
Pacific Salmon Commission



1989/90
Fifth Annual Report

Pacific Salmon Commission

**Established by Treaty between Canada
and the United States March 18, 1985**

for the

**conservation, management and
optimum production of Pacific salmon**

Fifth Annual Report 1989/90

**Vancouver, B.C.
Canada**



PACIFIC SALMON COMMISSION

ESTABLISHED BY TREATY BETWEEN CANADA
AND THE UNITED STATES OF AMERICA
MARCH 18, 1985

600 - 1155 ROBSON STREET
VANCOUVER, B.C. V6E 1B5
TELEPHONE: (604) 684-8081
FAX: (604) 666-8707

Letter of Transmittal

In compliance with Article II, Paragraph 14 of the Treaty between the Government of Canada and the Government of the United States of America concerning Pacific salmon, it is my pleasure as Chair of the Pacific Salmon Commission to present my compliments to the Parties and to transmit herewith the Fifth Annual Report of the Commission.

This report summarizes the activities of the Commission for the fiscal year April 1, 1989 to March 31, 1990, and includes reports on the final two sessions of the Fifth Annual Meeting which were held in April and May, 1990. The text of agreements recommended to the Parties by the Commission to establish fishery regimes for the 1990 season is contained within this report as is the amended Annex IV to the Pacific Salmon Treaty.

The Commission wishes to note particularly that significant progress was made on all major issues discussed during this meeting cycle. Provisions for fishery regimes in the Northern Boundary area have been successfully negotiated and will apply for the next four years; implementation of joint enhancement activities started on the Stikine River in 1989 and on the Taku River in 1990; ceilings on chinook fisheries in southeastern Alaska and northern British Columbia have been increased for 1990; and the Commission has made commitments to embark on a series of tasks designed to lead toward resolution of the "equity" issue, perhaps as early as 1992. These agreements clearly indicate that the Commission is addressing issues which will lead to implementation of the cornerstone principles of the Pacific Salmon Treaty.

Reports on meetings of the Standing Committees on Finance and Administration, and Research and Statistics, are presented in summary, as are the activities of the Northern, Southern and Fraser River Panels. Executive summaries of reports prepared by the Joint Technical Committees during the period covered by this report are also presented.

The Auditors' report on financial activities of the Commission during the fiscal year April 1, 1989 to March 31, 1990, as approved by the Commission, is presented for your consideration.

Yours truly,

D.W. Collinsworth
Chair

PACIFIC SALMON COMMISSION

OFFICERS for 1989/90

Chair Mr. C.W. Shinnors (to April 30, 1989)
 Mr. P.S. Chamut (May 1, 1989 to Nov. 30, 1989)
 Mr. D.W. Collinsworth (from Dec. 1, 1989)

Vice-Chair Mr. D.A. Colson (to Sept. 30, 1989)
 Mr. D.W. Collinsworth (Oct. 1 to Nov. 30, 1989)
 Mr. P.S. Chamut (from Dec. 1, 1989)

COMMISSIONERS

Canada

Mr. C.W. Shinnors (to April 30, 1989)
Mr. C. Atleo
Mr. R. Wright
Mr. L.P. Greene
Mr. G.E. Jones (to Feb. 28, 1989)
Mr. J. Gosnell
Ms. S. Hewlett
Mr. J. Nichol
Mr. P.S. Chamut (from May 1, 1989)
Mr. A.F. Lill (from Nov. 10, 1989)

United States

Mr. S.T. Wapato (to Feb. 28, 1989)
Mr. D.W. Collinsworth
Mr. G.I. James (from Feb. 2, 1990)
Mr. D.A. Colson
Mr. G.R. McMinds
Dr. J.R. Donaldson
Mr. H.R. Beasley
Mr. J. Blum
Mr. G. Slaven (to Sept., 1990)
Mr. B. Wallace (from Jan. 12, 1990)

SECRETARIAT STAFF

Executive Secretary	Mr. I. Todd
Deputy Executive Secretary	Mr. W.W. Johnson (from Aug. 1, 1989)
Administrative Officer	Mr. K. Medlock
Chief Biologist	Dr. J.C. Woodey

Contents

Letter of Transmittal	iii
Introduction	xi
I Activities of the Commission	1
A. Executive Session of the Commission October 11-12, 1989 — Prince Rupert, B.C.	3
B. Post 1989 fishing season meeting of the Commission November 29-December 1, 1989 — Vancouver, B.C.	4
C. Fifth Annual Meeting of the Commission February 5-10, 1990 — Vancouver, B.C.	6
D. Fifth Annual Meeting of the Commission (continuation) April 10-12, 1990 — Bellevue, Wash.	10
E. Fifth Annual Meeting of the Commission (conclusion) May 14-16, 1990 — Vancouver, B.C.	11
II Activities of the Standing Committees	13
A. Meetings of the Standing Committee on Finance and Administration	15
B. Meetings of the Standing Committee on Research and Statistics	18
III Activities of the Panels	19
A. Fraser River Panel	21
B. Northern Panel	21
C. Southern Panel	21
D. Joint Meetings of the Northern and Southern Panels	21
IV Review of 1989 Fisheries and Treaty-related Performance	23
A. Fraser River Sockeye	25
B. 1989 Post-Season Report for Canadian Treaty Limit Fisheries	31
C. 1989 Post-Season Report for United States Treaty Limit Fisheries	38
D. 1989 Update Reports for Salmonid Enhancement Programs in Canada and United States: (1) 1989 Canadian Enhancement Update (2) 1989 United States Enhancement Update	48
V Reports of the Joint Technical Committees	57
A. Chinook	59
B. Chum	70
C. Coho	71
D. Northern Boundary	74
E. Transboundary	74
F. Data Sharing	79
G. Joint Interceptions Committee	80
VI Publications of the Pacific Salmon Commission	85

VII	Report of the Auditors for 1989/90	99
VIII	Appendices	113
A.	Recommendations of the Commission to the Parties for Amendments to Annex IV and Other Understandings to Give Effect to the Agreed Fishery Regime for 1990	115
B.	Revised Annex IV to the Pacific Salmon Treaty in Effect for 1990	119
C.	Understanding between the United States and the Canadian Sections of the Pacific Salmon Commission concerning Joint Enhancement of Transboundary River Salmon Stocks	133
D.	Bilateral Northern Panel Recommendations Regarding Joint Planning Process	135
E.	Bilateral Northern Panel Recommendations Regarding Joint Technical Evaluation of the Stock Status and Catch Composition of Salmon Harvested in Northern Boundary Area Fisheries	136
F.	Northern Panel Steelhead Data Request	138
G.	Inclusion of Selected Terminal Area Chinook Catches from Northern and Central B.C. Chinook Catch Ceilings	139
H.	Understanding between the Canadian and the United States Sections of the Pacific Salmon Commission concerning Equity Related Issues	140
I.	Approved Budget for Fiscal Year 1990/91 and Comparison with Fiscal Year 1989/90	142
J.	Pacific Salmon Commission Secretariat staff list as of March 31, 1990	143
K.	Membership lists for Standing Committees, Panels. Joint Technical Committees and other appointments as of March 31, 1990	144

INTRODUCTION

Interception of Pacific salmon bound for rivers of one country by fishermen of the other has been the subject of discussion between the Governments of Canada and the United States of America since the early part of this century. Intercepting fisheries were identified through research conducted by the two countries on species and stocks originating from Alaska, British Columbia, Washington and Oregon. The results of research identified that Alaskan fishermen were catching salmon bound for British Columbia, Oregon and Washington. Canadian fishermen, primarily off the west coast of Vancouver Island, were capturing salmon bound for rivers of Washington and Oregon. Fishermen in northern British Columbia were intercepting salmon returning to Alaska, and United States fishermen were catching Fraser River salmon as they travelled through the Strait of Juan de Fuca and the San Juan Islands towards the Fraser River.

Management of stocks subject to interception is a matter of common concern to both Canada and the United States. A mechanism to enable the countries to reap the benefits of their respective management and enhancement efforts was required. That mechanism is now provided through the Pacific Salmon Treaty, which entered into force upon the exchange of instruments of ratification by the President of the United States of America and the Prime Minister of Canada on March 18, 1985.

The Pacific Salmon Commission, guided by principles and provisions of the Treaty, establishes general fishery management regimes for international conservation and harvest sharing of intermingling salmon stocks. Each country retains jurisdictional management authority for its fisheries but must take into account and manage its fisheries in a manner consistent with provisions of the Treaty. Implementation of the principles of the Treaty enables the United States and Canada, through better conservation and enhancement, to prevent overfishing, increase production of salmon, and ensure that each country receives benefits equivalent to its own production. The Commission also serves as a forum for consultation between the Parties on their salmonid enhancement operations and research programs.

The organizational structure of the Commission is focused on three geographically oriented panels. The Northern Panel's stocks of concern are those which originate in rivers situated between Cape Suckling in Alaska and Cape Caution in British Columbia, including the transboundary rivers. The Southern Panel has responsibility for salmon originating south of Cape Caution, other than Fraser River sockeye and pink salmon.

The functions of panels are to review annual post-season reports, annual pre-season fishing plans and ongoing and planned salmonid enhancement programs of each country to provide recommendations to the Commission for development of annual fishery regimes in accordance with the objectives of the Treaty. These plans, once adopted, are implemented by the management agencies in each country.

The Fraser River Panel, in addition, has been accorded special responsibility for in-season regulation of Fraser River sockeye and pink fisheries of Canada and the United States in southern British Columbia and northern Puget Sound. Scientific and technical work is conducted for the Panel by the Fishery Management Division of the Commission's Secretariat staff.

The Commission meets at least once annually and conducts its business between meetings through its permanent Secretariat located in Vancouver, British Columbia. In the period April 1, 1989 to March 31, 1990, the Commission met on five occasions:

1. Commission Executive Session
October 11-12, 1989, Prince Rupert, B.C.;
2. Post 1989 fishing season meeting of the Commission
November 29-December 1, 1989, Vancouver, B.C.;
3. Fifth Annual Meeting of the Commission
February 5-10, 1990, Vancouver, B.C.;
4. Fifth Annual Meeting of the Commission (continued)
April 10-12, 1990, Bellevue, Washington;
5. Fifth Annual Meeting of the Commission (conclusion)
May 14-16, 1990, Vancouver, B.C.

This, the fifth annual report of the Pacific Salmon Commission, provides a synopsis of the activities of the Commission and its subsidiary bodies during its fifth fiscal year of operation, April 1, 1989 to March 31, 1990, and includes reports on the final two sessions of the Annual Meeting which were held in April and May, 1990.

During the period covered by this report, the Commission again faced major challenges. All fishing arrangements originally established in Annex IV to the Treaty prior to the 1985 season were open for evaluation and re-negotiation, with the possible exception of Fraser River sockeye and pink salmon allocation arrangements.

In particular, both Parties desired to develop amendments to the chinook fishery regime early in the negotiating cycle which would result in increases to some ceilings for 1990 without impairing the agreed re-building schedule. Early resolution of this issue would provide time to begin development of a longer term chinook management regime.

The Commission also planned to enter into detailed discussion of the "equity" question through a review of reports prepared by the Joint Interceptions and Joint Objectives and Goals Committees which were established during the 1988/89 meeting cycle.

The tasks facing the Commission, then, were prodigious. Progress through the early part of the cycle was slower than hoped, and in the end two additional sessions of the Annual Meeting were required, however, major progress was made in all areas.

Successful re-negotiation of provisions in Chapter 2 of Annex IV which will apply for the next four years means that a relatively limited number of fishery regimes will have to be considered during the 1990/91 meeting cycle. This in turn should provide time for the Commission to focus its efforts on longer term arrangements which will enable the two countries to improve Pacific salmon production and for each to receive benefits equivalent to the production from its own rivers.

Activities of the Commission

PART I

ACTIVITIES OF THE COMMISSION

A. EXECUTIVE SESSION OF THE PACIFIC SALMON COMMISSION October 11-12, 1989 — Prince Rupert, B.C.

The Commission met in executive session October 11 and 12, 1989, discussing a range of issues. The following agreements were reached regarding instructions to working groups and arrangements for Commission meetings during the November 28 - December 1, 1989 meeting sessions in Vancouver and the February 1990 PSC Annual Meeting, also in Vancouver, B.C.

1. Chinook:

The Commission instructed the bilateral work group to report on the U.S. chinook proposal for 1990 during the November meeting. The Chinook Technical Committee will complete the necessary technical assignments as identified by the bilateral work group prior to the November Commission meeting;

By the end of the November meeting the Commission expects to reach agreement on the framework of the 1990 short-term chinook proposal;

The Chinook Technical Committee was instructed to schedule a January meeting to provide the data necessary to fill out the framework of the 1990 short-term chinook proposal:

Following the November meeting, the Chinook Working Group is to address long-term chinook issues. It is understood the Chinook Working Group will not complete work on this task by February.

2. Coho:

Prior to the November meeting a "Manager to Manager" meeting will be held to review the proposed U.S. stepped approach to coho management;

The U.S. Southern Panel will present the specifics of the U.S. coho proposal to the Canadian Southern Panel during their bilateral meetings in November.

3. Northern Issues:

Canada will bring specific conservation proposals regarding Skeena coho and Nass sockeye to the Northern Panel during the November meeting.

4. Equity:

At the November meeting Canada will provide a paper detailing the Canadian view on equity.

5. At the close of the November meeting, the Commission may provide Panels with further instructions to meet between November and February.

Note: Both the Joint Interceptions Committee (JIC) and the Joint Objectives and Goals Committee (JOGC), will continue to meet in order to fulfill their objectives.

B. POST 1989 SEASON MEETING OF THE COMMISSION November 29-December 1, 1989 — Vancouver, B.C.

Commission Chair, Pat Chamut, called the first executive session sitting of the Pacific Salmon Commission's (PSC) post-season meeting to order at 10 a.m. Wednesday, November 29, 1989, welcoming the U.S. participants to Vancouver and introducing new alternative Canadian Commissioner Al Lill.

U.S. Section Chair, Don Collinsworth, introduced new alternate U.S. Commissioner from Alaska, Bruce Wallace.

The Commission approved the agenda for its executive session and the schedule for the meeting, as provided by the Secretariat. The Commission then discussed the issue of changing Commission officers, planning to announce the new officers at a plenary session on Friday, December 1, 1989.

The Commission had the Executive Secretary review the report of the Standing Committee on Finance and Administration. The Commission agreed a major initiative on budget revision by the two nations is required. A drafting committee was to produce a letter with background on how initial funding levels for the Commission were established and outlining how this funding has proven to be inadequate once actual responsibilities of the Commission Secretariat became firmly established. The two sides agreed to go forward with an effort to increase the base PSC funding to a level of \$1 million (U.S.) from each Party in 1991/92. The Commission adopted the budget proposed for FY 1990/91.

The Commission received a report from the Standing Committee on Research and Statistics (R&S). Good progress has been made by the Joint Interceptions Committee and its report should be ready for R&S review by mid-January. The Joint Objectives and Goals Committee has also made progress, having exchanged initial draft documents in October.

The Commission reviewed progress on commitments which had been agreed at the Prince Rupert meeting. The United States tabled a document on southern coho management; Canada tabled a chinook proposal for 1990 and a position paper on equity. Canada also presented proposals for northern boundary area coho and sockeye.

Later in the meeting, the two sides exchanged the following:

Canada:

- (a) for the Northern Panel Area, papers on
 - (i) Area 1 pink troll fishery
 - (ii) Northern boundary steelhead
 - (iii) Northern boundary chum
- (b) for the Southern Panel Area, papers on
 - (i) coho in Areas 7/7A and Area 20
 - (ii) coho on the west coast of Vancouver Island

United States (Northern Panel Area only)

- (a) Stikine sockeye enhancement for 1990
- (b) Canadian overage on Stikine River coho
- (c) Portland Canal chum salmon
- (d) Sockeye management at Tree Point
- (e) Canadian Area 3 pink salmon management
- (f) Noyes Island (District 104) fishery
- (g) Canadian Area 1 pink salmon troll fishery

The Commission agreed on the following instructions for the Panels:

Fraser River Panel:

The Fraser River Panel may meet in full bilateral session in January 1990, once Canadian forecasts of sockeye abundance in 1990 are available, to begin discussion on 1990 fishing plans and other related matters.

The Commission also noted that the Panel may meet February 3 and 4 or during the week of February 5-9, 1990, as its schedule dictates, in conjunction with the Commission's Annual Meeting.

Southern Panel:

1. either side may seek clarification of proposals advanced during the November 27-December 1, 1989 meeting through "manager to manager" meetings as necessary prior to the February 3-10, 1990 Annual Meeting;
2. the Panel is encouraged to meet on February 3 and 4, 1990 to attempt to reach agreement and forward recommendations for resolution of issues to the Commission at the beginning of the Annual Meeting February 5, 1990.

The Commission noted that Secretariat staff is available to provide administrative support for the aforementioned Southern Panel meetings.

Northern Panel:

1. the Chair and Vice-Chair of the Northern Panel, along with such technical assistance as each section deems necessary, may meet as necessary to clarify proposals exchanged during the November 27-December 1, 1989 meeting of the Commission;
2. full membership meetings of the Northern Panel are not considered necessary prior to the February 3-10, 1990 Annual Meeting;
3. the full Panel is encouraged to meet in Vancouver on February 3 and 4, 1990 to prepare agreed recommendation to the Commission on as many of the issues exchanged as possible.

The Commission encourages the Chair and Vice-Chair of the Panel to seek administrative support from the Commission staff for any meetings they may schedule in accordance with point number 1.

The Commission also reached agreement on a process for adjustments to chinook catch ceilings for 1990. The agreement stated that by January 5 the Parties would:

1. identify fisheries where 1990 ceiling changes and other fishery adjustments will be considered;
2. establish a range for ceiling adjustments in 1990;
3. identify stocks of concern and rationale for each;
4. the Parties will recommend acceptable levels of impacts on stocks of concern;
5. the Parties will recommend ways to reduce impacts on stocks of concern through fishery adjustments.

On January 5, the Commission Chair and Vice-Chair will conduct a policy review of the results from steps 1-3.

At the direction of the Commissioners, the bilateral Chinook Working Group, in conjunction with the Chinook Technical Committee, will provide a technical assessment of the cumulative impacts of the options considered for 1990. (Note: Bilateral Chinook Working Group review of this process led to Commission agreement on an alternative approach to considering chinook ceiling adjustments.)

The Commission instructed the Executive Secretary to write to a company responsible for a chemical spill August 18, 1989 into the Fraser River, seeking compensation for fish taken in a PSC test fishery in the area of the spill. Because they had been exposed to toxic material, the fish, valued at roughly \$5,000, were confiscated and unavailable for sale, the result of a precautionary measure taken by officials of the Government of Canada. The Executive Secretary was to attempt to recover monies the fish would have brought had they been sold.

The Commission exchanged post-season reports with the understanding that the Parties could review them and ask questions of clarifications at future executive sessions. In addition, the Commission provided the Chair and Vice-Chair of the Northern Panel with instructions and authority to meet prior to the Commission's February meeting. The Commission established its slate of officers for the 1989/90 year:

Office	1989/90
1. Commission Chair	U.S. - D.W. Collinworth
2. Commission Vice-Chair	Can. - P.S. Chamut
3. Fraser River Panel Chair	Can. - F.J. Fraser
4. Fraser River Panel Vice-Chair	U.S. - R.P. Zuanich
5. Northern Panel Chair	U.S. - N.A. Cohen
6. Northern Panel Vice-Chair	Can. - N. Lemmen
7. Southern Panel Chair	Can. - P. Sprout
8. Southern Panel Vice-Chair	U.S. - T.D. Cooney
9. Meetings of the Northern and Southern Panels - Chair	Can. - N. Lemmen
- Vice-Chair	U.S. - T.D. Cooney
10. Meetings of the Fraser and Southern Panels - Chair	U.S. - R.P. Zuanich
- Vice-Chair	Can. - F.J. Fraser
11. Stand. Comm. on F&A - Chair	U.S. - G.R. McMinds
12. Stand. Comm. on F&A - Vice-Chair	Can. - P.S. Chamut
13. Stand. Comm. on R&S - Chair	Can. - S. Hewlett
14. Stand. Comm. on R&S - Vice-Chair	U.S. - J.R. Donaldson

The meeting was adjourned at 2:15 p.m. December 1, 1989.

C. FIFTH ANNUAL MEETING OF THE COMMISSION February 5-9, 1990 — Vancouver, B.C.

The Commission conducted its work in closed executive session, beginning at 3:00 p.m. February 5, 1990. The Chair, Mr. D.W. Collinworth, introduced Mr. G.I. James as new alternate U.S. Commissioner.

Deliberations focused on Chapter 3 of Annex IV, Chinook Salmon, as the Commission sought agreement for 1990. Other issues were to be the focus of panel discussions while the Commission addressed chinook. Ultimately all issues before the Commission would be brought together as a package.

The Commission received enhancement program updates from both national sections (see Part IV, Sect. D).

The Commission had, at its November/December post-season meeting outlined a process for addressing adjustments in chinook catch ceilings for 1990. The Chinook Technical Committee and the Chinook Working Group reported to the Commission progress on assignments from that meeting designed to help Commission discussions and deliberations.

The Commission received recommendations from the Standing Committee on Research and Statistics (R&S) relative to how the Commission can resolve differences in the Parties' interception estimates. The recommendations are based on R&S Committee review of the Joint Interceptions Committee Report 89-1 (see Part V, Sect. G) and are as follows:

1. The R&S recommends that JIC 89-1 be revised by December 1990 to include the following:

- a) An update by the technical committees of 1980-88 interception estimates, technical reasons for remaining differences, and technical recommendations on ways to resolve these differences.
- b) Correction of errors and omissions in the JIC 89-1 Report.
- c) The JIC Co-chairs also noted that some of the work could not be completed in the allotted time. Outstanding information on 1980-88 estimates include:
 - 1980-88 chinook interception estimates, a statement qualifying the chinook estimation methodology, technical reasons for remaining differences, and technical recommendations on ways to resolve these differences;
 - 1988 coho interception estimates (excluding transboundary coho which has been completed); and
 - 1988 southern chum interception estimates.
- d) 1989 interception estimates for all species and categories.
- e) A review of the quality of stock composition data and estimation methods that are available to the technical committees to estimate salmon interceptions. This review should be structured along the lines of "Report to the Pacific Salmon Commission from the Standing Committee on Research and Statistics Concerning Current Status of Interception Information and Other Related Matters", which was accepted by the Commission in October 1988.

2. Coho Salmon:

- a. Bilateral development of methodologies for estimating stock composition should be pursued. If agreement can be reached on methodologies, resulting stock composition estimates should be applied to produce common interception estimates. The U.S. and Canada are initiating a joint research project to examine current and alternative models for estimating stock composition. The first phase of the research is scheduled to be completed by the end of March 1990.

Current methodologies are based upon analysis of coded-wire-tag recovery data. Within the next year, the Coho Technical Committee should evaluate the feasibility of applying stock composition estimation techniques developed for Southern Panel area fisheries to northern B.C. and S.E. Alaskan fisheries. Because of data limitations, however, it is unlikely that these techniques will be capable of producing usable estimates for these northern fisheries prior to 1986.

- b. The research recommendations of the Coho Technical Committee in the JIC report should be pursued. However, substantive new work on item d, "Development of Coded-Wire-Tag Index Stocks" should not be undertaken until research directed at bilateral stock composition methodologies is completed.

