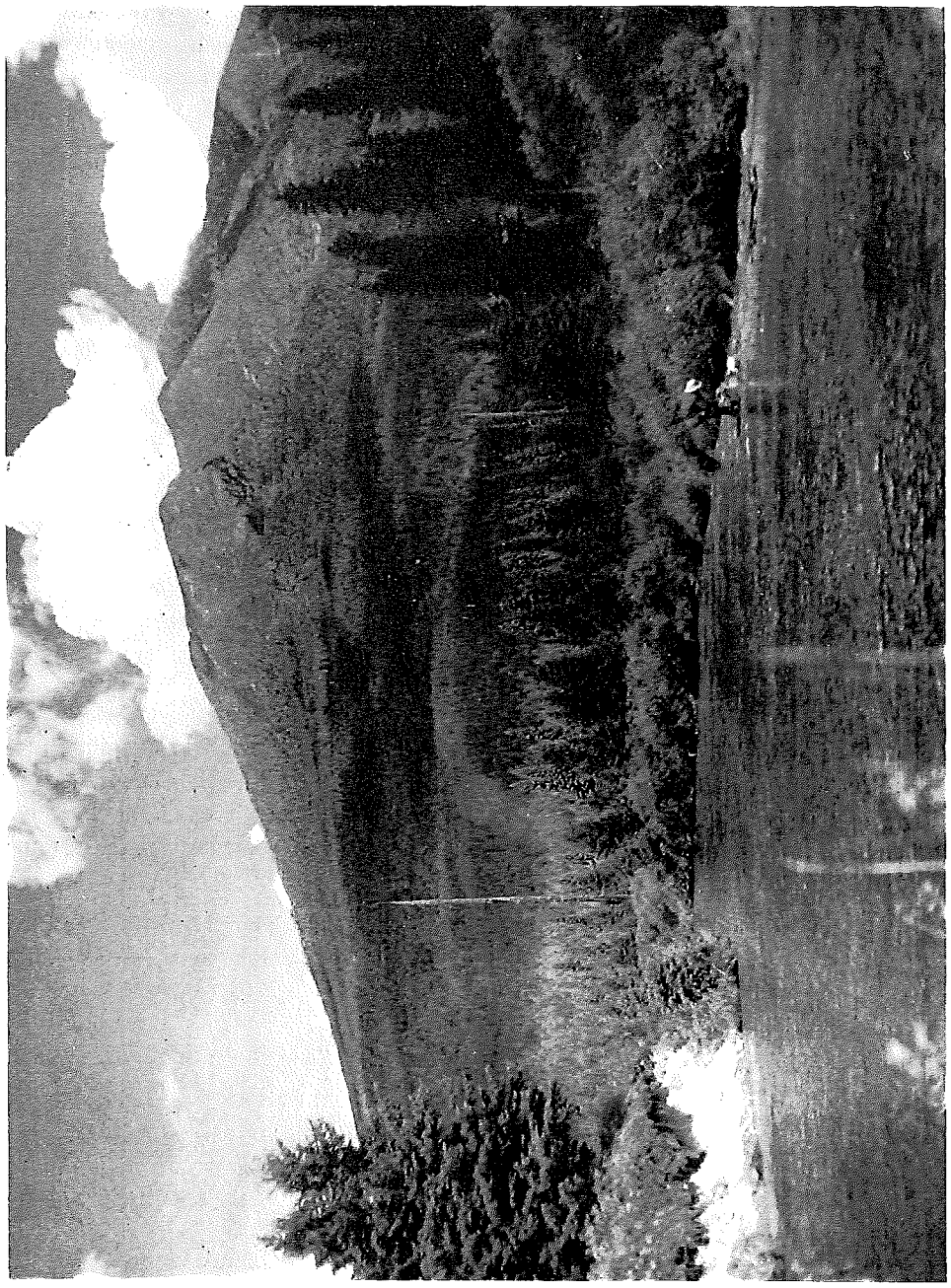


FIG. 6.—The upper Bowron River spawning grounds.

No delays at either Hell's Gate or Bridge River Rapids developed within the levels through which the fishways operated and the increased escapement was insured by the structures at these points. Tag recaptures at the Gate indicate some delay might still occur at water levels above 54 feet on the Hell's Gate gauge. This is the upper limit of operation of the present main fishways.

A total of 4,617 sockeye were tagged at Hell's Gate between July 6 and October 29. These operations provided a continuous check on the relative numbers of fish escaping to the spawning grounds and furnished further information on the movements of the runs through areas where they have been obstructed in the past.