3. Northern Boundary Pink Salmon:

- a. Substantial differences in estimates result from the different methods used to apply results from the three tagging years (1982, 1984, and 1985) to years with no tagging. The U.S. averaged the three years of tagging data and applied these average interception rates in years without tagging. Canada averaged even year data and applied it to even years when no tagging occurred and used 1985 tagging data for odd years when no tagging took place. In addition, when applying tagging data to non-tagging years, Canada adjusted interceptions by taking into account differences in the pink run sizes returning to northern B.C. and southern S.E. Alaska each year. The Northern Boundary Technical Committee agreed that relative differences in the run size to each country should be taken into account if tagging data is to be applied to non-tagging years. The Committee should attempt to develop a mutually accepted methodology to resolve this issue by December 1990.
- b. An additional difference in the analytical methods applied to the tagging data exists for Area 1 troll estimates. In 1985, international pink tagging data was collected in a manner that allowed calculation of a gradient of interceptions across Dixon Entrance. Canada applied this gradient to estimations for all years while the U.S. did not. The Joint Northern Boundary Technical Committee should pursue resolution of these differences in analysis by December 1990.
- c. For future interception estimation, additional work on stock identification methods are desired. It is recommended that the joint stock identification baseline studies, begun through the Northern Boundary Technical Committee, continue. Currently, pink salmon electrophoretic baseline samples are being analyzed for key northern boundary area stock groupings. Evaluation of the baselines for application in estimating interception estimates is expected to be completed in 1991. Pending the evaluation of the usefulness of the baseline data in identifying stock groups, plans for sampling mixed-stock fisheries should be made.

4. Transboundary Salmon:

- a. Very little information is available on the spawning populations of salmon in the Whiting, Unuk, Chikamin, and Chilkat Rivers. Basin surveys to determine the size of the spawning populations of each salmon species should be undertaken as a first step in developing more scientifically-based estimates of U.S. catches of salmon originating in Canadian sections of these rivers.
- b. No information is available on the contribution to U.S. fisheries of transboundary pink and chum stocks originating in Canadian portions of the rivers. It is recommended that the Transboundary Technical Committee evaluate the potential for alternative techniques, such as adult tagging or stock identification methods, to estimate these catches, particularly of stocks from the Taku River.
- c. For U.S. catches of coho stocks originating in Canadian portions of transboundary rivers, available data are insufficient for technically-based revisions of historical estimates. Coded-wire-tagging studies currently under way in the Taku River should help to improve estimates in the future. It is recommended that these studies be continued, and, if possible, expanded to the Stikine River. Methods of validating the estimates of coho escapements in both rivers should be explored by the Transboundary Technical Committee.

- d. The original estimates of U.S. catches of transboundary chinook have not been changed, pending joint discussion between the Transboundary and Chinook Technical Committees. While further analysis of existing information may narrow the difference, the information available is limited. Additional coded-wire tagging in the Taku, Stikine and Alsek Rivers, improved estimates of spawning populations, and surveys of the "other" rivers should lead to more reliable estimates.

5. General Recommendations:

- a. Bilateral development and refinement of methodologies for stock identification and estimation of catch composition should be encouraged.
- b. Research should be expanded to determine the direction and magnitude of bias associated with methods used to estimate stock composition where contributing stocks may constitute a small proportion of the catch.
- c. Research efforts should be undertaken to validate procedures currently used by the Parties to estimate stock compositions. For example, mass marking techniques could be used to evaluate the accuracy of CWT-based procedures employed to estimate hatchery contributions to catch.

6. Context For Research Recommendations on Interceptions

The context for further consideration of research efforts directed at narrowing differences in the Parties' estimates of interceptions should emanate from two sources: the JIC Report and the recommendations provided by the October 1988 R&S Report (SCRS 88-3). That Report recommended that:

- "1. The Commission should embrace a longer term view toward the development of interception information, recognizing that present and future research will improve the technical capabilities to estimate interceptions over time. In the near term, the Commission and the Parties should continue their efforts to improve management of fisheries, estimates of interceptions, and abundance of stocks.
2. The Commission should assign a high priority to development of a long-term research plan..."

In defining its research priorities and needs, the Commission needs to decide what it needs to know and why. Its needs flow from the fundamental question of what the Parties hope to accomplish, i.e. what will be done with the information with respect to each Party's goals under the Treaty. Presumably, the Parties want, through the PSC, to improve their fisheries and status of their stocks. Research activities required for reconciling differences in interception estimates should be examined within the context of these goals so that priorities can be properly established and a research plan developed.

During the course of the meeting, the Commission continued in executive session and national section meetings, to review chinook harvest options. Panel chairs and vice-chairs provided the Commission with progress reports on their deliberations. As chinook discussions continued, the Parties agreed to exchange position papers on all other issues.

The Commission remained in executive session for the duration of the meeting. Substantial progress was made on all issues, but agreement was not reached by adjournment late Friday evening February 9, 1990. The Commission agreed to continue the Annual Meeting April 10, 11 and 12 in the Seattle/Bellevue area.

D. CONTINUATION OF THE FIFTH ANNUAL MEETING OF THE COMMISSION

April 8 - 12, 1990 — Bellevue, Washington

The continuation of the Fifth Annual Meeting of the Pacific Salmon Commission had been preceded by a meeting of U.S. Commissioners Collinsworth and Wallace (with advisors Cohen and Seibel) and Canadian Commissioner Lill (with advisors Lemmen, Argue and Graham) March 16 at the SeaTac airport. At that meeting the participants sought to clarify Northern Panel issues in order to set an agenda for the April 8-12 discussions. They also discussed chinook ceiling proposals. The Northern Panel was instructed to have discussions on:

- Noyes Island before week 31
- Canada Area 1 troll
- Transboundary enhancement proposals
- Joint stock assessment program
- Canada Area 3 and U.S. Tree Point fisheries

Commission discussions in executive session reviewed progress to date and initially focused on amendments to Annex IV, Chapter 3, Chinook Salmon. In addition, the Commission reviewed draft language for a letter of transmittal to the governments.

The Parties passed extensive sets of draft documents covering all chapters of Annex IV under consideration and draft understandings regarding how they would address equity and the development of long-term management plans.

The Northern Panel met, discussing areas as instructed by the Commission.

Although final agreement was not reached, progress on all fronts was achieved and differences between the positions narrowed as the Commission met in executive session, then informally refining draft language in exchanges between the heads of delegation throughout the final day. The Parties agreed to meet May 14, 15 and 16 in Vancouver in an effort to finalize negotiations.

E. CONCLUSION OF THE FIFTH ANNUAL MEETING OF THE COMMISSION

May 14 - 16, 1990 — Vancouver, B.C.

The Commission met in executive session at the Pacific Salmon Commission offices, 1155 Robson Street, Vancouver, B.C., reviewing drafts of Annex IV, understandings between the Parties, a letter of transmittal and all other unresolved issues remaining from the April 8-12 meetings.

On May 16 the Commission reached a consensus on recommendations to present to the governments of Canada and the United States concerning 1990 fishing regimes (Appendix A). The Commission reached agreement on a revised Annex IV to the Pacific Salmon Treaty for 1990 (Appendix B).

In addition, the Commission:

- reached agreement on a method of facilitating the implementation of its February 1989 "Understanding between the United States and Canadian Sections of the Pacific Salmon Commission concerning Joint Enhancement of Transboundary River Salmon Stocks" struck in Portland. In the agreement regarding joint enhancement of Taku River salmon stocks for 1990, the Parties agreed on project selection, harvest sharing and cost sharing (Appendix C);
- agreed on a joint planning process for the Northern Panel, designed to consider opportunities and options for improved management, conservation and enhancement in the Northern Boundary area for the 1991 Commission meeting (Appendix D);
- recognized a need for improved information on stocks status and catch composition for Northern Boundary area fisheries and instructed the Northern Boundary Technical Committee to present an interim progress report on its evaluation of the status of sockeye, pink and chum salmon stocks at the Commission's February 1991 meeting (Appendix E);
- instructed the Northern Boundary Technical Committee to present a report on stock status and harvest patterns of steelhead in the Northern Boundary area at the November 1990 Commission meeting (Appendix F);
- agreed on an approach to determine the suitability of proposed exclusion of selected terminal area chinook catches from the northern/central British Columbia chinook catch ceilings (Appendix G);
- reached an understanding on an approach to resolve equity-related issues (Appendix H).

Activities of the Standing Committees

PART II

ACTIVITIES OF THE STANDING COMMITTEES

A. MEETINGS OF THE STANDING COMMITTEE ON FINANCE AND ADMINISTRATION

The Standing Committee on Finance and Administration met twice during the 1989/90 fiscal year; on May 4, 1989 in Washington, D.C. and on November 28, 1989 in Vancouver, B.C. A review of the major actions recommended by the Committee and later adopted by the Commission is presented in chronological order of meetings.

Meeting of the Committee - May 4, 1989 — Washington, D.C.

The Committee reviewed the Executive Secretary's final report on income, expenditures, and balances in accounts for fiscal year 1988/89. The balance of unexpended funds was committed against program costs in 1989 as had been previously approved by the Commission.

The Committee reviewed and amended the budget for FY 1989/90 to reflect decisions made at this meeting and to incorporate updates on anticipated revenues and expenditures provided by staff.

The Committee received budget forecasts for FY 1990/91 and 1991/92 which had been prepared by staff based on the assumption that all existing programs required for support of Fraser River Panel and Commission responsibilities will be continued. The Committee reviewed the financial status of the Commission's budget and expressed deep concern that funding practices agreed by the Commission may not continue to be acceptable to the Parties. The Committee concluded that the Commission should launch a major effort to obtain agreement from the Parties to increase basic appropriations to cover approved programs and operations, thus reducing or eliminating reliance on test-fishing revenues for general funding purposes. The Committee established an ad hoc working group headed by C.C. Graham (Canada) and J. Curtis (U.S.) to work with Secretariat staff to prepare a submission to the two governments.

On other matters, the Committee:

- reviewed the Executive Secretary's continuing efforts to secure privileges and immunities in Canada reciprocal to those provided in the United States. A new Order-in-Council is now expected to be promulgated in June, 1989;
- agreed that responsibility for repair and maintenance of equipment owned by the Commission but on permanent loan to representatives of the Parties will be transferred to the Parties effective April 1, 1989; and that ownership will be transferred once administrative arrangements have been completed;
- reviewed the status of Workers' Compensation coverage for Commission employees;
- reviewed the subject of funding Transboundary River joint enhancement projects and agreed that the Commission and this Committee have a responsibility to monitor implementation of these projects which are examples of the approach to problem-solving that the Commission should pursue. The Committee agreed that the Commission should forward a letter to the Parties expressing strong support for initial and continued funding of these projects;

- the Committee reviewed the Commission's meeting schedule and agreed to the dates and locations of the following two meetings
 - (i) January 21-25, 1991 - Vancouver, B.C.
Four Seasons Hotel
 - (ii) February 4-8, 1991 - Seattle, Washington
Sixth Annual Meeting of the Commission

Meeting of the Committee - November 28, 1989 — Vancouver, B.C.

The Committee reviewed the status of income and expenditure including projections for the balance of the current fiscal year. The financial position forecast for the end of the fiscal year indicated that revenues and expenditures in the test-fishing program will be significantly lower than forecast in the approved budget.

The Committee reviewed budget proposals prepared by staff for FY 1990/91. Direct expenditures exclusive of the test-fishing program are expected to total approximately \$1,928,000, thus leaving a shortfall of approximately \$475,000 if contributions are maintained at \$1,430,000. The Committee expressed deep concern about the funding situation, and both sides agreed that shortfalls of this nature should not continue to be funded through use of test-fishing revenues or from operating balances remaining from previous years. The Committee, however, is not prepared to cut programs at this time.

Canada informed the Committee that an initiative has been undertaken to attempt to seek a modest increase to the Commission's salary portion of the budget to offset anticipated statutory and cost-of-living increases expected in 1990/91. The United States section proposed that the Commission inform the two governments by letter that a significant increase in contributions is required to ensure that the Secretariat is in a position to carry out the necessary programs associated with the operation of the Commission. The letter should include a proposal to achieve full funding by FY 1991/92 at a contribution level of approximately \$1,000,000 (U.S.) from each Party. The Committee approved this proposal and struck a drafting committee comprising Messrs. Curtis, Graham and Todd to prepare the letter for signature by the Chair of the Commission.

The United States section informed the Committee that the United States is prepared to increase contributions from \$715,000 to \$750,000 for FY 1990/91. The Canadian section could not guarantee that Canada will be able to provide matching funds, and will have to await the outcome of the submission which is being reviewed by Treasury Board to provide an increase to the salary portion of the Commission's budget.

Mr. Chamut confirmed Canada's commitment to submit the necessary documents through the Department of Fisheries and Oceans to seek full funding to cover the Commission's operating costs independent of test-fishing revenues, for implementation in FY 1991/92.

The Committee, after further expression of deep concern, recommended adoption of the budget proposed by staff for FY 1990/91. Funding of the shortfall will be accomplished through agreement to obligate the operating balance expected from FY 1989/90 against 1990/91 programs, and to utilize test-fishing revenues generated in 1990 to the extent required.

The Committee briefly reviewed the budget forecast presented by staff for FY 1991/92. In view of the funding initiatives which will be undertaken by the two sections, it was agreed that detailed examination of this forecast will be deferred until the next meeting of the Committee tentatively scheduled for Ottawa, April 18, 1990.

On other matters, the Committee:

- was informed that Canada promulgated an Order-in-Council in July 1989 providing the Commission privileges and immunities reciprocal to those granted in the United States;

- received a progress report on the transfer of Commission equipment to the Parties noting that administrative arrangements had not been completed in the United States;
- received an update on Transboundary Rivers joint enhancement funding efforts. The United States section has requested \$350,000 (U.S.) from the Department of Interior for FY 1991;
- discussed potential legal action to recover losses suffered to the Commission's test-fishing operation as a result of a toxic chemical spill in the Fraser River in August, 1989;
- reviewed and approved the following meeting schedule for 1990, 1991 and 1992:

February 3-10, 1990	-	Fifth Annual Meeting Vancouver, B.C.
October 17-19, 1990	-	Kamloops B.C.
November 26-30, 1990	-	Vancouver, B.C.
February 4-8, 1991	-	Sixth Annual Meeting Bellevue, Washington - Hyatt Regency Hotel
October 16-19, 1991	-	Olympia, Washington
December 2-6, 1991	-	Portland, Oregon
February 3-7, 1992	-	Seventh Annual Meeting Vancouver, B.C.
January 22-23, 1990	-	Standing Committee on Research and Statistics - Vancouver, B.C. - PSC Boardroom
April 18, 1990	-	Standing Committee on Finance and Administration - Ottawa, Ontario

Other Administrative Matters

1. Staffing

Several changes occurred within the Secretariat staff during the period covered by this report:

- Mr. Whittier Johnson was appointed Deputy Executive Secretary effective August 1, 1989;
- Ms. Betty Tasaka, Scale Analyst, retired November 30, 1989 after more than 35 years in the combined employ of the International Pacific Salmon Fisheries Commission and the Pacific Salmon Commission;
- Mrs. Linda Ford, Accountant, resigned December 31, 1989;
- Ms. Carol Arffman was appointed Scale Analyst effective January 1, 1990; and
- Ms. Bonnie Dalziel was appointed Accountant effective January 1, 1990.

The staff organizational structure and continuing employees as of March 31, 1990 is presented in Appendix J.

2. Commission, Panels, Standing Committees, Joint Technical and Other Committees Membership Lists

An updated membership list for standing committees, panels, joint technical committees, sub-committees and ad hoc working groups as of March 31, 1990 is presented in Appendix K.

B. MEETINGS OF THE STANDING COMMITTEE ON RESEARCH AND STATISTICS

The Standing Committee on Research and Statistics, led by commissioners Hewlett and Donaldson, met twice during the period covered by this report; May 17-18, 1989 at the Westmark Hotel in Juneau, Alaska and January 22-23, 1990 at the offices of the Pacific Salmon Commission, 1155 Robson Street, Vancouver, B.C.

Meeting of the Committee - May 17-18, 1989 — Juneau, Alaska

The Committee received a report on the activities of the Data Sharing Technical Committee. The Committee discussed establishing a permanent sub-committee under the Data Sharing Technical Committee to maintain the coded-wire-tag (CWT) database, but determined that a "working group" was a more appropriate designation for this body. The Committee approved Terms of Reference for this group which was named Working Group on Data Standards. The Committee received a progress report on the activities of the Working Group on Mark-Recovery Statistics and approved a final report of the working group on Mark-Recovery Data Bases: "Information Content and Data Standards for a Coastwide Coded-Wire-Tag Database".

The Committee discussed the draft process for Implementing Terms of Reference Numbers 1 and 2 concerning research planning and evaluation within the PSC. The R&S Working Group will revise the draft process incorporating activities + schedules of the JIC and JOGC.

The Committee discussed progress in obtaining additional escapement information from agencies and plans for a workshop to evaluate escapement methodologies, noting most agencies were pleased at the interest shown. An ad hoc committee was established to develop an agenda and set a time and place for a workshop.

There was discussion about the current membership of the Standing Committee on Research and Statistics, its sub-committees and working groups, with concern expressed that changes in membership be provided the Secretariat in writing (including name, position, affiliation, mailing address and phone number) to facilitate communication throughout the Commission and maintain a record of Commission and Standing Committee activities.

Meeting of the Committee - January 22-23, 1990 — Vancouver, B.C.

The Committee received an oral report from the Technical Committee on Data Sharing, noting the Committee on Data Sharing will produce an annual written report by the February Commission meeting. The report will contain a review of the July 1989 meeting of the Data Sharing Committee, Working Group on Mark Recovery Statistics, and a list of source people and agencies for treaty-related data.

The Data Sharing Committee was given an assignment to develop a process for communicating with the tag coordinators and mark users about PSC recommendations on mark-recovery methodologies.

The Committee received a report on the development of a workshop to evaluate escapement methodologies, noting that no progress had been made in organizing such a workshop and there may not now be much support for such an event. The Data Sharing Committee will follow up by determining whether a workshop on escapement methodologies is worthwhile. Data Sharing will report back to the Committee after February 1991.

The Committee discussed activities of the Joint Interceptions Committee (JIC), noting the important and difficult work JIC participants had accomplished in producing a report on differences between the Parties' interception estimates. The Committee worked on drafting recommendations stemming from the JIC report to be given to the Commission. There was a great deal of discussion on how the Standing Committee on Research and Statistics' recommendations regarding the Parties' differing views of interceptions related to the Committee's development of a Long Range Research Plan and the Bilateral Inventory of Treaty-related Research. The Standing Committee on Research and Statistics made the following recommendations to the Commission at the February 5-9, 1990 Commission meeting in Vancouver (see Part I, p. 7 of this report)

Activities of the Panels

PART III

ACTIVITIES OF THE PANELS

A. FRASER RIVER PANEL

The Fraser River Panel met in conjunction with the Commission, and in view of its special responsibilities concerning in-season management of fisheries on Fraser River sockeye and pinks in Panel Area waters, met frequently throughout the fishing season. The Panel successfully completed negotiations on fishing plans in June for the 1989 season.

The Panel initiated discussions on fishing plans for the 1990 season during the winter meeting cycle. Final development of 1990 fishing plans was deferred past May 31, 1990 pending the outcome of Canada's domestic allocation processes.

The Commission's fishery management staff prepared, on behalf of the Panel, an annual report on the 1989 Fraser River sockeye and pink salmon fisheries. The executive summary is contained within Part IV of this report.

B. NORTHERN PANEL

The Northern Panel met in conjunction with the Commission during the 1989/90 meeting cycle. The Panel conducted a comprehensive review of the 1989 fishing season, identified issues for negotiation and identified tasks for Joint Technical Committees.

The Panel initiated discussions and made substantial progress in development of fishing plans for 1990 and beyond. The Panel was able to reach agreement on an implementation understanding concerning joint enhancement of Transboundary River salmon stocks; a joint planning process to consider opportunities/options for improved management, conservation and enhancement in the Northern Boundary area; an agreement for the Northern Boundary Technical Committee to conduct a joint evaluation of the stock status and catch composition of salmon harvested in Northern Boundary area fisheries; and an agreement to compile and exchange data on the stock status and harvest levels of steelhead in the Northern Panel area.

The Panel also made substantial progress in negotiations on the provisions of Annex IV, Chapter 2. Final agreement on those fishery regime issues escaped the Panel, and the remaining differences were forwarded to the Commission for resolution.

C. SOUTHERN PANEL

The Southern Panel met infrequently during the 1989/90 meeting cycle, as the Commission had agreed early in the cycle that only minor adjustments to the provisions of Annex IV, Chapters 5 and 6 would be contemplated. The Panel did review the results of the 1989 fishing season and exchanged views on coho stock identification.

D. JOINT MEETINGS OF THE NORTHERN AND SOUTHERN PANELS

The Northern and Southern Panels did not meet jointly during the 1989/90 meeting cycle. Chinook issues were developed by the Chinook Technical Committee and the Chinook Working Group, with final resolution of the provisions of Annex IV, Chapter 3, taking place at the Commission level.

Review of 1989 Fisheries and Treaty-related Performance

PART IV

REVIEW OF 1989 FISHERIES AND TREATY-RELATED PERFORMANCE

The following review has been drawn from a number of reports prepared by Commission staff, joint technical committees, and domestic agencies for presentation to the Commission at its November 1989 meeting. Source documents are referenced for each part of this review. All figures are preliminary and will be updated in future reports as more complete tabulations become available.

A. FRASER RIVER SOCKEYE AND PINKS

Under the terms of the Pacific Salmon Treaty, the responsibility of the Fraser River Panel is to manage the fisheries that target on Fraser River sockeye and pink salmon within the Panel Area. The annual process begins with Panel recommending a pre-season fishing regime and a management plan for Panel Area waters to the Pacific Salmon Commission. The management plan is based on abundance forecast and escapement goals for Fraser River sockeye and pink salmon stocks provided by Canada Department of Fisheries and Oceans (DFO), international allocation goals set out in the Treaty, domestic allocation goals set by each country and management concerns for other stocks and species also identified by each country.

In-season management of Panel Area fisheries is under the direct control of the Panel. To achieve the Parties' objectives, the Panel uses commercial and test-fishing data and various analyses from the Commission staff to modify the fishing times set out in the management plan. In 1989, the Panel exercised its in-season regulatory mandate in the Panel Area only for the net fisheries, the Canadian inside (Strait of Georgia) troll fishery and the Washington Non-Indian coastal troll fishery, as recommended by the Parties.

During the brief four-year history of the Panel, achievement of the domestic allocation goals of Canada and the United States has been a major focus of in-season management. Generally, the Panel has successfully implemented the national directives for domestic allocation of the allowable catch while achieving the goals for resource conservation (escapement) and international allocation. When trade-offs among these three objectives are necessary, however, resource conservation and international allocation goals take precedence over domestic allocation objectives.

The 1989 fishing season for sockeye and pink salmon was the first year of the second four-year cycle (1989-92) covered by the Treaty. The United States selected a target harvest level of 2,150,000 Fraser River sockeye salmon in 1989, out of its cumulative allocation of 7,000,000 sockeye for the 1989-92 period. In addition, a payback of 88,000 sockeye was due to United States fishermen for catch shortfalls in previous years. Pink salmon were to be shared according to the Treaty formula, with the United States share equal to a proportion of the Total Allowable Catch ($3.6/14.0 \times \text{TAC}$). A payback of 103,000 pink salmon to the United States was planned in 1989 for a catch shortfall in 1987. Canadian commercial harvests were expected to reach 7,071,000 sockeye and 7,879,000 pink salmon.

Based on pre-season forecasts of 13,000,000 sockeye and 17,000,000 pink salmon, gross escapement goals for sockeye (3,511,000) and pink (6,100,000) salmon established by Canada, and on the international and domestic catch allocation goals, the Panel established a fishing regime and management plan. In this process, the Panel used the fishery simulation model to examine fishing schedule options.

Major alterations to historical United States fishing patterns were planned prior to the season to accommodate weekly fishing and separation of Treaty Indian and Non-Indian fisheries and Non-Indian gear types. The Panel agreed to restrict fishing time in Canadian Area 20 if chinook by-catch became severe and to limit the by-catch of Lake Washington sockeye in United States Areas 4B, 5 and 6C in response to requests from the Parties.

The Panel met 37 times during the season to review the progress of the runs and to adjust fishing times as needed to obtain escapements and harvest the stocks. Many of the adjustments were needed to meet the domestic allocation objectives of the Parties.

The total return of Fraser River sockeye amounted to 18,336,000 fish, the second largest since 1913. Catches in all areas exceeded 15,000,000 sockeye, the largest catch since 1913. Canadian commercial harvests totalled 12,152,000 sockeye while United States fleets took 2,381,000. Non-commercial harvests were 696,000 sockeye, principally in the Fraser River Indian food fishery.

Fraser River pink salmon returned in numbers slightly below the forecast with 15,569,000 total fish, the third largest run on record. Commercial catches amounted to 8,172,000 fish, 6,165,000 in Canada and 2,007,000 in United States waters.

Monitoring of the run provided data which were used to update the estimated run sizes during the season. Several adjustments occurred in the estimates for both species and allowed the Panel to modify fishing plans to achieve harvest objectives in the Panel Area. The timing of peak summer-run sockeye arrival was approximately three weeks later than normal, which created difficulties in estimating stock abundances and timing. The arrival of pink salmon was also later than normal, thereby minimizing the overlap between the sockeye and pink salmon runs and alleviating potential problems in managing the harvest of these species.

Racial analyses of sockeye salmon using scale data correctly identified the major stocks, but low relative abundance and confounded scale data created difficulties in identifying minor stocks during the passage of Quesnel and Late Stuart sockeye. The Quesnel Lake area stocks produced approximately 11,694,000 sockeye, the largest on record and probably comparable to the early 1900's dominant year returns. Late Stuart sockeye production was 3,203,000 fish, also the largest on record for this group and 62% above the previously largest return in 1985.

The stock composition of pink salmon catches were determined in 1989 by use of genetic stock identification (GSI) data. Identification of Fraser River pink salmon catches in mixed-stock fisheries in southern areas (Washington and southern British Columbia) and in northern fisheries (central and northern British Columbia and southeastern Alaska) was successful due to the reconstructed baseline. Development of bias correction techniques is anticipated to improve racial catch estimates for pink salmon.

Spawning escapement goals for Early Stuart sockeye were exceeded, while early summer-run, summer-run and late-run stock escapements were less than desired. Escapements totalled 3,060,000 adult sockeye versus a goal of 3,300,000 (7% deviation). Pink salmon escapements reached 7,189,000, well over the goal of 6,000,000 (20% deviation).

The Canada-United States allocation status of Fraser River sockeye and pink salmon is periodically revised as catch estimates are derived from final sales-slip and landing-slip data and from final racial composition estimates. The shortfalls in catches in any year are carried over to subsequent years, in accordance with the policy for paybacks that was ratified by the Pacific Salmon Commission in February, 1988. This policy specifies that catch shortfalls and overages be compensated during the following year for sockeye or two years hence for pink salmon, up to a maximum of 5% of the paying Party's share of the TAC of that species.

International and domestic catch allocations of sockeye salmon for 1989 were near the objectives established by the Parties. The United States catch was 144,000 larger than the goal set prior to the season, primarily as a result of an unexpected catch of 133,000 Fraser River sockeye in Alaska District 104 (estimate subject to review). The pink salmon catch in United States waters was short of the allocation by 241,000 fish, which will be compensated for in future years.

The Fraser River Panel has now completed its first full four years of operation. Early in its history it established the following hierarchy of objectives:

1. to achieve spawning escapement goals for stocks and stock groups of Fraser River sockeye and pinks;
2. to achieve international allocation of the total allowable catch in accordance with agreed sharing arrangements; and
3. to achieve the Parties' domestic allocation goals if practical.

The following tables present data for the first four years which identify the measure of success of the Fraser River Panel in achieving its objectives.

Table 1. Comparison of gross escapement goals and in-season and post-season estimates of actual escapement by stock grouping, 1986-1989.

(a) Sockeye				
Year	Stock Group	Goal	In-Season	Post-Season
1986	Early Stuart	35,000	39,000	42,000
	Mid-summer	1,265,000	1,254,000	1,146,000
	Late-runs	3,550,000	3,828,000	3,004,000
	Total	4,850,000	5,121,000	4,192,000
1987	Early Stuart	200,000	175,000	164,000
	Mid-summer	1,050,000	1,066,000	1,217,000
	Late-runs	1,010,000	912,000	979,000
	Total	2,260,000	2,153,000	2,360,000
1988	Early Stuart	185,000	192,000	208,000
	Mid-summer	1,165,000	1,142,000	1,326,000
	Late-runs	245,000	393,000	252,000
	Total	1,595,000	1,727,000	1,786,000
1989	Early Stuart	475,000	465,000	559,000
	Mid-summer	3,174,000	3,031,000	3,009,000
	Late-runs	151,000	222,000	64,000
	Total	3,800,000	3,718,000	3,632,000
(b) Pinks				
1987		6,100,000	1,641,000	3,295,000
1989		6,100,000	4,194,000	7,261,000

TABLE 2. International allocation status of Fraser River sockeye and pink salmon for 1985-1989.*

	Sockeye Salmon					Pink Salmon		
	1985	1986	1987	1988	1989	1985	1987	1989
TOTAL RUN	13,879,000	15,904,000	7,694,000	3,762,000	18,336,000	19,038,000	7,136,000	15,569,000
Escapement and Other Deductions	2,522,000	4,042,000	2,103,000	1,744,000	3,432,000	6,479,000	3,251,000	7,229,000
Total Allowable Catch (TAC)	11,357,000	11,862,000	5,591,000	2,018,000	14,904,000	12,559,000	3,885,000	8,340,000
UNITED STATES								
Allocation **	3,013,000	2,797,000	1,912,000	650,000	2,150,000	4,110,000	1,166,000	2,145,000
Catch	2,925,000	2,748,000	1,932,000	679,000	2,382,000	3,834,000	1,339,000	2,007,000
Annual Allocation Status	(88,000)	(49,000)	20,000	29,000	232,000	(276,000)	173,000	(138,000)
Cumulative Allocation Status	(88,000)	(137,000)	(117,000)	(88,000)	144,000	(276,000)	(103,000)	(241,000)
CANADA								
Allocation + Add-on Benefits	8,344,000	9,065,000	3,679,000	1,368,000	13,120,000	8,449,000	2,719,000	6,195,000
Catch + Escapement Add-ons ***	8,432,000	9,114,000	3,659,000	1,339,000	12,888,000	8,725,000	2,546,000	6,333,000
Annual Allocation Status	88,000	49,000	(20,000)	(29,000)	(232,000)	276,000	(173,000)	138,000
Cumulative Allocation Status	88,000	137,000	117,000	88,000	(144,000)	276,000	103,000	241,000

NOTE: () indicate a negative number or shortfall.

* Based on Commission interpretations and Panel agreements in February, 1989.

** Allocation calculations:

Sockeye: 1985: $(TAC \times 1.78/6.60) - 50,000$

1986: $(TAC \times 3.0/12.5) - 50,000$

1987: $(TAC \times 1.06/3.1)$

1988: $(TAC \times 1.16/3.6)$

1989: Portion of 7,000,000 United States share for the 1989-1992 period.

Pink: 1985: $(TAC \times 3.6/11.0)$

1987: $(TAC \times 3.6/12.0)$

1989: $(TAC \times 3.6/14.0)$

*** Includes escapement add-ons requested or approved by Canada that will generate future benefits.

TABLE 3. United States domestic allocation* of Fraser River of Fraser River sockeye and pink salmon in Washington State waters for 1986-1989.

Year	User Group	Sockeye Salmon Catch					
		Allocation		Actual		Deviation	
		Number of Fish	%	Number of Fish	%	Number of Fish	%
1986	Treaty Indian	1,367,000	50.0%	1,351,000	49.4%	(16,000)	-0.6%
	Non-Indian	1,367,000	50.0%	1,383,000	50.6%	16,000	0.6%
	Total	2,734,000	100.0%	2,734,000	100.0%	0	0.0%
1987	Treaty Indian	963,500	50.0%	962,000	49.9%	(1,500)	-0.1%
	Non-Indian	963,500	50.0%	965,000	50.1%	1,500	0.1%
	Total	1,927,000	100.0%	1,927,000	100.0%	0	0.0%
1988	Treaty Indian	339,500	50.0%	377,000	55.5%	37,500	5.5%
	Non-Indian	339,500	50.0%	302,000	44.5%	(37,500)	-5.5%
	Total	679,000	100.0%	679,000	100.0%	0	0.0%
1989	Treaty Indian	1,124,500	50.0%	1,123,000	49.9%	(1,500)	-0.1%
	Non-Indian	1,124,500	50.0%	1,126,000	50.1%	1,500	0.1%
	Total	2,249,000	100.0%	2,249,000	100.0%	0	0.0%
1986-1989	Treaty Indian	3,794,500	50.0%	3,813,000	50.2%	18,500	0.2%
	Non-Indian	3,794,500	50.0%	3,776,000	49.8%	(18,500)	-0.2%
	Total	7,589,000	100.0%	7,589,000	100.0%	0	0.0%

Year	User Group	Pink Salmon Catch					
		Allocation		Actual		Deviation	
		Number of Fish	%	Number of Fish	%	Number of Fish	%
1987	Treaty Indian	669,000	50.0%	617,000	46.1%	(52,000)	-3.9%
	Non-Indian	669,000	50.0%	721,000	53.9%	52,000	3.9%
	Total	1,338,000	100.0%	1,338,000	100.0%	0	0.0%
1989	Treaty Indian	1,003,500	50.0%	1,059,000	52.8%	55,500	2.8%
	Non-Indian	1,003,500	50.0%	948,000	47.2%	(55,500)	-2.8%
	Total	2,007,000	100.0%	2,007,000	100.0%	0	0.0%
1987-1989	Treaty Indian	1,672,500	50.0%	1,676,000	50.1%	3,500	0.1%
	Non-Indian	1,672,500	50.0%	1,669,000	49.9%	(3,500)	-0.1%
	Total	3,345,000	100.0%	3,345,000	100.0%	0	0.0%

* Catches of Fraser River sockeye and pink salmon in fisheries in Alaska District 104 are not included.

TABLE 4. Canadian catches of Fraser River sockeye salmon by gear, compared with domestic allocation goals for 1986-1989.

Year	Gear Type	Allocation		Actual		Deviation	
		Number of Fish	%	Number of Fish	%	Number of Fish	%
1986	Inside Troll	301,000	3.4%	279,000	3.2%	(22,000)	-0.2%
	Outside Troll	1,797,000	20.5%	1,831,000	20.9%	34,000	0.4%
	Purse Seine	4,100,000	46.8%	4,037,000	46.0%	(63,000)	-0.8%
	Gillnet	2,566,000	29.3%	2,617,000	29.9%	51,000	0.6%
	Total	8,764,000	100.0%	8,764,000	100.0%	0	0.0%
1987	Inside Troll	81,000	2.5% *	95,000	2.9%	14,000	0.4%
	Outside Troll	355,000	11.0% *	555,000	17.2%	200,000	6.2%
	Purse Seine	1,668,000	51.8% *	1,544,000	48.0%	(124,000)	-3.8%
	Gillnet	1,120,000	34.8% *	1,030,000	31.9%	(90,000)	-2.8%
	Total	3,224,000	100.0%	3,224,000	100.0%	0	0.0%
1988	Inside Troll	47,000	4.0%	81,000	6.9%	34,000	2.9%
	Outside Troll	56,000	4.8%	49,000	4.2%	(7,000)	-0.6%
	Purse Seine	621,000	52.8%	623,000	52.9%	2,000	0.1%
	Gillnet	452,000	38.4%	423,000	36.0%	(29,000)	-2.4%
	Total	1,176,000	100.0%	1,176,000	100.0%	0	0.0%
1989	Inside Troll	243,000	2.0%	257,000	2.1%	14,000	0.1%
	Outside Troll	1,215,000	10.0%	1,417,000	11.7%	202,000	1.7%
	Purse Seine	6,684,000	55.0%	6,480,000	53.3%	(204,000)	-1.7%
	Gillnet	4,010,000	33.0%	3,998,000	32.9%	(12,000)	-0.1%
	Total	12,152,000	100.0%	12,152,000	100.0%	0	0.0%

* Approximate mid-points of the 1987 sockeye salmon allocations, which were the following ranges of percentages:
 Inside Troll: 1.5% - 3.5%
 Outside Troll: 10.5% - 11.5%
 Purse Seine: 51.5% - 52.0%
 Gillnet: 34.5% - 35.0%

TABLE 5. Canadian catches of southerly migrating pink salmon by gear, compared with domestic allocation goals for 1987 and 1989.

Year	Gear Type	Allocation		Actual		Deviation	
		Number of Fish	%	Number of Fish	%	Number of Fish	%
1987	Inside Troll	153,000	4.0%	143,000	3.7%	(10,000)	-0.3%
	Outside Troll	1,112,000	29.0%	1,318,000	34.4%	206,000	5.4%
	Purse Seine	2,223,000	58.0%	2,013,000	52.5%	(210,000)	-5.5%
	Gillnet	345,000	9.0%	359,000	9.4%	14,000	0.4%
	Total	3,833,000	100.0%	3,833,000	100.0%	0	0.0%
1989	Inside Troll	369,000	4.0%	396,000	4.3%	27,000	0.3%
	Outside Troll	2,679,000	29.0%	2,589,000	28.0%	(90,000)	-1.0%
	Purse Seine	5,358,000	58.0%	5,656,000	61.2%	298,000	3.2%
	Gillnet	831,000	9.0%	596,000	6.5%	(235,000)	-2.5%
	Total	9,237,000	100.0%	9,237,000	100.0%	0	0.0%

NOTE: () indicate a negative number or a catch shortfall.

(Source Document) - Report of the Fraser River Panel to the Pacific Salmon Commission on the 1989 Fraser River Sockeye and Pink Salmon Fishing Season. Pacific Salmon Commission staff. May 1990.

B. 1989 POST-SEASON REPORT FOR CANADIAN TREATY LIMIT FISHERIES

Catches reported below for 1989 are preliminary and are based on in-season estimates (hailed statistics), on-the-grounds counts by Canada Department of Fisheries and Oceans management staff, and/or sales slip data (troll and some net) processed to November 2 (net) and 15 (troll). Annex fisheries are reported on in the order of the Chapters of Annex IV. Comments are provided in point form, starting with expectations and management objectives, followed by catch results by species, and where available and appropriate, escapements. The expectations, management objectives, catches and escapements presented below are only for those stocks and fisheries covered by the Pacific Salmon Treaty; domestic catch allocations have been excluded. The attached table summarizes 1985-89 catches in Canadian fisheries under limits imposed by the Pacific Salmon Treaty.

Transboundary Rivers

Stikine

- The Stikine River sockeye run was expected to return at below average strength. As required by the Transboundary Chapter of Annex IV, a pre-season total run forecast of 80,850 was made to guide initial fishing patterns of both countries.
- The annual harvest sharing arrangements for Stikine sockeye from 1988 until 1992, tied to commitments by the Parties to undertake cooperative enhancement, are as follows:

Range in TAC		Canadian Catch	
from	to	Minimum	Maximum
0	0	4,000	4,000
1	20,000	10,000	15,000
20,001	60,000	15,000	20,000
60,001	+60,001	20,000	30,000

- The Annex also provides for a Canadian catch of 4,000 coho. Catch of chinook, pink and chum are to be incidental to the harvest of sockeye and coho.
- The total Canadian in-river sockeye catch of 20,032 was just above the target of 20,000 sockeye for a final in-season TAC estimate of approximately 54,000 sockeye. At the end of the season the final forecast run was approximately 114,000 fish, compared to a forecast total run at the beginning of the season of 80,850 sockeye. Apart from a difference in the interpretation of the Annex regarding the initial fishing effort in District 108, the Canada/U.S. cooperative management process worked reasonably well in 1989.
- Sockeye escapement past the Tahltan Lake weir was 8,316 which was well below the 1985-88 average of 19,841 sockeye. The preliminary estimate of total Tahltan stock size is only 14,111 fish, not wholly unexpected considering the relatively low smolt output in 1986 and a typical smolt to adult survival rate of approximately 7 percent. Based on preliminary analysis of in-season stock ID data and timing information, the non-Tahltan escapement was approximately 45,075 sockeye. Thus the total Stikine escapement is approximately 58,700 fish, which is 98 percent of the Stikine escapement goal of 60,000 sockeye.
- The target in-river coho catch for 1989 was 5,883 and included the 4,000 ceiling and the 1988 shortfall of 1,883 coho. The actual catch was 6,098 coho, 215 over the target. Above average coho CPUE in both commercial and test fisheries throughout the season indicated a strong 1989 coho return. Index counts from aerial surveys of coho spawning areas were above average.

- The total 1989 gillnet catch of chinook was 2,669 adults and 289 jacks. An estimated 0.9 million eyed eggs were obtained from holding and spawning 563 adult chinook (220 females). The 1989 adult chinook count of 4,715 fish at Little Tahltan weir was above average, whereas the jack return (199) was below average. Aerial surveys confirmed that the overall Stikine chinook returns in 1989 were above average.

Taku

- The new arrangements for 1988 through 1992 for the Taku, conditional on the Parties proceeding with a cooperative sockeye enhancement program, provide for a Canadian harvest of 18 percent of the Taku sockeye TAC.
- Initial in-season projections for Taku sockeye were for an above average run in excess of 200,000 fish. The final in-season estimate of the total run was 182,500 sockeye.
- The 1989 Canadian sockeye catch was 18,545 by the commercial fishery and 53 in the IFF fishery. Preliminary analyses suggest that the total catch (18,598) was approximately 17 percent of the in-season TAC estimate (107,500).
- Based on a joint Canada/U.S. tagging program, the estimated 1989 escapement of 95,000 sockeye was above the interim target range of 71,000 to 80,000. Weir counts of sockeye in Taku tributaries (Little Trapper Lake, Little Tatsamenie Lake) were, in total, slightly below returns observed in recent years.
- The coho catch was 2,876 by the commercial fishery, slightly below the 3,000 quota. The small 1989 IFF took 146 coho. Preliminary tagging and test fishing data suggest that the interim coho escapement goal was exceeded, and that the overall 1989 escapement was excellent.
- Chinook escapement counts in 1989 were above average at Nakina (4,697) and Tatsamenie (1,149) weirs and aerial counts in all major index streams were also above average.

Alsek

- Although catch sharing between Canada and the United States has not been specified for the Alsek, both countries have agreed to attempt to rebuild depressed chinook and early sockeye runs.
- Canada does not commercially fish these species but does conduct sport and Indian food fisheries (IFF). In keeping with the Annex provisions, Canadian catches of Alsek chinook and early sockeye continued to be restricted. The 1989 IFF catch was 167 chinook and 1,906 sockeye, slightly above recent five-year averages. The sport catch of 272 chinook was below average, whereas the sockeye catch of 319 fish and the coho catch of 227 fish were above average.
- At the Klukshu River, an Alsek tributary, the preliminary weir count for chinook was 2,456 which is above the 1984-88 average (2,097). The escapement of 23,542 sockeye past the Klukshu weir was also above the 1984-88 average (15,208). Both early and late sockeye counts were above average. An excellent return of sockeye was recorded in Village Creek where 9,569 sockeye passed through the electronic counter.

Northern British Columbia - Southeastern Alaska

Areas 3-1 to 3-4 and 5-11 Pink Catch by Nets

- Canadian pink stocks returning to Areas 3 and 4 were expected to provide a large harvestable surplus of pink salmon in 1989.
- The Canadian management objective, in keeping with the Treaty Annex, is to limit the above net fisheries in a manner that would result in an average annual harvest of 900,000 pink salmon.
- Canadian catch in 1989 was 3,005,707 in Areas 3-1 to 3-4 and 5-11; the 1985-89 average catch was 1,710,000. This high catch reflects the very large pink returns to Areas 3 through 5 and to SSE Alaska. The proportion of catch taken in subareas 3-(1-4) during the 1989 season (58%) was the same as the 1985-88 average, but was substantially lower than the pre-Treaty average (74%).
- Pink escapements to rivers and streams in Areas 3 and 4 are well above target levels.

Area 1 Pink Catch by Troll

- Canadian management objectives, in keeping with Annex IV of the Treaty, were to close the A-B line strip (Areas 101-4, 101-8, and northern portions of Areas 101-3 and 103) to trolling for pinks on July 22, or earlier if a 300,000 pink troll catch was taken in the strip before July 22. Area 1 was to close to pink trolling in subareas 101-1 to 101-3, 101-5, 101-9 and 1-1 once the Area 1 pink ceiling of 1.7 million was reached.
- Based on in-season estimates, the Canadian troll catch in the A-B line strip was 132,000 when it closed to trolling at midnight on July 22.
- The Area 1 pink fishery by troll gear was closed on September 5. Based on preliminary sales slip data the catch was 1.34 million in 1989.

Chinook

North and Central Coasts (Areas 1 to 10, 101 to 111, 130-2, 130-3 and 142 for Net and Sport; Troll includes above Areas plus 11 and 111)

- The Canadian objective was to manage for a total chinook harvest by commercial and sport gear of 263,000.
- The 1989 troll catch was 222,000 based on sales slips processed as of November 15, 1989. This plus the net catch estimate of 42,000 from sales slip data (sales slips to November 2) and the sport catch estimate of 34,000 by Fishery Officers gives a total North/Central catch of 298,000. Terminal net catches of 6,600 chinook have been excluded from this catch.
- The troll fishery opened on July 1 and closed on August 27. At the end of the season there was a nine day, troll non-retention fishery with no estimate of shaker catch.
- Based on very preliminary information, chinook escapements in 1989 were similar to 1988 levels.

West Coast Vancouver Island Troll (Areas 21 to 27, 121 to 127 and 130-1)

- Many time and area closures were implemented this year to control catch rates of various salmon species. Each of these closures affected the catch rate of the other species, particularly coho.
- The Canadian objective was to manage for a 309,000 troll harvest of chinook. This represents a reduction from the 360,000 ceiling to compensate for overages in 1987 and 1988.
- The 1989 troll catch was 197,000, based on sales slips processed to November 15. This compares with a catch of 407,000 in 1988.
- The troll fishery opened on July 1 with large area closures in place similar to those used at the beginning of the 1988 season. The fishery was completely closed from July 14 to 19 and again from August 6 to 11. In addition, large area closures were implemented to avoid reaching the coho ceiling early in the season. Chinook fishing closed on September 3 for the balance of the season. There was no chinook non-retention fishing in 1989.

Strait of Georgia Troll and Sport (Areas 13 to 19, 20-5 to 20-7, 28 and 29)

- The Treaty catch ceiling for the Strait of Georgia is 275,000 chinook, of which 225,000 are allocated to sport and 50,000 are allocated to troll. In response to conservation concerns for the Lower Georgia Strait (LGS) chinook stocks (Fraser River stocks not included), Canada continued a series of area and gear-specific management actions to reduce LGS harvest rate by 20 percent. Therefore the Canadian management objectives in the Strait of Georgia for 1989 were to manage sport and troll fisheries for harvests below the Treaty ceiling.
- The Canadian objective for troll was to manage for a 31,000 chinook harvest (62 cm minimum size limit). The troll catch based on sales slips to November 15 was 28,000, 3,000 pieces below the troll allocation.
- The troll season for chinook lasted from July 1 to September 30; spot closures were in effect. There was no non-retention troll fishery for chinook in Georgia Strait in 1989.
- For the sport fishery, a management plan to reduce harvest rates was implemented in Georgia and Johnstone Straits. In these areas the annual bag limit was 15, the daily bag limit was 2 and the size limit was 62 cm for Georgia Strait north of Cadboro Point (and for Johnstone Strait). In 1988, by comparison, there was a 45 cm size limit in Georgia and Johnstone Straits, an 8 per year bag limit in Georgia Strait and a 30 per year limit in Johnstone Strait, and a daily limit of 4 per day in Johnstone Strait. For the Canadian portion of Juan de Fuca Strait (Victoria area) in 1989, the size limit decreased from 62 cm to 45 cm and the annual bag increased from 8 to 20.
- To the end of October 1989 the Georgia Strait sport catch of chinook, including the Victoria area, was 118,000 based on creel survey results. The projected catch to the end of the year is 125,000.

Fraser River Sockeye and Pink Salmon

- Pre-season expectations were for a total Fraser sockeye run of 13 million with a TAC of 9.711 million and a total Fraser pink run of 17 million with a TAC of 10.96 million.
- The actual 1989 sockeye return exceeded the pre-season forecast. Based on preliminary information as of November 28, 1989, the estimated total return was 18.4 million sockeye. The 1989 pink run was less than expected and came in at 15.6 million pieces.