QUESNEL REHABILITATION

A biologist was again assigned to the problem of continuing a detailed survey of the Quesnel-Horsefly area in search of a location suitable for the establishment of an experimental hatchery. While this investigation was under way, an "eyeing" station was established on the upper Bowron River and approximately 750,000 eggs were taken from the spawning fish captured on the spawning grounds. These eggs were reared to the eyed stage at the station on the Bowron. With the co-operation of the Washington State Department of Fisheries the eyed eggs were then flown from Bowron Lake to Bellingham, Washington, in the Washington State Fisheries patrol plane and were put into the Sammamish Hatchery. Shortly before hatching, all but 60,000 of these eggs were transferred to the Washington State Department of Fisheries Hatchery at Marblemount on the Skagit River. The remaining eggs were hatched at the Sammamish Hatchery and the fry were then transferred to the University of Washington to be used in an experiment in accelerated growth. The young fish from both Marblemount and the University of Washington will be returned to the Quesnel-Horsefly district for planting. This operation was a temporary expedient, undertaken in order to get an early start toward the rehabilitation of the Quesnel runs.

After a futile search for a gravity water supply in the Quesnel-Horsefly district the Commission authorized the construction of an experimental station on Horsefly Lake which will form the real basis for rebuilding these runs. By the end of the year a site had been located and the Commission was in the process of procuring it. In the future it is planned to transfer eyed eggs from the Bowron to this station. The eggs are to be hatched and the young reared there to a size suitable for planting in the Quesnel area streams.

GILL-NET MESH INVESTIGATION

In discussing regulations in previous years with the Advisory Board the lack of information upon the relationship between the size of gill-net mesh and the efficiency of the nets in the capture of sockeye has been felt. In addition, results of the use of gill-nets in other fisheries had demonstrated the need for a study in connection with sockeye salmon conservation. Accordingly an experiment was undertaken at the lower end of the Fraser River for the purpose of studying the efficiency of various sizes of gill-net mesh. Ten sizes of net were

FIG. 7.—Anatole Duncan and family of Trembleur Lake village.

used, varying from 5¼ inches up to 8¾ inches. The meshes were hung in 40 fathom sections and the nets were made up of five pieces of these 40 fathom lengths. Operations were conducted by means of two chartered gill-net boats.

The results of these experiments demonstrated clearly that the 8 inch minimum mesh prescribed in previous years by the Commission during the season closed to sockeye fishing was valid and that smaller mesh could not be permitted without endangering the objectives of conservation. Nets having a mesh of 7½ inches were found to take significant numbers of the largest male sockeye. Widespread use of such nets would not only decrease the size of fish escaping to the spawning grounds but would also tend to upset the balance between the sexes. While the importance of this balance is not yet appreciated, the Commission does not consider it wise to permit fishing that is known to have this effect. It was also demonstrated that few sockeye could be taken in nets of 8 inch mesh or larger, when they were operated in the usual manner in which gill-nets are run.

TAGGING INVESTIGATION

Probably the most important biological work carried out by the staff each year is the estimation of the number of fish escaping to each stream. Limitations in the size of the appropriation and therefore in the size of staff available as well as in equipment have resulted in the widespread adoption of the tagging method for enumerating the runs in most of the streams. Some experimental work was carried out in 1938 and 1939 to determine the accuracy with which such estimates could be made. As a result of the use of this method, many other problems that were not solved by the 1938-1939 experiments have arisen. Accordingly another experiment was carried out this year, again having as its objective the determination of the accuracy of the tagging method in estimating the size of populations at Cultus Lake. The importance of determining the accuracy of these estimates is great. The success of regulation and of the stream improvement work or of any other program having as its objective the improvement of the sockeye runs is measured by the increased escapement and the catch. Even if total escapement figures could be obtained without the examination of the individual streams these figures would be of little value because of the demonstrated independence of the races spawning in different areas. The policy of the Commission must be dictated by the success of the individual runs. Therefore the sizes of these runs must be assessed each year as accurately as possible.

DEVELOPMENT OF YOUNG SOCKEYE IN ADAMS RIVER

The large run into the South Thompson streams in 1946 presented opportunity for a study of the early life history of the sockeye. Development of the eggs in Adams and Little Rivers was followed by sampling eggs dug out of the various nests throughout the winter and spring of 1947. The movements of the young fry as they emerged from the gravel were followed closely until it was no longer possible to capture them in Shuswap Lake. This program will be continued with a study of the migration of the fingerlings to sea in 1948.

FIG. 8.—A typical pool on the Driftwood River. Many miles of excellent spawning gravel were found in a survey conducted in this river in August, 1947.