- The current estimate of the Canadian commercial catch is 11,970,000 sockeye and 6,128,000 pink. Canadian total catches are 12,601,000 sockeye and 6,279,000 pink. The Canadian commercial catch was the largest since the Hells Gate slide. The 1989 Fraser IFF catch of 572,000 sockeye is the largest ever recorded.
- The total Fraser sockeye spawning escapement is expected to slightly exceed the in-season goal of 3.3 million adults. This will be the largest escapement on this cycle since 1913. There were three major stock groups that made up the bulk of this year's record run (Early Stuart, Late Stuart, Quesnel Lake). The group providing the majority of catch and escapement was the Quesnel Lake (Horsefly) sockeye.
- Fraser pink escapements are still being enumerated but are expected to exceed the 6 million escapement goal by over one million fish.

Coho Salmon

Area 20 Net Catch

- Canada conducted a targeted coho fishery in Area 20 following the Fraser Panel management period. This fishery lasted for two days, September 25 and 26, and gillnets and seines had separate 12 hours fishing periods each day.
- Catch during this fishery totalled 26,400 coho, 22,600 pink and 12,500 chum. The total Area 20 catches of coho and chum this season were 348,500 and 18,500, respectively.

West Coast Vancouver Island Troll (Areas 21 to 27, 121 to 127 and 130-1)

- The Canadian objective was to manage for a 1.935 million troll catch of coho. This catch represented the 1.8 million coho ceiling plus the 1988 shortfall. The harvest of the shortfall was conditional on abundance being available in 1989.
- Based on sales slips processed to November 15, the troll catch was 1.91 million.
- Record coho catches, well above the red line management limit, were experienced during July. Time and area closures to slow this coho catch rate were major factors in management of this year's fishery.

Southern British Columbia Chum Fisheries

Inside Net (Areas 11 to 19, 28 and 29)

Johnstone Strait

- Pre-season expectations indicated a total inside run size of 3,329,000 chum salmon which would include 100,000 U.S. chum.
- The first chum-directed fishery in Johnstone Strait (Areas 12 and 13) occurred on September 25/26 (4th week of September). The catch for the assessment fishery totalled 176,000 chum and indicated a run size of 3.0 million, which allowed a harvest of 20 percent under the clockwork plan. Subsequent run-size estimates on October 5, 12 and 19, based on test fishing, indicated no change in the initial estimate of 3.0 million.

Accordingly a commercial fishery was planned to harvest the balance of the clockwork commercial catch of 120,000. The fishery was held on October 23 and harvested 125,000 chum giving a total commercial harvest in Johnstone Strait of 436,000 chum. Post-season run assessments will be completed once escapement enumerations finish.

Georgia Strait

- Terminal fisheries in the mid Vancouver Island area occurred on October 17, 23 and 31. Catches from these early terminal fisheries totalled 89,000. No additional fisheries are anticipated.
- There are no fisheries planned in 1989 for the Nanaimo, Cowichan or Sooke terminal areas as escapements remain below target levels.

Fraser River

- No targeted fisheries have occurred for chum salmon this year. Test fishing is continuing and indicates a weak last half of the run. Escapement is likely to be in the order of 400,000 to 450,000.
- Chum catch during Fraser Panel openings totalled 11,400.

Outside Net (Areas 21 and 22)

- The stock of concern, relative to the Treaty, is the stock returning to Area 22 (Nitinat Lake) which is caught in Area 21. Pre-season expectations were for a harvestable surplus of 264,000 chum from the enhanced component of the Nitinat Lake return; the escapement objective is 175,000.
- Gillnet assessment fisheries were initiated on September 26. Results of these fisheries and an assessment in Nitinat Lake indicated that the total run was about at expected strength. As in 1988, additional fishing area was provided offshore for each weekly fishery. The area closed for the season on November 9 with a total catch of 290,000 chum; the by-catch of coho was 14,900.
- Preliminary in-lake and river assessments indicate a potential escapement of 100,000 chum.

West Coast Vancouver Island Troll (Areas 21 to 27, 121 to 127 and 130-1)

- The 1989 troll catch of chum was 22,000, taken predominately in the northwest portions of WCVI during July. This catch was well below 1985, 1986 and 1988 catches ranging from 79,000 to 260,000, but was close to the 1987 catch of 18,000. GSI sampling was not conducted in 1989 due to low catches.

G.S.I. Sample Collection

- In Johnstone Strait 11 weeks of either test or commercial fishing were sampled for a total of 3,450 chum salmon. Off Qualicum, 1,091 fish were sampled over three weeks and at Nitinat 1,343 fish were sampled over seven weeks.

Table 6. Preliminary 1989 Catches in Canadian Treaty Limit Fisheries and 1985-88 Catches for Comparison.+ Prepared for the November 1989 Pacific Salmon Commission Meeting.

Fisheries/Stocks	Species	1989	1988	1987	1986	1985
Stikine River (all groups, Canada)	Sockeye	20,032	15,291	9,615	17,434	25,464
	Coho	6,098	2,117	5,731	2,280	2,175
	Chinook Adults	289	2,352	2,201	1,936	1,111
	Chinook Jacks	2,669	444	444	975	185
	Pink	825	418	646	142	2,383
	Chum	674	733	459	307	536
	Steelhead	127	261	219	194	240
Taku River (com. gillnet, Canada)	Sockeye	18,545	12,014	13,554	14,739	14,244
	Coho	2,876	3,123	5,599	1,783	1,770
	Chinook Adults	895	555	127	275	326
	Chinook Jacks	139	186	106	77	24
	Pink	695	1,030	6,250	58	3,373
	Chum	42	733	2,270	110	136
	Steelhead	24	86	223	48	32
Areas 3 (1-4) and 5-11 (commercial net)	Pink	3,005,707	424,897	1,851,000	1,991,000	1,277,000
Area 1 (commercial troll)	Pink	1,339,244	1,630,000	495,000	416,000	687,000
North/Central Coast (commercial/sport)	Chinook	298,000*	246,000	283,000	261,000	273,000
West Coast Van. Is.	Chinook	198,000	407,000	379,000	342,000	358,000
Area 12 (com. troll)	Chinook	1,200	2,000	2,000	4,000	5,000
Georgia Strait (sport)	Chinook	125,000	119,000	121,000	182,000	235,000
	Chinook (troll)	28,000	20,000	38,000	44,000	52,000
	Total	153,000	139,000	159,000	226,000	287,000
Fraser River stocks (Total Canadian Catch)	Sockeye	12,597,000	1,615,000	3,783,000	9,363,000	8,754,000
	Pink	6,279,000	-	2,546,000	-	8,725,000
Fraser River stocks (Total U.S. Catch)	Sockeye	2,384,000	679,000	1,932,000	2,748,000	2,925,000
	Pink	2,007,000	-	1,339,000	-	3,834,000
West Coast Van. Is. - (Commercial troll)	Coho	1,913,000	1,592,000	1,825,000	2,157,000	1,389,000
Johnstone/Georgia/Fraser (Canadian commercial, clockwork catch only)	Chum	436,000	1,276,000	51,100	1,330,000	-

+ 1989 catches: troll from DFO In-season catch monitoring program and sales slips as of 15 November; net from DFO in-season estimates (hailed), preliminary sales slip data and PSC data; sport from preliminary creel survey (October 31 projected to December 31) and Fishery Officer estimates (parts of North Coast); Fraser River catches from DFO and PSC. Some 1988 net catches and the 1988 WCVI troll coho catch are preliminary.

* terminal exclusion of 6,600 omitted.

(Source Document) - 1989 Post-Season Report for Canadian Treaty Limit Fisheries. Report prepared for the November 1989 PSC meetings by Canada Department of Fisheries and Oceans November 30, 1989.

C. 1989 POST-SEASON REPORT FOR UNITED STATES TREATY LIMITED FISHERIES

Northern Boundary Area Fisheries

Noyes Island Purse Seine Fishery

From 1985 through 1988, the Treaty allowed a four-year maximum catch of 480,000 sockeye salmon in this fishery prior to statistical week 31 (an average of 120,000 per year). In 1989, a roll-over of annex provisions converted a 4-year average catch ceiling to a one-year ceiling of 120,000 sockeye salmon. The actual catch in 1989 was 157,034 sockeye salmon prior to week 31.

In 1989, there were four weeks of fishing time prior to week 31, while in the previous four years there were only three. With the catch of sockeye salmon limited to 120,000 fish over a four-week period, the fishing openings were kept low, 15 hours each, during the first three weeks. About 88,000 sockeye salmon had been caught during these three weeks. As the pink salmon return was looking strong, the fishery was opened for 39 hours the fourth week. Strong pink catches resulted in a second opening of 39 hours this fourth week in Districts 101, 102 and 103; while sockeye conservation and annex compliance prevented a similar opening in District 104.

Weekly catch and effort in District 104 for the first four weeks of the fishery are given in Table 7. Total catches for both sockeye and pink salmon and hours open in the fishery prior to week 31 and for the total season are given in Table 8 for the years 1985 to 1989.

Pink salmon returns to southern Southeast Alaska (District 101-108) in 1989 were much stronger than the predicted 19.6 million (6.0 million escapement plus 13.6 million harvest). Accordingly, the total fishing time in District 104 was greater than in the past two years when pink salmon returns were poor. However, the fishing time prior to week 31 in 1989 was below the previous four year average (Table 8). A preliminary estimate of total pink returns to southern Southeast Alaska is 53 million fish (9 million escapement and 44 million harvest). Distribution of the escapement through the area appears to be good.

Table 7. Fishing time, effort, and catch during the first four weeks of the season in the District 104 purse seine fishery.

Week	Date	Hours	Boats	Catch	
				Sockeye	Pink
27	7- 2	15	34	8,731	18,508
28	7- 9	15	85	48,252	171,897
29	7-16	15	81	31,346	344,377
30	7-23&24	39	91	68,705	1,129,968
Total		84		157,034	1,664,750

Table 8. District 104 purse seine catches up to statistical week 31 and for the total season. For 1985 to 1988, catches prior to week 31 represent three weeks of fishing, while for 1989 it is 4 weeks.

Year	Sockeye Catch		Pink Catch		Hours Fished	
	to wk 31	total	to wk 31	total	to wk 31	total
1985	100,590	431,575	356,881	8,503,133	84	492
1986	91,304	443,990	1,035,806	18,868,802	108	570
1987	72,385	171,214	198,479	1,674,018	75	183
1988	248,759	591,038	108,847	3,543,934	108	315
Mean	128,239	417,450	561,426	8,147,472	94	390
1989	157,034	516,069	1,664,750	13,010,578	84	462
Mean	134,014	430,777	672,953	9,120,093 *	92	404

Tree Point Drift Gillnet Fishery

The Treaty specifies that the gill net fishery in Districts 101-A and B be limited to an average annual harvest of 130,000 sockeye. From 1985 to 1988, the average was 135,512 sockeye. In 1989, 144,909 sockeye salmon were caught, making the 1985 to 1989 average 137,392 fish per year.

The Tree Point drift gillnet fishery opens by regulation on the third Sunday of June. The fishery was opened for four days starting on June 18, 1989. During the early part of the fishery, management is based on the strength of chum and sockeye returns. Returns of these two species were above average during the first week of the fishery. Starting on July 9, management, by regulation, was based on the Pink Salmon Management Plan. During the fall fishing period, fishing time was limited to 2 days a week to conserve coho stocks. A comparison of the catches in 1989 to those in 1985 to 1988 is given in Table 9.

Table 9. District 101-11 gillnet catches.

Year	Chinook	Sockeye	Coho	Pink	Chum
1985	2,788	172,820	51,043	691,147	233,917
1986	1,033	145,631	61,592	906,309	272,495
1987	1,785	107,503	36,644	583,145	157,856
1988	1,802	116,092	16,823	229,711	499,921
Mean		135,512			
1989	1,808	144,936	31,931	1,347,847	298,152
Mean		137,396			

Portland Canal Chum

The catch of chum salmon in the Tree Point gillnet fishery in 1989 was 292,557 fish, the second highest catch on record since 1960. The record catch occurred in 1988 with nearly 500,000 chum. Portland Canal was closed to fishing north of Akeku Point in order to conserve chum stocks returning to spawn in streams in the Canal. Chum escapements in Portland Canal appeared very good, although it was difficult to count due to the large number of pink salmon present.

Transboundary Area Fisheries

Stikine Sockeye

The U.S. harvested about 20,000 Stikine sockeye salmon in Districts 106 and 108 in 1989. This was less than the 40,000 allowable catch the Stikine River Management Model was stipulating near the end of the run.

The pre-season forecast of run strength for Stikine River sockeye salmon was 80,850 fish, which allowed the U.S. to fish in District 108 during the first two weeks of the fishery. The district was open both weeks. Although the Stikine Management Model, based on Treaty provisions, allowed District 108 to be open during the third week of the fishery, the district was closed for conservation purposes. Results from the Stikine Management Model are given in Table 10.

Table 10. Behavior of Stikine River Management Model for 1989. The table gives the output from the model that was obtained each week during the fishery.

Stat Week	Start Date	Forecasts		Fishing Regimes				Cumulative Catch	
		Run Size	TAC	6	8	U.S. TAC	Canada TAC	U.S.	Canada
25	6/18	80,850	20,850	I	D	5,850	15,000	575	0
26	6/25	80,850	20,850	I	D	5,850	15,000	786	788
27	7/02	88,201	28,201	I	D	8,820	19,381	2,727	1,510
28	7/09	109,769	49,769	I	D	29,769	20,000	10,075	2,445
29	7/16	95,919	35,919	I	D	15,919	20,000	16,351	7,430
30	7/23	94,734	34,734	I	D	14,734	20,000	18,576	15,877
31	7/30	121,302	61,302	I	D	31,302	30,000	19,690	17,551
32	8/06	119,973	59,973	I	D	39,973	20,000		

Taku Fisheries

The Treaty stipulates that Canada shall harvest no more than 18 percent of the Total Allowable Catch (TAC) of the sockeye salmon originating in the Canadian portion of the Taku River each year. In 1989, the U.S. harvested about 71,520 Taku sockeye salmon in the District 111 fishery. This represents about 63 to 68 percent of the TAC (Table 11).

The escapement goal for the Taku River system is 71,000 to 80,000 sockeye salmon. About 91,000 to 92,000 escaped to spawn in 1989, giving an over-escapement of about 14 to 28 percent. Preliminary run reconstruction for Taku sockeye salmon is given in Table 11.

Table II. Preliminary Taku River and Port Snettisham sockeye salmon run reconstruction for 1989.

	Taku River	Snettisham	Total
Run Reconstruction			
Escapement	91,839	13,328	
Taku Inriver Harvest (Canada)	18,598		
Test Fishery Catch	207		
Inriver Run (Canyon Island)	113,634		
District 111 Harvest (U.S.) ^{a/}	72,216	2,370	73,890
Total Run	185,860	14,320	
Total Allowable Catch			
TAC	114,860 - 105,860		
U.S. Percent of TAC	63 - 68%		
Canadian Percent of TAC	16 - 18%		
Exploitation of Stock			
U.S. of Total Run	39%		
Canada of Inriver Run	16%		

^{a/} Includes test fishery catch.

^{b/} Includes inriver personal use catch.

Alsek Fisheries

The total catch of salmon in the Alsek fishery was below average in 1989; the sockeye catch was about 13,500 fish (about half long-term average).

Enhancement Activities - Tahltan

The Understanding on joint enhancement in the transboundary rivers states that 3 million eggs will be taken from Tahltan Lake in 1989. About 3.3 million eggs were taken by Canada and flown to the Snettisham Central Incubation Facility. Mortality was initially high, but about 2.5 million survived to be fertilized and incubated. These eggs expected to produce about 1.8 million fry that will be back planted in Tahltan Lake in the spring of 1990. Due to the low escapement at Tahltan Lake this year, all fry will go back there this first year.

All problems about disease control and water quality at the Central Incubation Facility seem to have been cleared up to the satisfaction of both Parties. Pathological samples were taken from adult sockeye salmon at Tahltan Lake and indicate that IHN and BKD prevalence is considerably lower than last year.

Chinook Salmon

Chinook Fisheries in Southeast Alaska

The 1989 Southeast Alaska fisheries were managed for an all-gear base catch ceiling of 263,000 chinook salmon, as established by the Pacific Salmon Commission, for the period October 1, 1988 to September 30, 1989. An additional allowance was provided for harvest of Alaska hatchery chinook. These same provisions have been in place since the Treaty was implemented in 1985.

All-Gear Harvest

The preliminary 1989 all-gear harvest by Southeast Alaska fisheries was 284,000 chinook salmon. This included a base catch of 266,000 and an Alaska hatchery add-on of 18,000 chinook. The 1989 hatchery add-on was less than half the pre-season projection of 42,000 chinook salmon and about 25 percent below the 1988 add-on of 24,000.

The 1989 base catch of 266,000 exceeded the 263,000 base ceiling by 3,000 chinook salmon or about 1 percent. However, deviations from catch ceilings since 1987 total about -3,500 chinook salmon or 3,500 less than established ceilings. This is within the cumulative management range of plus or minus 7.5 percent (\pm 20,000 chinook salmon) established by the Commission.

The 1989 Southeast Alaska chinook harvest of about 283,700 fish was distributed by gear type as follows: troll fisheries, 234,600 (83 percent); net fisheries, 22,100 (8 percent); and projected recreational fisheries 27,000 (9 percent).

Troll Fisheries

Approximately 34,100 chinook salmon or about 15 percent of the total troll harvest were taken during the 1989 winter troll season from October 1, 1988 through April 14, 1989. This was slightly more than half the record 1988 winter troll harvest of 60,400, and approximately equal to the 1985-88 average of 33,600. An estimated 4,500 chinook salmon, or about 14 percent of the total 1989 winter catch, were of Alaska hatchery origin.

The summer troll chinook season consisted of several limited openings during June to access Alaska hatchery chinook salmon, plus a general summer opening July 1-13.

Approximately 33,200 chinook salmon were harvested during special June openings. An estimated 5,600 chinook salmon or about 17%, were Alaska hatchery chinook. Most of the harvest occurred during two 3-day openings, June 5-7 (14,200) and June 21-23 (16,500) which were restricted to inside waters. About 3,000 chinook salmon (46 percent Alaska hatchery) were harvested in experimental areas near several hatcheries which were open several days a week during the second and fourth weeks of June.

Net Fisheries

Net fisheries are managed for a harvest guideline of 20,000 chinook salmon, excluding Alaska hatchery add-on. Chinook catches by net fisheries are incidental to the harvest of other species and, in 1989 were only a fraction of a percent of the total net harvest of approximately 60 million. Net harvest of chinook salmon is limited by a 28" minimum size limit and periodic non-retention periods in the purse seine fisheries and by spring closures in the gillnet fisheries.

Recreational Fisheries

Recreational fisheries are managed under a 2 fish per day bag limit and a 28" minimum size limit. No recreational harvest guideline has been established by the Alaska Board of Fisheries. The projected 1989 harvest of 27,000 chinook salmon is about 4,000 fish above the 1985-88 average of 23,000 fish.

Preliminary 1989 Chinook Salmon Catches in Southern U.S. Fisheries

The following is a summary of 1988 and 1989 chinook catch in southern U.S. fisheries of interest to the Pacific Salmon Commission. The 1989 data are very preliminary and can be expected to change as fish ticket data replace in-season projections and as final landings are included in the catch. These summaries have been compiled with information available as of 11/6/89.

<u>Fishery</u>	<u>1989 Estimate</u>	<u>1988 Estimate</u>
Central Oregon		
Troll	346,200	456,000
Recreational	30,600	38,000
Columbia In-River		
Net	266,200	491,300
Recreational	59,900	94,000
Ocean (North of Falcon)		
Troll	73,700	105,800
Recreational	21,300	19,500
Washington Coastal		
Marine Net	59,700	47,500
River Net	27,900	25,100
Strait of Juan de Fuca		
Net	9,900	9,000
Troll	21,900	49,900
Recreational	NA	40,800
Area 7/7A	16,400	34,000
Puget Sound		
Troll	1,200	400
Marine Net	119,600	110,300
Recreational	NA	78,400
River Net	32,800	21,600

Review of Southern U.S. Chinook Fisheries

Ocean Fisheries South of Cape Falcon

While troll and recreational fisheries conducted within the PFMC region of central Oregon are constrained by quotas for coho salmon, harvest constraints on chinook salmon are minimal or non-existent. Chinook directed troll fishing effort has increased in this region in recent years, due in part to greater restrictions in adjacent management areas, but also due to good chinook fishing success.

Columbia River

Although the 1989 Columbia River freshwater recreational and commercial net fisheries are incomplete, preliminary catch estimates suggest a substantial reduction in harvest compared to 1988. Net fishery catch is estimated at 266,200, compared to 491,300 in 1988. To date, the freshwater recreational fishery has harvested approximately 59,900, compared to 94,000 in 1988, including approximately 16,200 in the Buoy 10 fishery.

Ocean Fisheries North of Cape Falcon

In 1989, ocean commercial and recreational fisheries operating in the PFMC region north of Cape Falcon were constrained by quotas for both chinook and coho salmon. Separate quotas were established for the Treaty troll and non-Treaty fisheries.

Overall, chinook catch success was very poor, consistent with 1989 pre-season expectations that indicated low abundance of key stocks. Mixed or all-species fisheries were terminated when coho quotas were achieved; chinook quotas were not fully harvested. Preliminary chinook catches for the Treaty troll total 30,500, about 95 percent of the quota. Preliminary catches by non-Treaty fishers total 64,500, about 68 percent of the quota. Recreational catches are estimated at 21,300 (1,400 Oregon and 19,900 Washington). Non-Treaty troll catches are estimated at 43,200 (3,000 Oregon and 40,200 Washington), of which approximately 40,000 were taken during the early season coho non-retention fishery.

Washington Coast

Ocean escapements of northern Washington coastal stocks were above minimum spawning levels, allowing both commercial and recreational fisheries. 1989 commercial net catch estimates for coastal rivers are not complete and are expected to change substantially.

Puget Sound

Recreational and commercial net fisheries in Puget Sound were regulated by time and area closures to protect depressed spring chinook stocks. With several exceptions, Puget Sound summer/fall type stocks returned at levels of abundance sufficient to support some terminal fisheries. Commercial net catch was 178,700 in 1989, similar to the 1988 level of 174,900. The recreational fisheries were managed in the same general manner as in 1988. Recreational catch estimates for Puget Sound are not available at this time.

Coho Salmon

Coho Fisheries in Southeast Alaska

No specific provisions of the Annex IV chapter on coho salmon currently apply to Southeast Alaska fisheries. These fisheries are managed by the Alaska Department of Fish and Game to achieve gear allocation objectives established by the Alaska Board of Fisheries and general coho conservation objectives. The 1989 fisheries were managed in a manner similar to that employed since 1980. Fisheries are managed in-season with time/area regulations and recreational bag limits based on run strength assessment. Catch ceilings are not utilized for coho salmon management.

Preliminary catch data indicate a total all-gear harvest of approximately 2,250,000 coho salmon by Southeast Alaska fisheries in 1989. Catches by gear type are shown in Table 12.

Table 12. Coho catches in Southeast Alaska (Districts 101-115) by gear type.

Gear Type	Catch	Percent
Troll	1,412,000	63 %
Set Net	177,000	8 %
Seine	333,000	15 %
Drift Net	255,000	11 %
Sport	73,000	3 %

The 1989 harvest was approximately 15 percent greater than the 1980 to 1988 average harvest of 1,948,000 and the third highest since 1960. Returns were strong throughout Southeast Alaska but the strongest returns occurred in the northern inside area. Preliminary analysis indicates Alaskan hatcheries contributed about 75,710 coho salmon (3% of total harvest) to the commercial fisheries in 1989. Significant hatchery contributions have occurred since 1986 (Table 13).

Table 13. Hatchery contributions of coho salmon to the commercial catches in southeast Alaska.

Year	Catch	Hatchery	Percent
1986	3,457,000	400,000	12%
1987	1,592,000	129,000	8%
1988	1,056,000	55,000	5%
1989	2,243,000	76,000	3%

Complete information on coho escapements to index systems in 1989 is not yet available. However, preliminary information indicates that escapements were strong in the northern inside and adequate throughout the rest of the region.

Preliminary Review of U.S. Southern Panel 1989 Coho Fisheries

This review compiles available information on the performance of the 1988 and 1989 U.S. Southern Panel coho fisheries. The 1989 data is preliminary through 11/7/89 and will change as terminal fisheries are concluded and the catch data updated. Generalized catch data is presented below.

Fishery	1988 Estimate	1989 Estimate
North of Cape Falcon Troll	69,800	159,200
North of Cape Falcon Sport	98,400	226,500
Washington Coastal Marine Net	73,300	93,900
Washington Coastal River Net	20,200	18,200
Juan de Fuca Net	20,600	64,000
Juan de Fuca Troll	600	2,389
Area 7/7A	83,400	109,500
Puget Sound Marine Net	966,600	695,800
Puget Sound River Net	113,100	69,000
Puget Sound Sport	215,500	NA
Columbia River Net	374,000	364,000
Columbia River Sport	147,800	76,800

U.S. Southern Panel Fisheries Snapshot

North of Cape Falcon Troll

The 1989 Pacific Salmon Treaty Coho Annex did not define harvest ceilings for U.S. ocean coho fisheries north of Cape Falcon. The U.S. troll fisheries operating in this area were constrained by coho ceilings developed through the domestic regulatory process of the Pacific Fisheries Management Council (PFMC). Catch ceilings for each ocean fishery were developed to address conservation of depressed wild coho stocks originating in Puget Sound and Washington coastal rivers. Non-Treaty and Treaty Indian troll fisheries operated under catch ceilings of 75,000 and 77,000, respectively. Both the non-Treaty and Treaty fisheries exceeded the PFMC quotas with catches of 78,000 and 81,300, respectively. The combined ocean troll fisheries harvested a total of 159,300 coho. The Treaty troll harvest of 14,200 coho in Area 4B during the PFMC management period is included in the ocean troll total. The substantial difference between the 1989 catch of 159,300 and the 1988 catch of 69,800 is a reflection of expected stock abundance differences and allocation considerations.

North of Cape Falcon Sport

The 1989 recreational fishery north of Cape Falcon was constrained by a ceiling of 225,000 coho developed through the PFMC management process. The fishery was managed on the basis of sub-area quotas. Anglers harvested approximately 226,500 coho during the course of the fisheries compared to 98,500 in 1988.

Washington Coastal Marine Net

A total of 94,000 coho has been harvested by 1989 Willapa Bay and Grays Harbor net fisheries (Willapa Bay 65,800 and Grays Harbor 28,200) compared to a catch of 73,300 coho in 1988.

Washington Coastal River Net

The Treaty net fisheries in Washington's coastal rivers have harvested approximately 18,200 coho compared to 20,200 in 1988. Fisheries for some coastal rivers are still in progress so the 1989 catch is very preliminary and is expected to change. Returns of natural coho stocks to Washington coastal rivers appear to be below pre-season expectations.

Strait of Juan de Fuca Marine Net

The net fisheries for Areas 4B, 5, and 6C harvested 64,000 coho in 1989 compared to 20,600 in 1988. The coho net catch in these areas was taken incidentally during fisheries under Fraser River Panel control, test fisheries, and fisheries directed at chinook and chum. Directed coho net fishing was not scheduled during the 1989 season.

Strait of Juan de Fuca Troll

The Treaty troll fishery in Areas 4B, 5, and 6C harvested 2,400 coho in 1989 compared to 600 in 1988. The harvest of 14,200 coho in Area 4B during the May-September PFMC management period is included with the Area 4B Treaty ocean troll catch.

7/7A Net Fisheries

The 7/7A net fisheries harvested 109,500 coho during the 1989 season compared to 83,400 in 1988. Pre-season domestic management planning, which took into account the conservation needs of Puget Sound native coho stocks, anticipated an Area 6, 7, and 7A combined coho catch of 140,200. The San Juan Islands (7) accounted for 82,900 of the 7/7A total with Point Roberts (7A) accounting for 26,600. The catch includes coho taken incidentally during fisheries under Fraser River Panel control (86,600), fisheries directed at chum salmon (22,800), and test fisheries (100). Directed coho net fisheries were not implemented in Areas 7 and 7A during the 1989 season.

Puget Sound Marine Net

Net fisheries in Puget Sound marine areas other than 4B, 5, 6C, 7, and 7A harvested 695,800 coho in 1989 compared to 966,637 in 1988. The majority of the harvest occurred in marine terminal areas and included both directed and incidental catch. Coho directed net fisheries were designed to protect Skagit coho where appropriate.

Puget Sound River Net

River net fisheries in Puget Sound harvested approximately 69,000 coho in 1989 compared to 113,100 in 1988. Terminal area run sizes and hatchery escapements for 1989 are generally below pre-season expectations.

Puget Sound Sport

Catch estimates are not available at this time for the 1989 Puget Sound sport fishery.

Columbia River Net

The lower Columbia River net fishery harvested 364,000 coho in 1989 compared to 374,000 in 1988. The lower Columbia coho net fishery was supported in 1989 by the second largest recorded run of late-timed coho since 1970 with an inriver run size of 435,000 compared to 299,000 in 1988. Early-timed coho demonstrated an average inriver run size of 200,000 coho compared to 349,000 in 1988.

Columbia River Sport

The Columbia River Buoy 10 sport fishery harvested 76,800 coho in 1989 compared to 143,800 in 1988. An additional 4,000 coho were harvested by anglers in the lower Columbia mainstem and tributaries during the 1988 season. The lower mainstem and tributary sport catch is unavailable for 1989. The Columbia River coho sport catch is a combined estimate for Washington and Oregon fishers.

Chum Fisheries

Preliminary Review of 1989 Washington Chum Fisheries of Interest to the Pacific Salmon Commission

This summary report provides a preliminary review of the 1989 chum fishing season and is subject to correction and revision as additional information becomes available. Some terminal area Washington chum fisheries are still underway, and catch information provided is preliminary data reported through mid-November. This report addresses in detail only those fisheries of most concern under the Pacific Salmon Treaty. The mixed-stock fisheries in United States (U.S.) waters that are addressed in the chum annex of the Pacific Salmon Treaty are those in the western Strait of Juan de Fuca (Areas 4B, 5, and 6C), the San Juan Islands (Area 7) and Point Roberts (Area 7A). Other chum fisheries in Washington waters are primarily terminal fisheries which harvest stocks of local origin.

Mixed Stock Fisheries

Areas 4B, 5, 6C

Consistent with the provisions of the chum annex, the fishery in Areas 4B, 5, 6C was restricted to Treaty Indian gillnet gear. Due to weak coho returns to some Puget Sound rivers, the Strait of Juan de Fuca chum fishery was delayed beyond the beginning of the chum management period (October 1), and did not open until October 11.

Catches in the Strait fishery were about as expected throughout the chum management period, except during the week of October 22 when there was a noticeable drop-off in catches. Incidental chum catches prior to the chum management period were only 650. The total chum catch reported through November 14 is 52,594. The fishery is continuing beyond this date and some additional catch is expected.

Areas 7 and 7A

Prior to the chum management period, significant incidental catches of chum salmon were taken in conjunction with fisheries on sockeye and pink salmon regulated by the Fraser River Panel of the PSC, particularly in pink fisheries scheduled in mid to late September. Total catches of chum salmon in Areas 7 and 7A prior to chum management were 19,316.

Throughout the chum season, U.S. and Canadian technical staffs kept in close contact on the status of the chum run size entering Johnstone Strait. Indications from the initial evaluation fishery and subsequent test fishing in late September were that the run was smaller than expected, with an estimated total run size of 3.0 million. U.S. managers notified DFO on October 9 that, based on catches in Johnstone Strait and projected run sizes, that they intended to fish in Areas 7 and 7A for a quota of 124,000 chum (120,000 plus 4,000 shortfall from 1988).

Fisheries conducted in Areas 7 and 7A by Treaty Indian and non-Treaty fisheries have harvested a total of 69,900 chum to November 12. Additional fisheries have been scheduled for the week of November 12 and are expected to be scheduled for the week of November 19. It is uncertain at this time whether the total quota of 124,000 chum will be taken.

Puget Sound Terminal Area Fisheries and Run Strength

Pre-season forecasts for chum returns to Puget Sound were for a good run of about 1.2 million. Most Puget Sound chum runs have been updated in-season to less than predicted pre-season. Overall, the in-season estimates of abundance indicate a total Puget Sound chum return of just over 1 million. Many Puget Sound chum fisheries are still underway or just beginning. It is too early to assess spawning escapement.

(Source Document) - *Preliminary 1989 Post-Season Report for United States Fisheries of Relevance to the Pacific Salmon Treaty*. November 1989.

D. 1989 UPDATE REPORTS FOR SALMONID ENHANCEMENT PROGRAMS IN CANADA AND THE UNITED STATES

The Pacific Salmon Treaty between Canada and the United States requires that information be exchanged annually regarding: operations of and plans for existing enhancement projects; plans for new projects; and views concerning the other country's enhancement projects. In 1988, a committee was formed to develop recommendations for the pre- and post-season and enhancement report formats. In summary, the committee proposed that:

- a) detailed reports on existing enhancement facilities of the type produced in 1987 be prepared every four years;
- b) the Parties will annually update the information in (a) with information on eggs taken, fry or smolt released and adults back to the facility; significant changes in facility mission or production will be highlighted in narratives; and
- c) Parties will provide periodic reports through the appropriate panels on new enhancement plans.

(1) 1989 Canadian Enhancement Update

This report addresses item b) of the Committee's proposal, and consists of tables on eggs taken and fry and smolt releases from existing facilities in 1987 as well as a narrative discussion on significant changes to the enhancement program since the detailed 1987 report.

Significant Changes in Program

Since 1987 there have been a few significant changes in the enhancement facilities or production. In 1990, SEP plans to increase the focus of the program toward more assessment and research. A major evaluation of the program is planned for 1992. The specific production changes that have occurred are discussed by area.

Fraser

1. Fish passage for low level water conditions has been improved in the Fraser Canyon. By-passes were installed at Little Hells Gate and Saddle Rock and a low level fishway was put in at Hells Gate. In addition lighting was added at several sites to improve passage at night. The effectiveness of the lighting for increasing movement will be studied in 1990. In addition a 5-year plan for improvements to other difficult passage areas is being prepared.
2. Two new sockeye spawning channels were constructed on the Chilko and Horsefly Rivers. The Chilko channel, built in 1988 is 8,556 m² with capacity for 6,800 female spawners. In 1988 and 1989, there were 4,679 and 1,525 total spawners, respectively. The Horsefly channel was built in 1989. It has an area of 15,520 m² which is designed to accommodate 12,400 female spawners. In 1989, the channel was filled to capacity with a total of 23,000 spawners. In addition to the channels, a flow control structure was installed on the Mitchell River to reduce overwinter mortality of sockeye.
3. Chilko Lake was partially enriched, with a pre-season treatment in the fall of 1988. However, it did not receive treatment in 1989.
4. The strategy at the Quesnel Hatchery has changed focus. Instead of enhancing numerous Upper Fraser chinook stocks, the enhancement efforts are now focused on fewer stocks, particularly the Quesnel, the Chilko/Chilcotin, Cariboo and Bowron. These stocks could potentially support terminal fisheries.
5. Experimental net pen rearing of Upper Pitt sockeye is being conducted in Pitt Lake. There are about 24,600 yearlings currently being reared.

South Coast

1. The most significant new enhancement initiative in the South Coast are the efforts to assist the Lower Georgia Strait chinook stocks in rebuilding.

The quality of the Nanaimo facility was improved and egg targets were raised from 500,000 to 700,000 in 1988. The target was achieved in 1988 and a total of 660,000 smolts were released in 1989. The egg target was not achieved in 1989, only 467,000 eggs were taken.

The Cowichan facility was also expanded. The egg target was increased from 500,000 to 750,000 in 1987, to 1.2 million in 1988 and 1.5 million in 1989. The targets were achieved in 1987 and 1988. There were 692,000 and 955,000 smolts released from these broods in 1988 and 1989, respectively. In 1989, 1.1 million eggs were taken. A major expansion is planned for 1990 and capacity will be increased to 3.5 million eggs. It is expected that 1.7 million will be taken from the wild stock, and 1.8 million will be taken from a group of the 1987 brood which are being reared to maturity in seapens.

The Tenderfoot Hatchery increased chinook production of the Squamish stock in 1987. The numbers of smolts released were 497,000 in 1987, 1.4 million in 1988 and 1.3 million in 1989.

The Little Qualicum Hatchery was also expanded in 1987. Capacity was increased from 1.5 million to 4 million smolts. Releases were 1.7 million in 1987, 4.4 million in 1988 and 4.0 million in 1989.

2. The rearing of chinook fry in seapens in Howe Sound and Burrard Inlet has increased significantly from the experimental levels reported in 1987. Chinook juveniles are moved into the pens about 3 weeks prior to their normal release time and held. The objective of the seapen rearing was that the adults would home to a site where brood stock could be seined and support a local sport fishery.

Results from the earlier trials suggest that ocean survival is improved and therefore this approach has been expended throughout Howe Sound and Burrard Inlet and is also being conducted on a small scale at several South Coast facilities (Qualicum, Puntledge, Quinsam, Robertson Creek and Conuma). In Howe Sound/Burrard Inlet, there are currently three major sites and 5 small sites. In 1989 there were about 1.6 million chinook released from seapens in the Howe Sound and Burrard Inlet.

3. The Mainland Inlet pink salmon stocks are being enhanced to stabilize production. A spawning channel was built on the Glendale River in 1988. The channel is 20,010 m² and has the capacity for 16,000 female spawners. In 1988 a total of 45,600 pink and 8,000 chum salmon spawned in the channel. A spawning channel (22,880 m²) with capacity for 18,300 female spawners was built on the Kakweikan River in 1989 but was not operational until the end of the season. Use of the channels in 1989 was very low as the pink return to the Mainland Inlets was poor.
4. There have been some increases in chinook production at some of the West Coast Vancouver Island Community Involvement Projects. Egg targets at the San Juan and Clayoquot facilities were increased by about 500,000 in total in 1988. The Gold River facility also increased targets, releasing 580,000 smolts in 1988 and 1.1 million in 1989. The Marble River facility achieved its target of 1.1 million eggs for the first time in 1989.

North Coast

1. In response to the coho salmon conservation initiative in the Skeena River, additional enhancement efforts have focused on increasing coho production to support the fishery management adjustments.

A total of 200,000 eggs were taken from the Morice and Upper Bulkley Rivers in 1989. Half of these are being reared at the Kitimat Hatchery while the remainder are at various Community Involvement facilities. The smolts will be released into their native streams.

Experimental enhancement of coho at Fulton Channel was initiated in 1988 and expanded to Pinkut in 1989. In 1989, 200,000 eggs were taken at Fulton and 31,000 at Pinkut. These fish are being reared to the fed fry stage.

2. In 1987, experimental enhancement of chinook salmon was initiated at Pallant Hatchery. The objective is to determine the feasibility of creating a stock for a terminal fishery in Cumshewa Inlet. The donor stock is Quinsam. In 1987 and 1988, 43,000 and 84,000 90-day smolts were released, respectively. No eggs were transferred in 1989.

(Source Document) - *1989 Update Report for the Salmonid Enhancement Program in British Columbia*. Canada Department of Fisheries and Oceans. January 31, 1990.

(2) 1989 United States Enhancement Update

Northern Southeast Alaska

New Production

Construction of a new sockeye salmon Central Incubation Facility (CIF) at Snettisham was not completed during the 1989 construction season. September 1990 is the targeted project completion date. At full production, 25 million eggs will be incubated at the permanent CIF facility and 20 million unfed fry will be produced for lake stocking projects. Adult production will provide sockeye salmon for harvest in the commercial net fisheries of Northern Southeast Alaska and at transboundary rivers. Annual harvest is projected to be between 50-80 percent of annual adult production. In the interim, the temporary CIF facility produced and released 224,000 unfed fry from 295,000 eggs taken during 1988. During 1989, 7.58 million sockeye eggs were collected for incubation at the temporary CIF facility.

U.S./Canada funds were used in 1989 to expand the Hidden Falls Hatchery for chinook salmon enhancement. The contractor is on site and is expected to complete work by November 1, 1990. The project goal is to construct a hatchery facility capable of producing 1.2 million 12 gram chinook fingerling and 1.1 million 20 gram chinook smolts, annually. Adult chinook salmon production from smolt releases will provide salmon for harvest in the targeted commercial troll fishery. The expected contribution to the common property fishery will be 54,000 adult chinook salmon. At a 50% harvest rate, 22,500 adults would be caught in the commercial troll fishery.

Expansion of chinook salmon production at the Private Nonprofit Program (PMP) hatchery at Medvejie Creek began in 1986, with hydrological feasibility studies and conceptual design work. Construction began in September 1987 and was completed by June, 1988. Other stream rehabilitation took place and was completed in April, 1989. The overall goal of the Medvejie Creek chinook enhancement project was to develop rearing facilities, a water delivery system, and supporting improvements to produce an additional 600,000 chinook smolts.

The Baranof Warm Spring Bay Hatchery development project is behind schedule because of public concerns about recreational and aesthetic values at Baranof Warm Spring Bay. At this time, The FRED division is seeking alternatives to building a hatchery at Baranof Warm Springs.

During the 1988 and 1989 seasons, U.S./Canada funds were expended to evaluate the rearing capacity of Crescent Lake for juvenile sockeye salmon. Project funding covered: collecting, processing and analyzing water quality, determining photo period, temperature, and dissolved oxygen profiles, assessing algal biomass and zooplankton species composition and density, and enumerating rearing juvenile sockeye salmon populations in the lake. Analysis of water quality parameters for both seasons were completed, and juvenile sockeye fry population surveys were also done.

During 1989, the 6.4 million dollar Gastineau Hatchery opened its doors for salmon production. The hatchery has the capacity to incubate 111 million chum, 50 million pink, 1 million coho, and 200,000 chinook salmon per year. When the hatchery reaches full production, it is estimated that 1.7 million adult chums, 2 million adult pink salmon, 50,000 adult coho salmon, and 4,000 adult chinook salmon will be contributed to the common property fisheries in the Juneau area, while contributions of adult coho and chinook salmon to sport and personal use fisheries in the Juneau area are expected to be 50,000 and 4,000 salmon, respectively.

Southern Southeast Alaska

New Production

The Alaska Department of Fish and Game (ADF&G) Fisheries Rehabilitation, Enhancement and Development (FRED) Division Beaver Falls Hatchery was modified to facilitate enhanced

sockeye salmon production in 1988. Annual sockeye salmon production capacity at Beaver Falls hatchery is 15.6 million unfed fry. The purpose of this project is to partially mitigate impacts suffered as a result of the U.S./Canada Treaty, plus enhance depressed stocks. Approximately 7.4 million eggs were collected for incubation during the 1988/1989 winter season. In the spring of 1989, 5.9 million unfed sockeye fry were released from Beaver Falls Hatchery. The contribution to the commercial fishery was estimated at 35,700 during the 1989 fishing season.

Construction of the adult sockeye holding and brood-stock ripening complex at Southern Southeast Regional Aquaculture Association (SSRAA) Beaver Falls Hatchery began in June 1989 and was completed in mid-July. Brood-stock tests are expected to proceed as scheduled during 1990.

Crystal Lake Hatchery is being renovated to maintain chinook salmon production. Gas supersaturation assessment was conducted at Crystal Lake Hatchery with U.S./Canada monies. Project completion is scheduled to occur on June 30, 1991. The purpose of Crystal Lake Hatchery chinook enhancement is to produce salmon for harvest by the troll fleet in Southeast Alaska. Renovation at the hatchery will mitigate potential disease concerns and increase overall chinook salmon production efficiency by 20 percent.

Bioenhancement of chum salmon at Marx Creek Spawning Channel occurred during 1989. Three phases of bioenhancement occurred: pre-emergent fry sampling, adult transplants and coded-wire-tag recovery, and instream incubator design and construction. It is estimated that during 1989 the total chum salmon fry production at Marx Creek Spawning Channel exceeded 4.2 million.

Loss of Production

An accident occurred at Crystal Lake Hatchery during 1989 that resulted in mortality of 37,000 brood year 1989 Crystal Lake Hatchery steelhead trout. As a result of a water line breakage, 90 percent of the incubating steelhead trout died leaving only 2,350 to be released as smolts during 1990.

Major Trends in Production from 1983-1989: Northern and Southern Southeast Alaska

During the report period from 1983-1989, all hatcheries in Southeast Alaska were undergoing brood-stock development. Both State and PNP facilities in Southeast Alaska were involved in applied fisheries research and producing fish for common property fisheries. In addition, State-managed facilities also contributed to fisheries enhancement and rehabilitation projects that benefited personal use, subsistence, and sport fisheries.

FRED hatcheries in Southeast Alaska have switched emphasis from pink and chum production to sockeye salmon production and chinook salmon brood-stock development. Sockeye salmon have long been valuable to commercial and personal-use fisheries. Pink and chum production will be facilitated mainly by the PNP sector in Southeast Alaska in the future.

Current FRED management strategies may warrant contracting the operation of some state-operated facilities to the private sector.

Washington Department of Fisheries

Details of anticipated releases in 1990 and 1991 are provided in the report on each facility operated by WDF.

Trends in Production

Trends in production are depicted in the following table.

Table 14. Thousands of pounds of salmon released by the Washington Department of Fisheries, 1983-1988.

Release Year	Fall Chinook	Spring Chinook	Coho	Chum	Pink	Annual Total
1983	1,532	466	2,121	119	0	4,238
1984	1,514	697	2,414	92	1	4,718
1985	1,609	605	2,373	131	0	4,718
1986	2,014	583	2,576	119	3	5,295
1987	1,856	495	2,695	115	0	5,161
1988	1,843	707	2,605	99	7	5,261
Species Totals	10,368	3,553	14,784	675	11	29,391

Northwest Indian Fisheries Commission Reporting for The Treaty Tribes of Western Washington

New Production

Three new tribal facilities began production in 1989; the Muckleshoot Tribe's White River Hatchery, the Lummi Tribe's Kwina Slough rearing pond, and the Stillaguamish Tribe's Johnson Creek Hatchery. The Lummi Tribe's Skookum Creek Hatchery was also expanded during 1989. A major new facility, the Nisqually Tribe's Clear Creek Hatchery, is currently under construction and is scheduled to begin operation in 1991. A cooperative marine net pen facility for coho rearing is also planned for 1992.

The White River Hatchery is on a tributary to the Puyallup River in central Puget Sound. The hatchery began operating in August, 1989, and the first fish releases are scheduled for spring, 1990. Initially the facility will operate as a rearing facility for the White River spring chinook rebuilding program. Scheduled production is for 275,000 spring chinook fingerlings and 75,000 spring chinook yearlings.

The Kwina Slough rearing pond is located at the mouth of the Nooksack River in northern Puget Sound. The facility started operations in April, 1989, and the first fish were released in June. Scheduled production is for a release of 2 million fall chinook fingerlings. This will increase Lummi fall chinook production by 1 million, since some of the chinook currently reared at the Lummi Bay facility will now be reared at this site.

The Skookum Creek Hatchery expansion is expected to double the facility's annual coho production from 2 million to 4 million yearling releases.

The Stillaguamish Tribe began operations at its Johnson Creek Hatchery in spring, 1989. The facility is a converted trout hatchery on a tributary to the N.F. Stillaguamish River. Approximately 20,000 yearling coho are currently being reared, with future production goals of 1.5 million chum, 250,000 fall chinook and 250,000 coho.

The Clear Creek Hatchery is located on the Nisqually River in southern Puget Sound. Construction is now in progress and completion is scheduled for fall, 1991. Production plans are for 6.8 million fall chinook, 3.4 million chum, and 630,000 yearling coho.

The Muckleshoot and Suquamish Tribes are planning a cooperative marine net pen facility for central Puget Sound. The facility is planned to be in operation by 1992 and will produce 950,000 yearling coho.