Engineering Operations

HELL'S GATE FISHWAYS

The Hell's Gate fishways operated successfully throughout the year within the water levels for which they were constructed. The right bank high-level fishway has been completed by the Commission's forces. This fishway parallels the principal structure and extends the upper range of operating level on the right bank to elevation 70 on the Hell's Gate gauge. Three areas in the right bank tunnel have been concreted to support fractured rock and to prevent future falls of rock into the tunnel. Permanent operators' quarters have been constructed on the right bank. Construction of an access road to the deck of the principal fishway on the right bank has been started. To prevent erosion of the rip-rap on the left bank, concrete for its consolidation has been placed in two areas along this bank. This consolidating work will be continued as may be found necessary.

BRIDGE RIVER RAPIDS FISHWAYS

Required sloping of the banks and adjustments to these fishways have been completed. An access road to the deck of the lower rapid fishway has been constructed. The two fishways operated without interruption.

FARWELL CANYON FISHWAYS, CHILCOTIN RIVER

Construction work has been carried to 80% of completion on the five fishways at Farwell Canyon on the Chilcotin River. The work has been carried out by the Commission's forces. Since the site of the works is eleven miles from the main road it has been necessary to reconstruct this section of unimproved roadway. The existing bridge spanning the Chilcotin River has required strengthening in order that equipment could be moved from bank to bank. A camp, capable of housing 35 men has been constructed. Delay in obtaining the required construction equipment postponed the start of the construction work on this project approximately 60 days. The rock formation in the canyon has been found to be of poorer quality than the preliminary geological examination disclosed, thus necessitating great care in the construction operations to prevent slides from the steep canyon walls.

FIELD SURVEYS

A detailed survey has been made of Scotch Creek in its Delta area to prepare plans for stabilizing the stream bed. This stream has periodically changed its course following one or more of three existing flood channels. The project proposed for this stream will confine the low flow into one of these channels, thereby preventing the loss of spawn which has occurred in the past.

A complete topographic and water profile survey of three potential block areas has been under way. Two of these turbulent areas are in the Fraser River above Hell's Gate, namely at China Bar and Scuzzy Rapids. At these points the drop through the rapids increases at low flows, and at a water elevation

FIG. 9.—Farwell Canyon showing two of the five fishways partially completed (lower left). The construction camp may be seen on the upper right.

of approximately 13 feet at the Hell's Gate gauge there is sufficient fall to cause difficulty in the passage of sockeye. The third such rapid is in the Thompson Canyon, approximately 8 miles above the confluence of the Thompson and Fraser Rivers.

HIGH AND LOW LEVEL FISHWAYS AT HELL'S GATE

Data from the biological experiments indicate that sockeye salmon experience some difficulty in passing Hell's Gate above the upper operating level of the principal fishways which is 54 feet on the Hell's Gate gauge. Their passage is also blocked on the right bank at low water below the lowest operating level of the right bank fishway—at gauge level 15 feet. Detailed plans and specifications have been prepared for the construction of a high level left bank fishway and a low level right bank fishway. In order to determine the exact placement of the entrances of these auxiliary fishways and the most efficient pool size, the existing model of the Hell's Gate reach constructed at the University of Washington has been overhauled and again placed in operation. A comprehensive study has been made of the required operating conditions and the proposed fishways have been finally located in this model. When these fishways are constructed at Hell's Gate, passage-way will be afforded to the sockeye throughout 60 feet of fluctuation in river level on the right bank, and 50 feet of river levels on the left bank, with natural passage along the left bank open to the fish to the lowest river level starting from the lower operating range of the fishways.

WAREHOUSE

A two-storey warehouse has been built at New Westminster for the housing of the Commission's equipment, automobiles and supplies. The warehouse has been constructed on Dominion Government property at the Dominion Fisheries Station.

HYDROMETRIC READINGS

The Dominion Water and Power Bureau has co-operated with the Commission by taking flow readings in various tributary streams of the Fraser River system on which corrective work is to be undertaken by the Commission. It has also currently furnished the Commission with gauge heights and flow data from its established gauging stations when such data have been needed by the Commission.

BIRKENHEAD RIVER

Action has been taken by the Commission and the Dominion Department of Fisheries with the Prairie Farm Rehabilitation Administration to alleviate a potentially serious interference with the salmon run in the Birkenhead River. The Prairie Farm Rehabilitation Administration engineers, in connection with a minor land erosion problem, planned to dry up or reduce the flow in the first half mile of the present river channel, by opening up an old overflow channel. The overflow channel would not have provided suitable spawning grounds for

salmon. If the present channel had been dried the resulting damage this year would have been the destruction of the spawn from 35,000 adult fish, or approximately 30% of the sockeye spawning in the Birkenhead system.

The Prairie Farm Rehabilitation Administration has agreed to alleviate this hazard by the construction of a tight wooden crib to close off the overflow channel at its point of take-off from the main channel. This instance is but one of many which show repeatedly the need for the closest co-operation between water users, whether government agencies, private companies or individuals, in order to obtain the greatest possible benefits to the region from the utilization of the water resources.