Loss of Production

Viral Hemorrhagic Septicemia Virus (VHSV) was recently isolated from brood year 1989 adult coho salmon at the Lummi Bay Sea Pond Hatchery. As part of the emergency eradication measures associated with this detection, 2.7 million coho eggs and 60,000 fall chinook eggs and fry have been destroyed. Additional eradication measures are under consideration.

Major Trends in Production

Tribal fish releases are listed in Table 15. Tribal releases have increased greatly in recent years. From 1982 to 1984, total annual releases averaged approximately 33 million fish. From 1985 to 1989, total annual releases increased to an average of approximately 47 million fish. This trend towards increased production is predicted to continue.

Table 15. Hatchery releases for Western Washington Tribes (1,000's of fish). Release numbers include tribal cooperative projects with state, federal and private entities.

Species	Release Year							
	1982	1983	1984	1985	1986	1987	1988	1989 ^a
Fall Chinook	10,871	9,836	8,721	9,686	11,632	11,080	13,094	11,820
Spring Chinook	0	76	14	67	114	142	4	31
Summer Chinook	100	54	96	355	123	91	472	451
Coho sub-yearlings	2,683	3,162	2,766	9,512	2,893	2,584	1,699	1,885
Coho yearlings	6,249	5,136	5,815	6,598	7,536	6,957	8,150	6,471
Chum	13,119	12,892	11,268	25,190	22,380	23,470	21,092	18,917
Pink	105	0	737	0	0	0	882	0
Sockeye	469	476	10	200	240	12	133	200
Steelhead sub-yearlings	683	320	766	1,402	1,159	932	577	573
Steelhead yearlings	572	730	948	1,252	1,242	978	905	458
Totals	34,858	32,682	31,141	54,262	47,319	46,246	47,008	40,806

^a 1989 numbers are preliminary. Beginning with 1989, releases from the Quinalt National Hatchery will be reported by the USFWS.

Oregon Department of Fish and Wildlife

New Production

The Restoration and Enhancement Act of 1989 will add the following production to Columbia basin hatcheries:

- 1,000,000 coho smolts for release in 1991
- 900,000 fall chinook smolts for release in 1991

A number of other proposals not yet approved will increase production from existing or new facilities in later years.

Construction on the Umatilla Hatchery will begin in mid 1990 and is expected to be completed by 1991. This facility will produce summer steelhead, upriver fall chinook and spring chinook. A five year BPA funded oxygen supplementation study at Willamette Hatchery is expected to increase spring chinook production by 60,000 smolts in 1990 and 360,000 smolts in 1991.

Loss of Production

No major loss of production is anticipated.

Major Trends

The Restoration and Enhancement Act is expected to provide funding for a general increase of production at mitigation facilities.

United States Fish and Wildlife Service

New Production

Effective in October 1989, operation of the Quinault National Fish Hatchery reverted to the Fish and Wildlife Service from the Quinault Tribe.

Changes in species and production regimes have increased production of spring chinook at Little White Salmon and coho at Eagle Creek.

Loss of Production

Detection of the disease, Viral Hemorrhagic Septicemia, at the Makah National Fish Hatchery in February 1989 prompted the destruction of all fish and eggs on hand. Over 3.4 million fall chinook, coho, chum, and steelhead eggs and fish were destroyed to prevent spread of the virus.

Changes in species have eliminated production of spring chinook at Eagle Creek and steelhead at Warm Springs.

Trends in Production

Recent and projected production represent increases over that during the middle of the decade. Total releases are expected to near 50 million fish, up from a low of 38 million fish in brood year 1986.

Idaho Department of Fish and Game

New Production

The Crooked River satellite rearing pond portion of the proposed Clearwater River Hatchery production project was completed and smolts released spring, 1989. The pond has a rearing capacity of 300,000 spring chinook smolts. A third satellite pond (Powell) will be completed in 1990, adding another 750,000 smolt enhancement capacity. Construction of the Clearwater River Hatchery began in 1989, with completion expected in 1992. Potential rearing capacity of the facility is 65,000 pounds of spring chinook and 550,000 pounds of steelhead smolts.

The hatchery enhancement effort has been paralleled by activities to improve Snake River and Columbia River juvenile and adult migration survival. These efforts continue to achieve full implementation of elements of the Northwest Power Planning Council's Fish and Wildlife Program, to improve juvenile survival to and past power generation dams by 1994.

Loss of Production

The 1989 chinook salmon egg take was substantially reduced as a result of insufficient brood escapement into the Snake River. Only 1 million summer chinook eggs were available, compared to 3.3 million in 1988. Similarly only 5 million spring chinook eggs were available in 1989, compared to 9 million in 1988. Consequently, brood year smolt releases in 1991 will be reduced.

Trends in Production

Enhancement of salmon and steelhead production has increased since 1982 as new facilities and hatchery brood are developed. The Clearwater River Hatchery project and proposed Nez Perce Tribe Hatchery and satellite ponds will further increase hatchery production capability of chinook salmon and steelhead in the near future and over the longer term. However, actual chinook salmon enhancement will depend largely on brood availability each year.

Reports of the Joint Technical Committees

PART V

REPORTS OF THE

JOINT TECHNICAL COMMITTEES

Executive summaries of reports submitted to the Commission by the joint technical committees during the period April 1, 1989 to March 31, 1990 are presented in this section. Copies of the complete reports are available on request from the library of the Pacific Salmon Commission.

A JOINT CHINOOK TECHNICAL COMMITTEE

Joint Chinook Technical Committee. 1988 Annual Report. TCCHINOOK (89)-1. November 10, 1989

1988 Chinook Salmon Catches in Fisheries with Ceilings

Estimates of 1988 catch for each fishery managed under a harvest ceiling established by the Treaty are:

Area and Fishery	Ceiling (x1000)	Catch c/ (x1000)	Difference	
			#'s	%
SE Alaska (T,N,S) a/ b/	263	253.7	-9.3	-3.5%
North/Central B.C. (T,N,S)	263	245.9	-17.1	-6.5%
West Coast Vancouver I. (T)	360	407.2	47.2	13.1%
Georgia Strait (T,S)	275	138.7	-136.3	-49.6%

a/ T=Troll; N=Net; S=Sport

b/ The actual total catch was 278,700 chinook, including 25,000 for hatchery add-on

c/ compiled with information available as of 10/24/89

Catches in all fisheries of interest to the Pacific Salmon Commission are documented in Table 1-1. The catch in the west coast Vancouver Island troll fishery exceeded the 7.5% management range about the catch ceiling established by the Commission.

TABLE 1-1. CHINOOK CATCHES IN FISHERIES RELEVANT TO THE U.S./CANADA SALMON TREATY, CATCHES FOR THE YEARS 1985 - 1988 (numbers of fish in 1,000's).
05-Nov-89

AREA	TROLL				NET				SPORT				TOTAL			
	1988	1987	1986	1985	1988	1987	1986	1985	1988	1987	1986	1985	1988	1987	1986	1985
S.E. ALASKA	231	242	236	217 a	22	15	22	36 a	26	24	21	25	279	281	279	278
BRITISH COLUMBIA																
North/Cent. Coast	181	240	202	215	44	29	47	51	21	14	12	9	246	283	261	275
W. Vanc. Island	407	379	342	358	15	0.5	3.3	11	33	32	13	22 d	455	412	358	391
Georgia St/Fraser	20	38	44	52	10	13	32	31	119	121	182	235 e	149	172	258	318
Johnstone St	2	2	4	5	6	14	18	38	10	10	10	10	18	26	32	53
Juan de Fuca St	0	0	0	0.4	4	7	18	17				e	4	7	18	17
sub-total	610	659	592	630	79	64	118	148	183	177	217	276	872	900	927	1054
WASHINGTON INSIDE																
Strait (mar)	50	45	30	13 g	9	11	19	13	41	53	69	44 h	92	99	114	63
San Juans (mar)	0	0	0	0	32	29	21	33	12	14	17	13 h	44	43	38	46
Other PS (mar+fw)	0	0	0	0	132	124	151	180	78	59	88	93 h	210	183	239	273
Coastal (mar+fw)	0	0	0	0	77	54	28	25	3	3	3	2	80	57	31	27
sub-total	50	45	30	13	250	218	219	251	134	129	177	152	426	382	422	409
COLUMBIA RIVER	-	-	-	-	491	483	283	151 i	94	84	66	48 j	585	567	349	199
WA/OR N C FALCON	107	78	51	58	3	2	0	0	19	44	23	30	138	134	79	91
OREGON																
C Blanco-C Falcon	4	3	2	2 l	-	-	-	-	49	47	33	25 k	53	50	35	27
South of C Falcon	456	516	393	205 m	-	-	-	-	38	55	20	52 m	494	571	413	257
GRAND TOTAL	1458	1543	1304	1125	842	780	642	586	543	560	557	608	2843	2883	2503	2319

- a/ S.E. Alaska troll catches shown for Oct. 1- Sept. 30 counting year; purse seine catches only include chinook 28 in. or greater in total lt.
- b/ British Columbia net catch only includes fish over 5 lb. round weight. Native food fishery catches are not included.
- c/ Sport catches are for tidal waters only, catch updates will be provided as available.
- d/ Estimates of tidal sport catches are from creel surveys in Barkley Sound only. Survey times and areas may vary from year to year.
- e/ Georgia Strait sport catches include Juan de Fuca Strait sport catches.
- f/ Coastal and Puget Sound sport catches include marine and freshwater catches, but only adults in freshwater.
- g/ Includes areas 5, 6c and area 4B troll catches outside of the PFMC management period (May - September) in the Juan de Fuca Strait total.
- h/ Adjusted for punch card bias by multiplying punch card estimate by 0.833. This bias adjustment methodology is currently under review and may result in future adjustment to these numbers; 1988 catches do not include freshwater catches.
- i/ Columbia River net catches include Oregon, Washington and treaty catches, but not treaty ceremonial.
- j/ Columbia River sport catches include adults only, for Washington, Oregon, Idaho and Buoy 10 anglers.
- k/ Estuary and inland sport catch data are still preliminary for 1986 to 1988.
- l/ Includes only special late season ocean troll catch off Elk River in the Cape Blanco area.
- m/ Catches in marine fisheries managed by the Pacific Marine Fisheries Council.

Cumulative Deviations from Catch Ceilings

Cumulative deviations from catch ceilings through 1988 are as follows:

Area & Fishery	Ceiling (x1000)	1987	1988	Cumulative		Action Required in the Following Year
		Catch ^{c/} (x1000)	Catch ^{c/} (x1000)	Deviations #s	%	
SE Alaska (T,N,S) ^{a/}	263	266.1	253.7	-6.2	-2.4	NO
North/Central B.C. (T, N,S)	263	283.0	245.9	+3.1	+1.1	NO
West Coast Vancouver I. (T)	360	379.0	407.2	+66.2	+18.4	YES
Georgia Strait (T,S)	275	159.0	138.7	-252.3	-7.5/ ^b	NO

a/ SE Alaska catches exclude hatchery add-ons of 16,000 and 25,000 for 1987 and 1988 respectively.

b/ Negative deviations below the 7.5% management range cannot be accumulated.

c/ Compiled with information available as of 10/24/89.

Escapement Assessment

Escapement assessment of progress towards rebuilding was based on the same 43 indicator stocks as used in last year's assessment (TCCHINOOK (88)-2). The 1988 escapement data have been incorporated and the methods for determining stock rebuilding status have been improved. The indicator stocks have not responded uniformly to the rebuilding program. However, since expected rebuilding schedules have not been defined for all indicator stocks, it is difficult to assess if progress is sufficient to ensure rebuilding of stocks by their target year. The Committee's assessment through 1988 can be summarized as follows:

Categories	Number of Stocks	% of Indicators
Rebuilding	9	21%
Probably Rebuilding a/	13	30%
Indeterminate	17	40%
Probably Not Rebuilding	4	9%
Not Rebuilding	0	0%
	43	100%

a/ Stikine stock has been included as Probably Rebuilding.

(1) Rebuilding and Probably Rebuilding Categories:

In this 1988 assessment, 51% of the escapement indicator stocks were placed in these categories. There is basically no change in the percent of stocks in these categories from 1987, when using the present assessment method and the exclusion of the 1988 data point.

(2) Indeterminate:

Forty percent of the escapement indicator stocks do not show clear progress towards rebuilding or clear movement away from rebuilding. Lack of clear progress towards rebuilding for stocks in phase 1 of a 3-phase rebuilding program may not be a concern, as long as fishery exploitation rates meet expectations and these stocks show clear progress towards rebuilding during phase 2. SEAK and TBR stocks, which have been involved in a rebuilding program since 1981, are already in phase 2 of their rebuilding program. The rebuilding status of five of these stocks (Situk, Blossom, Alsek, Chilkat, and Taku) is Indeterminate, suggesting that these stocks are not currently responding to the rebuilding program as expected.

(3) Probably Not Rebuilding:

Nine percent of the escapement indicator stocks are placed in this category. These stocks are cause for concern and should receive special attention. The four stocks are the West Coast of Vancouver Island falls, the Lower Strait of Georgia falls, the Harrison River falls, and the Snohomish River summer/fall chinook.

(4) Not Rebuilding:

None of the escapement indicator stocks are placed in this category. The two stocks identified as Not Rebuilding in 1987 (WCVI and Lower Georgia Strait) both showed increased escapements in 1988.

(5) The average Treaty period escapements increased over pre-Treaty periods for 29 (67%) indicator stocks, decreased for 9 (21%) stocks, and no change could be assessed for 5 (12%) stocks.

(6) The percentage of stocks meeting their escapement goal decreased in 1988. The percentage reaching their goals increased each year between 1982 and 1987. From 1987 to 1988, however, the percentage decreased from 42% to 33%.

Exploitation Rate Analysis

This analysis is based on 15 exploitation rate indicator stocks, 14 of which are hatchery stocks and 1 naturally spawning stock (Lewis River). The indicator stocks are composed of 2 spring run-type, 1 summer run-type, and 12 fall run-type. Four indicator stocks were added to the analysis for 1988 (Puget Sound yearling and fingerling, Lewis River, and Columbia River Summer). The method to calculate fishery indices was changed to reduce the variability, attributed to low tag recovery numbers for some stock and age combinations, in the indices. The stock index method was changed to provide annual fishery impacts for a stock in fisheries under PSC ceiling management and Canadian and U.S. fisheries not under ceiling management. A new component was added to the analysis which provided catch distributions for each indicator stock by year.

(1) Fishery Indices:

With the exception of the North/Central B.C. troll fishery, total fishing mortalities for index stocks have not decreased to the extent anticipated when the chinook rebuilding program was established. This may indicate that, for stocks represented in the analysis, initial reductions in harvest rates obtained when ceilings were imposed in 1985 have partially been lost due to fishery restructuring, increased incidental mortalities, or abundance changes. The fishery indices are summarized as follows:

SOUTHEAST ALASKA: The average 1985-88 fishery index is 15% below the base, but 7 percentage points higher than the 22% target reduction. However, the 1988 index was 31% below the base period.

NORTH/CENTRAL B.C.: The average 1985-88 fishery index is 28% below the base and 12 percentage points below the 16% target reduction. The 1988 index was 48% below the base period.

WEST COAST VANCOUVER ISLAND: The average 1985-88 fishery index is 4% below the base, but 20 percentage points higher than the 24% target reduction. The 1988 index is 14% above the base period.

GEORGIA STRAIT SPORT AND TROLL COMBINED: The average 1985-88 fishery index is 26% below the base, but 21 percentage points higher than the 47% target reduction. The 1988 index is 28% below the base.

WASHINGTON/OREGON OCEAN: The average 1985-88 fishery index is 24% below the base. The 1988 index has returned to the base period.

It appears that management actions for the Southeast Alaska and West Coast Vancouver Island troll fisheries have not reduced harvest rates on the indicator stocks to the degree intended. The average fishery index decreased for the combined Georgia Strait troll and sport fishery, but remained above target levels. The declining catches in the Strait of Georgia are primarily the result of declining stock abundance, not harvest rate reduction. The fishery index for the Washington and Oregon ocean fisheries initially decreased substantially from base period levels but have been gradually increasing for recent years.

(2) Stock Indices:

The indices showed that the combined impacts on the stocks for all fisheries under PSC catch ceiling management have generally declined since the base period (12 of 16 age-stock combinations). The combined exploitation rate for all Canadian fisheries not under PSC catch ceiling management (the majority are net fisheries) was reduced by 25% from the base period for all significantly impacted stocks. This result is consistent with the reduction in impacts for Canadian net fisheries, which was assumed in the rebuilding program. The stocks significantly impacted by U.S. fisheries not under PSC catch ceiling management showed a mixed response (5 greater than the base period, 5 less than base period).

(3) Brood Year Ocean Exploitation Rates:

The 1982-84 average brood year exploitation rates have declined from pre-Treaty levels for 11 of the indicator stocks (Quinsam, Big Qualicum, Puget Sound fingerling and yearling, Spring Creek, Cowlitz Fall, Bonneville Tule, Stayton Pond Tule, Columbia Upriver Brights, Columbia Summers, and Lewis River). The average decline was 9 percentage points from the base, but the values ranged from 3 to 19 percentage points. The average 1982-84 brood year rates have increased 6 percentage points from pre-Treaty levels for two stocks (Alaska Springs and Robertson Creek). The 1982-84 brood year average rates have remained unchanged for Capilano and Willamette Springs. The brood year incidental mortalities have increased for fourteen of the fifteen indicator stocks. The proportion of total fishing mortality accounted for by incidental mortality has increased by more than 50% from the base period for 11 of the 15 indicator stocks.

(4) Survival Rate indices:

Nine of the fifteen stocks show long term (all available observations) decreasing trends in survival. For the short term, survival of 14 stocks has decreased substantially for the 1984 and 1985 broods.

(5) Stock Contribution Indices:

The contribution of Columbia Upriver Brights to the outside PSC fisheries has increased dramatically since the implementation of the PST. However, contribution of Robertson Creek and Spring Creek fish to the same fisheries and time periods has decreased substantially. These data indicate that increased contributions of Columbia Upriver Brights are probably compensating for decreased contributions of other stocks in these fisheries. Columbia Upriver Brights appear to be the largest single contributor to the PSC outside fisheries.

(6) Stock Catch Distribution:

Catch distributions for each exploitation indicator stock by year are presented. In general the average distributions are very similar to those presented in the 1987 report (calculated using the PSC model).

- (7) Incidental mortalities of chinook salmon continue to be a problem and are increasing. It is not possible to quantify impacts of incidental mortalities for each escapement indicator stock, but analyses of the exploitation rate indicators imply that incidental mortalities have slowed the rebuilding rate for stocks represented by these indicators.

Qualifications

- (1) With only four years of observations under full Pacific Salmon Commission management, plus the normal high variability in fishery and escapement data, conclusions regarding rebuilding status should be viewed cautiously. Further, the assessment based on spawning escapement alone can be misleading if stock-specific conservation measures or harvest impacts obscure the effects of PSC conservation measures in fisheries under catch ceilings.
- (2) Most agencies have not yet begun to collect age and sex information from natural spawning populations. Major changes in these parameters have been observed for some stocks. Observing only the number of spawners is inadequate to assess rebuilding under these circumstances.
- (3) The exploitation rate analysis is limited by insufficient numbers of spring and summer run-type indicator stocks.
- (4) Changing fishing patterns can confound interpretation of the total exploitation rate analysis; monitoring programs are essential to up-date information used to evaluate incidental mortalities and parameters used in the exploitation rate analysis.

Recommendations

- (1) Four indicator stocks were assessed to be Probably Not Rebuilding based on spawning escapement (Harrison River falls, West Coast of Vancouver Island falls, Lower Georgia Strait falls, and Snohomish River summer/falls). Some changes in management are probably required to rebuild these stocks.
- (2) Five SEAK and TBR stocks were assessed as Indeterminate based on spawning escapements. Since these stocks are in phase 2 of their rebuilding program, the lack of progress is of concern. Potential causes for the lack of progress should be investigated.
- (3) Hatchery stocks that are major contributors to PSC fisheries have displayed declining trends in survival. Without compensating increases in abundance of natural stocks contributing to these fisheries, fishery harvest rates will increase unless management regimes are adjusted to reduce impacts at least proportional to reductions in abundance. The PSC should consider the decreasing trends in survival exhibited by the majority of the exploitation rate indicator stocks when establishing 1990 fishing regimes.
- (4) Management measures should be implemented to reduce or compensate for incidental chinook mortalities on a coastwide basis.
- (5) A complete assessment of cumulative pass-through impacts on rebuilding progress is needed to complete the Commission's rebuilding assessment. Policy questions and information needs for interpretation of the pass-through provision should be resolved.
- (6) Policy questions of what constitutes rebuilding must be resolved before the Committee can complete its assessment of rebuilding progress.

- (7) The Committee recommends attention to the following information concerns and needs.
- (a) An increased commitment should be made to conduct consistent escapement surveys and obtaining better escapement data, including sex ratio and age composition data needed to evaluate expected production and returns by brood years.
 - (b) The indicator stock programs should be reviewed to determine the adequacy of production region and stock type representation. The Committee is especially concerned about the representation of spring and spring/summer stocks in the exploitation rate analysis, and the development of standardized definitions for run-timing classifications of stocks.
 - (c) Changes in spatial and temporal fishery patterns have affected fishing effort and perhaps chinook encounter rates. Troll fisheries and catch non-retention periods should be re-sampled to assess these impacts, and to verify parameters used in the induced mortality assessments.
 - (d) Consistent and standardized recovery programs for coded-wire tagged fish at hatcheries and on spawning grounds are required. In addition, procedures used during tagging of juvenile fish should be standardized for enumeration of marks, total release numbers, and tag retention estimates.

Joint Chinook Technical Committee. Preliminary 1989 Catch and Escapement. TCCHINOOK (90)-1. February 7, 1990.

1989 Chinook Salmon Catches In Fisheries With Ceilings

Estimates of 1989 catch for each fishery managed under a harvest ceiling established by the Treaty are presented below. These data (numbers x 1,000) are preliminary, compiled with information available as of 29/11/89 for U.S. data and 06/02/90 for Canada.

Area and Fishery	Ceiling	Catch	Difference	
			#s	%
SE Alaska (T,N,S) a/b/	263	267.4	4.4	+1.7%
North/Central B.C. (T,N,S)	263	305.3	42.3	+16.1%
West Coast Vancouver I. (T)	360	200.6	-159.4	-44.3%
Georgia Strait (T,S)	275	160.8	-114.2	-41.5%
<hr/>				
Northern B.C. (T,N,S) c/	254.4	290.1	35.7	+14.0%

a/ T=Troll; N=Net; S=Sport

b/ The actual total catch was 288,000 chinook, including a hatchery add-on of 20,600.

c/ Alternative catch values as per Canada's terminal area exclusion paper Feb.13/89; excludes 8,600 chinook caught in 3 extreme terminal areas during the base period and 15,200 chinook caught in these areas in 1989, difference is 6,600 chinook.

Catches in all fisheries of interest to the Pacific Salmon Commission are documented in Table 1.

TABLE 1. PRELIMINARY 1989 CHINOOK CATCHES IN FISHERIES RELEVANT TO THE U.S./CANADA SALMON TREATY. (numbers in 1,000's of fish)
Catches as of 29/11/89 for U.S. data and 06/02/90 for Canada.

AREA	TROLL				NET				SPORT				TOTAL			
	1989	1988	1987	1986	1989	1988	1987	1986	1989	1988	1987	1986	1989	1988	1987	1986
S.E. ALASKA	236	231	242	236 a	24	22	15	22 a	28	26	24	21	288	279	281	279
BRITISH COLUMBIA b,c																
North/Cent. Coast	223	182	240	202	46	44	29	47	36	21	14	12	305	247	283	261
W. Vanc. Island	201	409	379	342	38	15	0.5	3.3	NA	33	32	13 d	NA	457	412	358
Georgia St/Fraser	28	20	38	44	23	8	13	32	133	119	121	182 e	184	147	172	258
Johnstone St	2	2	2	4	29	6	14	18	10	10	10	10	41	18	26	32
Juan de Fuca St	0	0	0	0	19	4	7	18				e	19	4	7	18
sub-total	454	613	659	592	155	77	64	118	NA	183	177	217	NA	873	900	927
WASHINGTON INSIDE f																
Strait (mar)	22	50	45	30 g	10	9	11	19	NA	41	53	69 h	NA	100	109	118
San Juans (mar)	0	0	0	0	16	32	29	21	NA	12	14	17 h	NA	44	43	38
Other PS (mar+fw)	1	0.4	0	0	152	132	124	151	NA	78	59	88 h	NA	210	183	239
Coastal (mar+fw)	0	0	0	0	88	77	54	28	NA	3	3	3 k	NA	80	57	31
sub-total	23	50.4	45	30	266	250	218	219	NA	134	129	177	NA	434	392	426
COLUMBIA RIVER	-	-	-	-	266	491	483	283 i	60	94	84	66 j	326	585	567	349
WA/OR N C FALCON	74	106	78	51	1	3	2	0	21	20	44	23	96	129	124	74
OREGON																
Inside Waters k	NA	4	3	2	-	-	-	-	NA	49	47	33	NA	53	50	35
GRAND TOTAL	787	1004	1027	911	704	843	782	642	NA	506	505	537	NA	2350	2314	2090

a/ Southeast Alaska troll chinook catches shown for Oct. 1- Sept. 30 catch counting year.

b/ British Columbia net catches includes only fish over 5 lb. round weight. Native food fishery catches are not included.
1989 includes catch from terminal sport and gillnet fisheries (6,600) proposed for exclusion from the catch ceiling.

c/ Sport catches are for tidal waters only, catch updates will be provided as available.

d/ Estimates of tidal sport catches are from creel surveys in Barkley Sound only. Survey times and areas vary between years.

e/ Georgia Strait sport catches include Juan de Fuca Strait sport catches.

f/ Coastal and Puget Sound sport catches include marine and freshwater catches, but only adults in freshwater.

g/ Includes areas 5, 6C, 4B troll catches outside of the PFMC management period (May - September) in the Juan de Fuca Strait total.

h/ Adjusted for punch card bias by multiplying punch card estimate by 0.833. This bias adjustment methodology is under review and may result in future adjustment to these numbers.

i/ Columbia River net catches include Oregon, Washington and treaty catches, but not treaty ceremonial.

j/ Columbia River sport catches include adults only, for Washington, Oregon, Idaho and Buoy 10 anglers.

k/ Troll = late season troll off Elk River mouth (Cape Blanco); sport = estuary and inland (preliminary for 1986-88).

Cumulative Deviations from Catch Ceilings

A 7.5% cumulative management range was established by the Commission in 1987. Catches and deviations from catch ceilings since 1987 (in thousands of fish) are as follows:

Area and Fishery	Ceiling	1987	1988	1989	Total Deviations	Cumulative Deviations	
		Catch ^{a/}	Catch ^{a/}	Catch ^{a/}		#'s	%
SE Alaska (T,N,S) ^{b/}	263	266.1	253.7	267.4	-1.8	-1.8	-0.7%
North/Central B.C. (T,N,S)	263	283.0	247.1	305.3	+46.4	+46.4	17.6% ^{c/}
West Coast Vancouver I. (T)	360	379.0	407.2	200.6	-93.2	-27.0	-7.5% ^{d/}
Georgia Strait (T,S)	275	159.0	138.7	160.8	-380.9	-20.6	-7.5% ^{d/}
<hr/>							
North/Central B.C. (T,N,S) ^{e/}	254.4	283.0	247.1	290.1	+39.7	+39.7	+15.6%

a/ Compiled with information available as of 29/11/89 for U.S. data and 06/02/90 for Canada.

b/ S.E. Alaska catches exclude hatchery add-ons of 16,000, 25,000 and 20,600 for 1987, 1988, and 1989, respectively.

c/ Exceeds 7.5% management range; management action required.

d/ Negative deviations below the 7.5% management range cannot be accumulated.

e/ Alternative catch values as per Canada's terminal area exclusion paper Feb. 13/89; footnote c Table 1.0.

Preliminary Review of 1989 Escapements

Some fall running chinook stocks are still spawning at this time. Consequently, only a brief preliminary escapement overview can be presented (Table 2). We have prepared brief narratives to summarize the information which is currently available. This information should be considered very preliminary.

Table 2. SUMMARY OF THE 1986 to 1988 ESCAPEMENTS TO ESCAPEMENT INDICATOR STOCKS, AND PRELIMINARY 1989 SPAWNING ESCAPEMENTS.
29-Nov-89

Production Unit	Stock Type	Ave Esc. Base 1/	Esc. Goal	1986 Esc.	1987 Esc.	1988 Esc.	1989 Esc.	1989 % Base	1989 % Goal
Southeast Alaska									
Situk	Spring	1,391	2,100	2,067	1,884	885	652	47%	31%
King Salmon	Spring	92	250	245	193	206	238	259%	95%
Andrew Creek	Spring	379	750	1,131	1,042	752	848	224%	113%
Blossom	Spring	163	1,280	2,045	2,158	614	550	337%	43%
Keta	Spring	407	800	1,104	1,229	920	1,848	454%	231%
Transboundary Rivers Not Addressed in Treaty Annexes									
Chilkat (U.S.)	Spring	213	2,009	129	1,286	781	1,362	639%	68%
Unuk (U.S.)	Spring	1,469	2,880	3,402	3,157	2,794	1,838	125%	64%
Chickamin (U.S.)	Spring	338	1,440	2,683	1,560	1,258	1,494	442%	104%
Transboundary Rivers Addressed in Treaty Annexes									
Alsek (U.S.)	Spring	4,214	5,000	4,073	3,892	3,105	3,838	91%	77%
Alsek (Canada)	Spring	5,255	12,500	5,418	5,232	4,060	4,912	93%	39%
Taku (U.S.)	Spring	7,978	25,600	12,178	8,951	13,411	15,451	194%	60%
Taku (Canada)	Spring	9,700	30,000	15,040	11,486	17,252	18,784	194%	63%
Stikine (U.S.)	Spring	6,224	13,440	11,572	19,108	29,168	18,860	303%	140%
Stikine (Canada)	Spring	8,004	25,000	11,572	19,100	29,168	18,860	236%	75%
B.C. North Coast									
Yakoun River	Summer	788	1,576	500	2,000	2,000	2,800	355%	178%
Nass area	Spr/Sum	7,944	15,888	17,390	11,400	10,000	12,500	157%	79%
Skeena area	Spr/Sum	20,883	41,766	59,968	59,120	68,700	57,200	273%	136%
B.C. Central Coast									
Area 6 Index	Summer	2,760	5,521	2,615	1,566	3,165	1,000	36%	18%
Area 8 Index	Spring	2,725	5,450	3,362	1,456	1,650	2,500	92%	46%
Rivers Inlet	Spr/Sum	2,475	4,950	7,623	5,239	4,430	3,300	133%	66%
Smith Inlet	Summer	1,055	2,110	532	1,050	1,050	225	21%	11%
West Coast Vancouver Island									
Indicator Stocks	Fall	5,745	11,500	4,810	3,570	5,525	8,490	148%	74%
Fraser River									
Upper River	Spring	12,229	24,458	41,207	34,520	34,250	24,000	196%	98%
Middle River	Spr/Sum	9,216	21,133	27,349	27,330	24,160	12,300	133%	58%
Thompson River	Summer	22,059	55,714	45,130	36,730	47,100	33,000	150%	59%
Harrison River	Fall	116,791	233,582	162,393	78,693	35,700	75,000	64%	32%
Georgia Strait									
Upper	2/ Sum/Fall	2,546	5,100	1,630	5,700	3,300	6,600	259%	129%
Lower	Fall	11,139	22,278	2,830	2,530	6,914	5,830	52%	26%

Table 2. (Continued)

Production Unit	Stock Type	Ave Esc. Base 1/	Esc. Goal	1986 Esc.	1987 Esc.	1988 Esc.	1989 Esc.	1989 % Base	1989 % Goal
Puget Sound									
Skagit	Spring	1,217	3,000	1,995	2,108	1,988	NA		
Skagit	Sum/Fall	13,265	14,900	18,127	9,647	11,954	NA		
Stillaguamish	Sum/Fall	817	2,000	1,277	1,321	717	NA		
Snohomish	Sum/Fall	5,028	5,250	4,534	4,689	4,513	NA		
Green	Fall	5,723	5,800	4,792	10,338	7,994	NA		
Washington Coast									
Hoh	Spr/Summ	1,325	NA 3/	1,500	1,700	2,600	NA		
Queets	Spr/Summ	925	NA 3/	900	600	1,800	NA		
Grays Harbor	Spring	425	1,400	1,800	800	3,000	NA		
Grays Harbor	Fall	8,575	14,600	10,500	18,800	28,200	NA		
Quillayute	Summer	1,275	1,500	600	700	1,300	NA		
Quillayute	Fall	5,850	NA 3/	10,000	12,400	7,900	NA		
Hoh	Fall	2,875	NA 3/	5,000	4,000	2,700	NA		
Queets	Fall	3,875	NA 3/	7,700	6,000	8,600	NA		
Columbia River									
Upper River 4/	Spring	27,425	84,000	38,500	41,400	35,100	27,900 5/	96%	33%
Upper River	Summer	23,100	85,000	25,700	31,800	30,100	28,800	119%	34%
Lewis River 4/	Fall	13,021	10,000	12,000	12,900	12,100	NA	NA	NA
Upriver Bright	Fall	28,325	40,000	113,300	154,100	114,700	96,500	341%	241%
Oregon Coast									
Aggregate Index 6/	Fall	91	NA	121	129	221	NA		

- 1/ Base period for Alaskan and Transboundary stocks 1975-80; base for all other stocks 1979-82.
- 2/ 1986 escapement estimate for Upper Georgia Strait reflects unusual survey conditions.
- 3/ Stocks managed on the basis of floor minimum and fixed harvest rates.
- 4/ Interim management goal, only includes naturally spawning component.
- 5/ Based on average wild proportion of total adult escapement.
- 6/ Oregon coastal north-migrating chinook stocks are assessed in terms of spawners per mile survey units.

B. JOINT CHUM TECHNICAL COMMITTEE

Joint Chum Technical Committee. Final 1988 Post Season Summary Report. TCCHUM (90)-1. January 1990.

Introduction

This Joint Chum Salmon Technical Committee report presents the appropriate information for 1988 chum salmon in southern British Columbia and Washington, as required in Chapter 6 of Annex IV of the Pacific Salmon Treaty (PST). Detailed information may be found in the Canadian and United States agency reports appended to this report.

Status of Treaty Requirements

Chum stocks and fisheries in southern B.C. and in U.S. Areas 4B, 5, 6C, 7, and 7A are managed under the terms set out in the Pacific Salmon Treaty. The following provides a brief synopsis of the PST chum annex provisions (*italics*) and of Canadian and United States management actions in 1988.

1. *The Parties shall maintain a Joint Chum Technical Committee to review stock status, develop new methods for stock management and report on management and research findings.*

Reports published in 1988 are listed under 1988 Technical Committee Publications.

2. *Canada was to manage its Inside fisheries to provide rebuilding of depressed stocks and minimize increased interceptions of U.S. chum.*

In 1988, the gross escapement of Inside chum totalled 1,669,000. Wild escapement totalled 1,480,000 which was 74% of the Clockwork goal of 2,000,000. The Fraser River wild escapement was 400,000 or 57% of the 700,000 goal. Although stock compositions samples were taken, the technical committee has not agreed on a method for determining whether increased interceptions were minimized.

Terminal area fisheries scheduled by Canada to harvest specific stocks with identified surpluses included: mid Vancouver Island (Area 14), Nanaimo (Area 17), Cowichan (Area 18), Sooke (Area 20) and the Fraser River (Area 29). None of these fisheries were thought to increase interceptions of U.S. origin or other non-targeted stocks.

3. *In 1988, Canada was to manage its Johnstone Strait Clockwork harvest to set levels dependent on the run size entering Johnstone Strait as determined in-season.*

The in-season estimate of Johnstone Strait run size was 4,153,000 providing for a harvest of 30% or 1,246,000 chum. At the end of the season, the overall harvest rate was 38.8% for clockwork assessment purposes and the run size was 3,138,000 chum. In 1988, the Clockwork Plan was revised to allow discrete management of the Fraser River terminal area fishery.

The harvest of chum salmon in U.S. fisheries 7 & 7A was limited to set catch ceilings dependent on the catch of chum salmon in Johnstone Strait. In addition, the proportion of effort and catch between Areas 7 & 7A was to be maintained.

The total allowable catch for U.S. Areas 7 & 7A was 140,000, however, this was reduced by a 6,000 chum overage from the U.S. fishery in 1987. The total catch for this fishery in 1988 was 130,000. The U.S. catch in Areas 7 and 7A was evenly divided between the two areas, which is the traditional proportion of catch between the two areas.

4. *In 1988, the U.S. was to maintain the limited effort nature of its chum fishery in U.S. Areas 4B, 5, and 6C to minimize increased interceptions of Canadian chum. In addition, the U.S. was to monitor this fishery for increasing interceptions of Canadian chum.*

The U.S. chum fishery in the Strait of Juan de Fuca (Areas 4B, 5, and 6C) was limited, as it has been in past years, to participation by gillnet fishermen from the four Strait Tribes. It opened a week later than normal and closed in mid-November, as usual. The catch of 96,000 chum was the highest on record. GSI samples were taken to determine whether this large catch resulted in higher interception of Canadian chum.

5. *When the catch of chum salmon in U.S. Areas 7 & 7A fails to achieve the specified ceiling, the ceiling in subsequent years will be adjusted accordingly.*

The U.S. fishery in Areas 7 and 7A in 1988 fell 3,000 chum short of the 134,000 ceiling for 1988.

6. *Catch compositions in fisheries covered by this chapter were to be estimated post-season using methods agreed upon by the Joint Chum Technical Committee.*

Methods for estimating catch compositions in fisheries covered by this chapter are under review by the committee.

7. *In 1988, Canada was to manage to Nitinat net chum fishery to minimize the harvest of non-targeted stocks.*

The boundaries of the Nitinat fishery, in 1988, were extended an additional two miles offshore to increase the harvest of the large Nitinat return once escapement goals were achieved. Canada conducted GSI sampling to quantify the incidence of interceptions of passing stocks. The stock composition estimates of U.S. origin chum have not been finalized.

8. *In 1988, Canada was to conduct GSI sampling of the West Coast Vancouver Island troll fishery (Areas 121-124) if catch levels were predicted to reach levels similar to those in 1985 and 1986.*

Early season catch information from the West Coast Vancouver Island troll fishery did not indicate that the season's total chum catches would reach 1985/86 levels, as a result, Canada did not conduct GSI sampling of this fishery.

C. JOINT COHO TECHNICAL COMMITTEE

Joint Coho Technical Committee. Report to the Southern Panel on Coho Stock Composition Estimates in the Southern Panel Area. TCCOHO (89)-1. September 29, 1989.

In the fall of 1987, the Pacific Salmon Commission identified a need for estimates of the stock composition of Southern Panel area fisheries. The Coho Technical Committee (CoTC) was assigned the task of estimating stock composition for these fisheries for catch years 1984 through 1987.

This report provides estimates of stock composition for Southern Panel area fisheries for catch years 1984 through 1986. Washington CWT recovery data for 1987 were not available in the appropriate format and, therefore, only analyses for 1984 through 1986 were conducted. This report discusses the strengths and weaknesses of the analytical methods used and makes recommendations for further analysis. Results presented should be considered preliminary since the methods developed by the work group to estimate stock composition have not yet been fully evaluated and alternative methods (e.g., non-linear models) are under development.

Stock composition for Southern Panel area fisheries for 1984 through 1986 has been estimated using two methods; 1) the production factor expansion (PFE) method; and 2) the linear programming (LP) method. Contributions to catches from each stock production area (single stock or aggregate of stocks within a geographic area represented by a single coded-wire-tag distribution) were estimated. Within each fishery, these contributions were aggregated by country of origin to provide the required stock composition estimates.

The PFE method involves expansion of CWT recoveries to account for total production from a given area. This generally involves using hatchery CWT groups to represent both the hatchery and wild production from a particular watershed or geographic area, although both hatchery and wild CWT groups were used for some production areas. Most U.S. production was accounted for in this way. Apart from hatchery releases, the Fraser River was the only Canadian production area for which a production factor could be calculated.

The LP method is a mathematical optimization approach that relies upon reported catch and CWT recoveries to estimate the contribution to catch of fish originating from a particular production area. These data are generally available and are not as subject to large error as other data such as escapements, which may be required for the PFE method.

Since true stock compositions are unknown, there is no way to determine the accuracy of the estimates produced by the two methods. Nevertheless, the LP method likely produces better available estimates of stock composition than the PFE method. The LP method requires fewer assumptions and much of the data necessary to compute Canadian production using the PFE method are unavailable. However, an evaluation of the LPM by Canada indicates that biases may potentially be introduced when stocks are not adequately represented by tags.

The following discussions for major coho fisheries of concern to the Southern Panel are based upon estimates produced by the LP method.

NWVI and SWVI Troll Fisheries

The estimated Canadian contribution to the NWVI troll fishery was highly variable and declining during the period 1984 to 1986 (54% to 26%). The U.S. contribution ranged from 36% to 62% for the same period. In the SWVI troll fishery, Canadian contributions were approximately one-half of those in the NWVI troll fishery (30% to 14%) and U.S. contributions ranged from 70% to 86%. The portion of the catch which was not attributed to either U.S. or Canadian stocks ranged from 0% to 13%.

Canadian Juan de Fuca Net Fishery

The stock composition of the Canadian Juan de Fuca net fishery (Area 20) catch of coho ranged from 16% to 22% Canadian and 69% to 83% U.S. The portion of the catch which was not attributed to either U.S. or Canadian stocks ranged from 1% to 11% for this fishery.

Georgia Strait Sport and Troll

The majority of the coho catch in these fisheries is of Canadian origin. The proportion of the troll catch comprised of Canadian stocks ranged from 68% to 88%. U.S. contributions ranged from 10% to 32%. The proportion of the sport catch comprised of Canadian stocks ranged from 73% to 77%, and the proportion of U.S. stocks ranged from 13% to 23%. The portion of the catch which was not attributed to either U.S. or Canadian stocks ranged from 0% to 14%.

U.S. Area 7 and 7A Net Fishery

The stock composition in these fisheries was highly variable. U.S. contributions ranged from 22% to 38% in Area 7A (Point Roberts) and 31% to 47% in Area 7 (San Juan Islands). Canadian contributions ranged from 22% to 53% in Area 7A and 22% to 47% in Area 7. A large portion of the catch was unassigned by both the PFE (18% to 45%) and the LP analyses (22% to 40%). This may be explained by low sampling rates in the Area 7A fishery and/or large amounts of production not represented by CWT groups (perhaps from the Fraser River) in both Areas 7 and 7A.

U.S. Juan de Fuca Sport/Troll and Net

The combined troll and sport catch in this area is estimated to be comprised of from 65% to 91% U.S. stocks and 5% to 9% Canadian stocks. The portion unassigned in the troll and sport fisheries ranged from 0% to 30%. For the Juan de Fuca net fishery, the catch is estimated to consist of 78% to 86% U.S. stocks and 14% to 20% Canadian stocks; virtually all the catch was accounted for. The composition for the Canadian Juan de Fuca net fishery was similar in all three years to estimates for the U.S. net fishery in the Strait, with the exception of the 1985 estimates of U.S. and unassigned percentages.

Other Puget Sound All Gear

Virtually no Canadian coho stocks were estimated in the catch by all gear types in other Puget Sound fisheries. With the exception of the 1986 Hood Canal fishery, nearly all the commercial catch by net fisheries was assigned. There are high rates of unassigned catch in the sport fisheries (as high as 100%). Small size of catches, low sampling rates, and low numbers of CWT recoveries (where voluntary returns and problems of catch estimation are known) may explain this result.

Recommendations:

- 1) Of the two approaches used in this report, the LP estimates of stock composition in Southern Panel area fisheries should be considered as the best technically supportable estimates available at this time.
- 2) Preliminary analytical work directed at evaluating the LP method and developing other estimation techniques has been conducted. Work on continuing that analysis for both LP and non-linear models should be supported and given a high priority.
- 3) Annual CWT releases which represent the distribution of all major stocks contributing to U.S. and Canadian boundary area fisheries are required if stock composition estimates are needed on a routine basis. In particular, increased annual tagging of Canadian stocks from the west coast of Vancouver Island, Juan de Fuca Strait, and southeast Vancouver Island is recommended.
- 4) Research programs designed to test the validity of the assumption that tagged hatchery coho adequately represent the catch distribution of wild stocks from the same geographic area should be undertaken. Wild tagging programs on the Salmon River in the lower Fraser, and on the Black, Trent, and French stocks on the east coast of Vancouver Island, and on Puget Sound and Washington coastal river systems will provide critical data over the next few years. Additional tagging programs may be required after further analysis.
- 5) Further research should be directed towards evaluating the accuracy and precision of CWT-based stock composition estimates using alternative stock identification methodologies.

- 6) We recommend a thorough review of the CWT tagging and tag recovery programs in Canada and the U.S., with emphasis on the quantification of error and bias.
- 7) We recommend that the stock composition working group of the CoTC continue efforts to develop improved methods for estimating stock composition.

D. JOINT NORTHERN BOUNDARY TECHNICAL COMMITTEE

No documents were published by this committee during the period covered in this report.

E. JOINT TRANSBOUNDARY TECHNICAL COMMITTEE

Joint Transboundary Technical Committee. Salmon Management Plan for the Stikine, Taku, and Alsek Rivers, 1989. TCTR (89)-1. April 1989.

Management of the transboundary Stikine, Taku, and Alsek rivers to achieve conservation and allocation objectives stipulated by the Pacific Salmon Treaty requires close cooperation between Canada and the United States. To assure each Party has a clear understanding of objectives and procedures used in managing relevant fisheries, this plan has been developed.

Organization of this report is by river and species. Within each section the pre-season forecast, spawning escapement goals, and management procedures are presented. For sockeye salmon stocks of the Stikine River, details of the stock assessment program are also presented.

The pre-season forecast for the Stikine River sockeye salmon return in 1989 is 80,850 fish. This is an average level return from which a total allowable catch of 20,850 fish could be shared by the two Parties. The escapement goal of 60,000 sockeye salmon has not been changed. In-season prediction of run size determined by the Stikine Management Model will be based on historical data from 1982 to 1988. The stock assessment program for the river is similar to last year although sampling programs have been reduced due to budget cuts within each Party.

There are no major changes to the management plans for coho salmon in the Stikine River or for any species in the Taku and Alsek rivers. It is expected that returns of sockeye and pink salmon to the Taku River will be above average, of coho and chum, about average, and chinook, below average. Returns of all species to the Alsek River are expected to be below average.

Joint Transboundary Technical Committee. Progress Report and Recommendations for Joint Canada/U.S. Sockeye Salmon Enhancement Projects in the Stikine and Taku River Drainages. TCTR (89)-2. May 1989

This report is a summary of studies undertaken to determine the feasibility of sockeye salmon enhancement projects proposed for the transboundary rivers. All projects discussed involve the collection of eggs from brood-stock sources in the transboundary river systems, incubation of the eggs at an Alaskan hatchery, and outplanting of resulting fry into lakes having underutilized rearing capacity. In the Taku system, outplanting is proposed for Trapper and Tatsamenie lakes; proposed sources of brood stock are Little Trapper and Little Tatsamenie lakes, respectively. In the Stikine system, it is proposed to outplant fry into Tuya Lake and/or Tahltan Lake, using Tahltan Lake as a source of brood stock for both.

Results of field activities conducted during 1988, relevant to the feasibility of the proposed projects, are presented. Tests of capture and holding of brood stock at the proposed brood-stock source lakes indicate it is feasible to collect the required number of eggs at each site, providing run strength is sufficient. Pathological surveys of the proposed brood stocks detected very high prevalences of both Infectious Hematopoietic Necrosis Virus (IHNV) and Bacterial Kidney Disease (BKD) in Tahltan Lake spawners, raising serious concerns regarding the outplanting of Tahltan origin fry into Tuya Lake. Results of limnology and juvenile fish

population surveys of Tuya and Tatsamenie lakes support earlier conclusions on their enhancement potential. Additional limnological and juvenile fish studies conducted during the summer and fall of 1988 are discussed. The Phase I construction of a central incubation facility (CIF) was completed at Port Snettisham, Alaska. Studies involving the mass-marking of sockeye fry by thermal banding of otoliths and delaying of fry emergence through coldwater incubation, to ensure fry do not emerge before ice has left the outplant sites, were undertaken at this facility using 1988 brood sockeye. Both techniques are essential to the projects as presently planned. Success of the otolith marking technique has been demonstrated. Delay of emergence also appears successful, although this cannot be stated conclusively until fry emerge in mid-June.

Enhancement projects were analyzed in detail, incorporating results of the field activities. Issues examined include procedures for evaluation, fisheries management requirements, technical feasibility, likelihood of success, schedules for implementation and production forecasts, and benefit/cost analyses.

Evaluation

Evaluation and fisheries management require a practical method of marking enhanced fish. The recommended technique of thermally induced banding of the otoliths is described in detail and reasons for its selection are given. Evaluation of outplanting success would require hydroacoustic and trawl sampling to provide estimates of population size and growth and survival of juveniles in freshwater, as well as information on possible early outmigration. Migrating smolts should be sampled to determine total freshwater growth, age composition, and the ratio of wild to enhanced production. Limnological surveys should be conducted to monitor changes in lake productivity. Survival to the adult stage should be evaluated through enumeration and sampling of both the fishery and escapement.

Fisheries Management

In the U.S. District 106 fishery, enhanced returns to the Stikine River would likely commingle with wild stocks. Management would be based on maintaining optimal yield from wild stocks; thus, an in-season method of distinguishing enhanced fish from wild fish would be required. This would also be required for monitoring compliance with any U.S./Canada sharing arrangements for enhanced returns. Fisheries targeting on enhanced returns would probably not be possible and harvest rates of from 2 to 35 percent could be expected. Fisheries targeting on a mix of enhanced Tuya Lake sockeye and Tahltan Lake sockeye in the U.S. District 108 fishery should be possible because of their early run timing; however, exploitation rates of enhanced Tuya fish could be limited to those appropriate for Tahltan Lake, unless this stock was also enhanced. Possible conservation problems with chinook, chum and pink stocks are discussed. Steelhead are unlikely to be affected because of their late run timing. Enhanced Taku stocks could be expected to commingle with wild sockeye stocks in the U.S. District 111 fishery; as in District 106, management would be based on maintaining optimum yield from wild stocks and an in-season method of identifying enhanced fish would be required. Harvest rates averaging about 30 percent (15%-40%) could be expected unless enhanced fish could be targeted. It would perhaps be feasible to target to some extent on Trapper Lake fish, but not on Tatsamenie Lake fish, based on the run timing of donor stocks.

In the Canadian lower Stikine River fishery it would probably be possible to target on an enhanced Tahltan sockeye run or on a mixture of wild Tahltan Lake sockeye and enhanced Tuya sockeye (using Tahltan fish as donor stock), because of their early run timing. However, enhancement of Tahltan Lake sockeye would likely be required to permit any increases in harvest rate. Chinook stocks could also be affected by the higher harvest rate and their enhancement should be considered. Harvest rates of steelhead are unlikely to be affected because of their late run timing. Expansion of Indian food fisheries and/or the commercial fishery located further up-river is discussed. On the Taku, there appears to be little opportunity for targeted fisheries in the lower river, because of expected overlaps in run timing with wild stocks. Since sockeye management would continue to be based on maintaining wild stocks,

7

it is unlikely that harvest rates on other species would be affected by the sockeye enhancement projects. The possibility of initiating new terminal fisheries on both systems, including weir fisheries at Tahltan, Little Trapper and Little Tatsamenie lakes, and some type of fishery in the vicinity of the Tuya River obstruction, is discussed.

Feasibility

The proposed enhancement activities appear to be technically feasible based on the results of studies to date and should have a high likelihood of success. Thermal banding of otoliths has been successfully tested and delay of emergence through low temperature incubation appears successful, subject to confirmation in mid-June. Retention of the otolith mark to the adult stage will still not have been demonstrated at that time; however, the use of an otolith mark is recommended based on results of studies elsewhere. If delay of emergence proves unsuccessful, an alternative strategy will have to be identified prior to implementation of the projects. This could alter decisions regarding feasibility, or delay implementation. Other unanswered issues affecting feasibility include that of introducing Tahltan Lake sockeye, with high prevalences of IHNV and BKD, into Tuya Lake and the possibility of gas pressure problems in fry during transport.

Schedule for Implementation

A schedule for implementation is recommended. In an Understanding reached during the Pacific Salmon Commission meeting at Portland, Oregon, in February, 1989, the Parties agreed to an egg-take of 3 to 6 million eggs at Tahltan Lake in 1989. The resulting fry would be planted into Tahltan Lake or distributed between Tahltan and Tuya lakes, dependent on the magnitude of the 1989 Tahltan Lake adult escapement. Enhancement operations on the Taku River are discussed, but under the agreement would not begin until 1990, unless hatchery space and funding issues are resolved in time to permit an egg-take of 2.4 million in 1989.

Benefit/Cost

A favourable, but preliminary, benefit/cost ratio of 1.56 to 1 was calculated based on 20-year production forecasts and cost schedules. Further analysis by economists from both countries, using transboundary fishery-specific information, is warranted.

Several areas requiring immediate action are identified. These include:

1. direction from the Northern Panel on whether joint enhancement should proceed or be delayed, if the strategy for delaying emergence of incubated fry to coincide with ice departure from target lakes does not work;
2. a decision from Alaska regarding availability of additional space in the Port Snettisham CIF in 1989 and a decision from Canada on whether funding is available to take advantage of such space;
3. the need for disease surveys of Tuya River system fish populations (in regard to introduction of disease carrying Tahltan sockeye);
4. a decision from Canada on whether outplants of Tahltan sockeye into Tuya Lake will be permitted;
5. approvals from transplant authorities in both countries;
6. completion of field tests to determine the possibility of gas pressure problems in fry during aerial transport to the outplant lakes; and
7. formation of a Work Group to examine issues surrounding harvest and cost sharing on the Taku River, as agreed to at the February, 1989 Portland meeting.

Areas identified as requiring further study, but not felt to be of sufficient importance to delay implementation of projects, are:

1. additional knowledge on the availability of spawning habitat in Tatsamenie, Tahltan, and Little Trapper lakes;
2. examination of the feasibility of capturing and marketing sockeye in non-traditional terminal areas;
3. more detailed examination of the productivity of Little Trapper Lake, in regard to its potential for lake enrichment;
4. studies to determine whether sockeye in Tatsamenie and Little Tatsamenie lakes represent two discrete stocks;
5. the feasibility of larger egg-takes and economy of scale (i.e. improved benefit/cost ratios at higher levels of production); and
6. intensified enhancement studies on Tuya Lake.

Joint Transboundary Technical Committee. Salmon Catches and Escapements to the Transboundary Rivers in 1988. TCTR (90)-1. March 1990.

Post-season estimates of the catches and escapements of Pacific salmon returning to the transboundary Stikine, Taku, and Alsek rivers for 1988 are presented and compared with historical patterns. Relevant information pertaining to the management of appropriate U.S. and Canadian fisheries is presented and the use of in-season management models is discussed.

The 1988 Stikine sockeye run was estimated at 45,100 fish, of which 19,700 were harvested in various fisheries and 25,400 escaped to spawn. The U.S. marine commercial and test fishery catches of Stikine sockeye salmon were 2,800 and 400 fish, respectively; the Canadian inriver commercial and Indian food fishery catches were 13,100 and 2,200 fish, respectively; and the inriver test fishery catch was 1,200 fish. The Stikine Management Model provided fishery managers weekly in-season harvest guidelines. The model correctly recommended reduced fishing times during the early part of the run when Tahltan stocks proved to be very low. The model also correctly predicted a higher run of non-Tahltan stocks than of Tahltan stocks, although the final prediction overestimated the non-Tahltan portion of the run. Both Parties stayed within their catch quotas as determined by the management model. Due to the low run size of the Tahltan stock (9,400 fish), the resulting spawning escapement to Tahltan Lake (2,500 fish) was far below the 20,000 to 30,000 goal range established by the Transboundary Technical Committee. The escapement of 22,800 non-Tahltan Stikine sockeye salmon fell within the established goal range.

The Canadian inriver Stikine chinook catch was 2,800 fish, approximately one-third more than the 1980 to 1987 average, with approximately 50% harvested in commercial fisheries and 50% harvested in the Indian food fishery. The U.S. marine catch in the District 106 and 108 mixed stock fisheries was 1,300 fish, similar to the 1980 to 1987 average catch. Chinook spawning escapements were excellent in the Stikine River in 1988, with a record count of 7,300 large adults through Little Tahltan weir and a record total inriver escapement estimate of 29,200 large fish.

The Stikine coho run was very poor in 1988. The U.S. marine harvest of Stikine River coho salmon is not known. The Canadian inriver coho catch was 2,100, fish, slightly more than 50% of the Treaty entitlement of 4,000 fish. Coho aerial survey escapement counts were well below average.

The Stikine River runs of pink and chum salmon are typically very small. In 1988, Canadian catches of these two species were 400 and 700 fish, respectively. This is well below the 1980 to 1987 average for pink salmon and slightly above average for chum salmon.

The 1988 total Taku sockeye run was estimated at 113,000 fish and included a catch of 38,900 and an escapement of 74,100 fish. The U.S. marine commercial sockeye catch was 26,000 fish and the Canadian inriver commercial, food fishery, and test fishery catches were 12,000, 250, and 700 fish, respectively. The Pacific Salmon Treaty defines harvest sharing of Taku River sockeye salmon as 18% of the total allowable catch to Canada and 82% to the U.S. Since the escapement goal set by the Transboundary Technical Committee is expressed as a range, 71,000 to 80,000 fish, the resulting total allowable catch is also determined as a range. In 1988, Canada took 29% to 37% and the U.S. took 62% to 79% of the total allowable catch. The estimated spawning escapement for Taku sockeye salmon fell within the desired escapement goal range.

The chinook catch in the Canadian commercial fishery on the Taku River was 700 fish, more than twice the 1980 to 1987 average. The catch in the U.S. District III mixed stock fishery was 1,800 chinook salmon, approximately 75% of the 1980 to 1987 average. Relatively strong chinook escapements were observed in spawning areas throughout the Canadian portion of Taku River drainage.

The Taku coho run was good in 1988. The U.S. harvest of coho salmon in the District III mixed stock fishery was 45,200 fish, well above the 1978 to 1987 average. The Canadian inriver coho catch was 3,100 salmon, close to the Treaty limit of 3,000 fish. The above-border run size through September 18 (end of tagging program) was estimated at 43,100 coho salmon, similar to the above-border run for a comparable time period in 1987.

The catches of chum and pink salmon in the U.S. District III fishery were 157,400 and 139,700 fish, respectively, slightly below the 1980 to 1987 average for pink salmon and nearly double the average for chum salmon. Canadian inriver catches included 1,000 pink and 700 chum salmon, well below the 1980 to 1987 averages for both species.

The sockeye run to the Alsek River was poor as indicated by low U.S. terminal and Canadian inriver catches and low escapement counts. The U.S. Dry Bay catch was 6,300 sockeye salmon, approximately one-third of the 1980 to 1987 average catch. The Canadian sport fishery catch of 300 fish and food fishery catch of 1,600 fish were approximately two-thirds the 1980 to 1987 averages. The count of sockeye salmon through Klukshu weir was a record low of 9,300. The chinook run to the Alsek River was also poor. The U.S. Dry Bay catch of 200 fish was less than 50% of the 1980 to 1987 average. The Canadian sport and food fishery catch of 300 chinook salmon was approximately two-thirds of the 1980 to 1987 average. However, the escapement into Klukshu Lake, 2,000 chinook salmon, was near the 1980 to 1987 average.

The coho run to the Alsek River was relatively strong in 1988. Although the U.S. Dry Bay coho catch of 5,000 fish was below the 1980 to 1987 average, the Canadian inriver sport catch of 200 fish was twice the 1980 to 1987 average. The record Klukshu weir count of 2,800 coho salmon represents a five-fold increase over the 1980 to 1987 average.

The U.S. Dry Bay pink and chum salmon catches of seven and 900 fish, respectively, were near the 1980 to 1987 averages. There are no recorded Canadian catches of pink or chum salmon in the Alsek River.

Joint Transboundary Technical Committee. Salmon Management Plan for the Stikine, Taku, and Alsek Rivers 1990. TCTR (90)-2. April 1990.

Management of the transboundary Stikine, Taku, and Alsek rivers to achieve conservation and allocation objectives stipulated by the Pacific Salmon Treaty requires close cooperation between Canada and the United States. To assure each Party has a clear understanding of objectives and procedures used in managing relevant fisheries this plan has been developed.

Organization of this report is by river system and species. Within each section the pre-season forecast, spawning escapement goal, and management procedures are presented. For sockeye salmon stocks of the Stikine River, details of the stock assessment program are also presented.

The pre-season forecast for the Stikine River sockeye salmon return in 1990 is 94,000 fish. This is an average level return from which a total allowable catch of 34,000 fish could be shared by the two Parties. The escapement goal of 60,000 sockeye salmon has not been changed. The in-season predictions of run size during the 1990 season, as determined by the Stikine Management Model, will be based on historical data from 1982 to 1989. The stock assessment program for the river is similar to last year although genetic stock identification sampling has been eliminated due to budget cuts.

There are no major changes to the management plans for other species of salmon in the Stikine River or for any salmon species in the Taku and Alsek rivers. Returns of coho salmon to the Stikine River are expected to be below average. It is expected that returns of sockeye and coho salmon to the Taku River will be average to above average; of chinook salmon, about average; and of pink and chum salmon, below average. Returns of chinook, coho, and early-run sockeye salmon to the Alsek River are expected to be below average. The return of late-run sockeye salmon is expected to be about average.

F. JOINT TECHNICAL COMMITTEE ON DATA SHARING

Joint Technical Committee on Data Sharing - Joint Working Group on Mark Recovery Databases. Information Content and Data Standards for a Coastwide Coded-Wire Tag Database. TCDS (89) - 1. July 12, 1989.

The Joint Committee attempted to address six terms of reference, including making recommendations regarding a preferred coded-wire tagging and management system to be adopted coast wide.

The Working Group on Mark/Recovery Databases recommends a coded-wire tag management data system as follows:

1. A single central exchange point is to be established for the U.S. The recommended implementation of this central exchange point is defined in Appendix 6.1 to this report.
2. A single central exchange point is to be established for Canada. The recommended implementation of this central exchange point is defined in Appendix 6.2 to this report.
3. The U.S. central exchange point acquires CWT data that originates in the U.S. Data must be of a form that can meet the specifications in Section 4 of this report.
4. The Canadian central exchange point acquires CWT data that originates in Canada. Data must be of a form that can meet the specifications in Section 4 of this report.
5. The central exchange points shall each house a single copy of the complete PSC Coded-Wire Tag Data set, which meets the specifications defined in Section 4 of this report and is recognized as the authoritative data set for PSC coded-wire tag analysis. They perform regular data management, update, documentation, and auditing processes to ensure all data submissions are accurately reflected in their copy of the PSC Coded-Wire Tag Data set. The central exchange points, during the process of revising their copies of the PSC Coded-Wire Tag Data set, communicate all changes between themselves in such a manner that both copies of the PSC Coded-Wire Tag Data set contain the same information. A suggested protocol for this process is contained in Appendix 6.3 to this report.
6. The U.S. central exchange point provides access to information contained in the PSC Coded-Wire Tag Data set in a manner that satisfies the needs of users within the U.S.
7. The Canadian central exchange point provides access to information contained in the PSC Coded-Wire Tag Data set in a manner that satisfies the needs of users within Canada.

The report also captures the status and information content of available databases containing release information for coded-wire tagging groups of fish through 1987.

Joint Technical Committee on Data Sharing. Activities of the Working Group on Mark-Recovery Statistics 1986 - 1988. TCDS (89)-2. July 26, 1989.

The Working Group was charged with summarizing different methods used to estimate recovery rates, total survival of tagged fish, and contribution to catches of untagged fish; develop confidence intervals for estimates; and identify efforts needed to achieve desired confidence levels. They were also to determine data requirements, method assumptions and sensitivity assumptions and variation in input data in addition to developing sampling procedures to improve precision and cost efficiency. The Working Group was to write a report to the Data Sharing Committee and identify factors limiting the value of coded-wire tag data for stock assessment.

This report provides a history of the Working Group, summarizes projects currently being worked on, and illustrates cooperative work with other PSC groups. As the task given the Working Group is rather daunting given current knowledge and development of statistics applicable to coded-wire tag studies, progress has been slow. Work has centered on specific case studies brought before the Group. Current studies involve bias in coded-wire tag returns to hatcheries, fallibilities in use of embedded replicate codes, variance estimates for compound distributions, comparing release and recovery rates of tagged fish, developing a computer simulation model for coded-wire tag estimation techniques, and calculating hatchery add-ons and risk adjustment factors.

G. JOINT INTERCEPTIONS COMMITTEE

Joint Interceptions Committee. Report on Progress in Resolving Differences in the Parties' Estimates of Salmon Interceptions. JIC (89)-1. December 22, 1989.

In February 1989 the Pacific Salmon Commission (PSC) instructed the Joint Interceptions Committee (JIC) to work through PSC technical committees in an attempt to resolve differences in 1980-1987 interception estimates, exchanged by the Parties in January 1989. Unresolved differences and technical reasons for these differences were to be documented and reported to the Research and Statistics Committee by December 1989. This report addresses this charge and summarizes the technical committees' recommendations for resolving outstanding differences.

JIC has prepared the following information from responses received from the joint technical committees:

1. Summaries of results of technical committee deliberations in four areas: (a) major changes to the Parties' interception estimates; (b) remaining differences in interception estimates and technical reasons for these differences; (c) work remaining to be done within the committees to attempt to resolve differences and anticipated time frames for completion; and (d) research recommendations to resolve or reduce differences in the future,
2. Tables summarizing the Parties' interception estimates and the differences between the Parties' estimates, by species and interception category, before and after work by the technical committees,
3. Figures depicting the magnitude of remaining differences in interception estimates and the degree to which technical committees were able to narrow these differences,
4. Appendix tables detailing the Parties' annual estimates of interceptions by species, fishing area and gear.

Success in reducing or narrowing differences in the Parties' interception estimates varied considerably amongst the committees. In the case of the Chinook Technical Committee, other priorities delayed completion of its work on interceptions.

Differences That Have Been Resolved

SOCKEYE: - B.C. catch of transboundary sockeye; B.C. interceptions of Washington sockeye; Washington interceptions of B.C. sockeye.

PINK: - B.C. catch of transboundary pinks; B.C. interceptions of Washington pinks; Washington interceptions of B.C. pinks.

CHUM: - B.C. catch of transboundary chum; B.C. interceptions of Washington chum; Washington interceptions of B.C. chum.

COHO: - B.C. catch of transboundary coho.

CHINOOK: - B.C. catch of transboundary chinook. Agreement has been reached within the Analytical Work Group of the Chinook Technical Committee to utilize stock composition estimates derived from the rebuilding model as the basis for estimating interceptions. As a result, differences in interception estimates for other categories, with the possible exception of Alaskan catch of chinook from Canadian sections of transboundary rivers, will be resolved in the near future.

Differences That Have Substantially Decreased

SOCKEYE: - B.C. interceptions of Alaska sockeye.

PINK: - Alaskan catch of pinks from Canadian sections of transboundary rivers.

CHUM: - Alaskan interceptions of B.C. chum.

COHO: - Alaskan catch of coho from Canadian sections of transboundary rivers.

Differences That Have Substantially Increased

SOCKEYE: - None.

PINK: - None.

CHUM: - B.C. interceptions of Alaskan chum.

COHO: - B.C. interceptions of Washington coho.

Substantial Remaining Differences

SOCKEYE: - Alaskan interceptions of B.C. sockeye; Alaskan catch of sockeye from Canadian sections of transboundary rivers.

PINK: - B.C. interceptions of Alaskan pinks; Alaskan interceptions of B.C. pinks; Alaskan catch of pinks from Canadian sections of transboundary rivers.

CHUM: - Alaskan catch of chum from Canadian sections of transboundary rivers; B.C. interceptions of Alaskan chum.

COHO: - B.C. interceptions of Washington coho; Alaskan interceptions of B.C. coho; Washington interceptions of B.C. coho.

Reasons for Remaining Differences

With the exception of chinook, the Parties have developed a common catch database. Consequently, remaining differences in interception estimates generally reflect differences in methodologies and circumstances where hard data are scarce. Detailed discussion of reasons for remaining differences is included in this document in summaries of reports by the technical committees.

Additional Work and Time Frame for Resolution of Differences

Detailed presentations of additional work and time frames for completion are contained in the technical committee summaries.

TRANSBOUNDARY TECHNICAL COMMITTEE: Additional work on narrowing differences for sockeye, pink, chum and coho would not be fruitful without further research. The Transboundary Technical Committee has agreed to discuss Alaskan catches of chinook from Canadian sections of transboundary rivers with the Chinook Technical Committee before making any changes in the original estimates.

NORTHERN BOUNDARY TECHNICAL COMMITTEE:

Sockeye:

Further discussion with PSC staff and the Fraser Technical Committee is required to decide on methodology and accounting procedures for southward migrating sockeye. Refinement of Canadian GSI-based estimates is required.

Pink:

Within the next year the Committee will attempt to develop an agreed-upon methodology for accounting for annual variations in run size.

Chum:

Additional work on narrowing differences would not be fruitful without further research.

CHINOOK TECHNICAL COMMITTEE: Creation of a common data base for catches, calibration of the chinook rebuilding model, development of interception estimates and preparation of a statement qualifying the use of the rebuilding model for generating stock composition estimates remain to be done. This work will not be completed before late spring 1990.

COHO TECHNICAL COMMITTEE: Technical exploration of the feasibility of developing a methodology to generate mutually agreed-upon estimates of interceptions for the northern boundary area is necessary. Some additional work is required to address concerns regarding potential bias in techniques used to produce preliminary estimates of stock composition in Southern Panel area fisheries. Once these concerns are addressed and coded-wire tag data become available, it is anticipated that joint interception estimates can be developed for at least 1984 through 1988. No time frame is indicated for Northern Boundary work. It is anticipated that further exploration of current stock composition estimation techniques for Southern Panel area fisheries will be complete by late spring 1990.

FRASER RIVER PANEL TECHNICAL COMMITTEE: Estimates of B.C. interceptions of Washington sockeye and pinks and Washington interceptions of B.C. sockeye and pinks were provided by PSC staff and approved by the Fraser River Panel Technical Committee. Estimates of pink salmon interceptions are preliminary and subject to change. Run reconstruction and GSI techniques must be reviewed. It is anticipated that estimates of pink interceptions will be updated well before the 1990/91 meeting cycle.

CHUM TECHNICAL COMMITTEE: Although interim agreement has been reached on B.C. interceptions of Washington chum and Washington interceptions of B.C. chum, the Committee will continue to review three aspects of the methodology employed: (a) GSI baselines and use of loci for stock identification; (b) time/area stratification for application of GSI-based stock composition estimates; and (c) quantification of bias correction methods for stocks which comprise a small proportion of the catch. It is anticipated that interception estimates will be reviewed and updated sometime during 1990.

Research Needs

Research recommendations for deliberation by the Research and Statistics Committee fell into four general areas. The most common need was to improve existing stock identification techniques and implement associated programs to collect the necessary data. Next came research to assist in interpretation of results of stock identification work and to assist in analysis of harvest distribution. Third came research to determine the magnitude of escapements and distribution of production for spawning populations. This was identified as a particular need for transboundary stocks. Finally, the Coho Technical Committee identified the need to develop analytical tools for bilateral estimation of stock composition. The research proposed by the committees will be of limited value in resolving interception differences for past years.

Publications of the Pacific Salmon Commission

PART VI

PUBLICATIONS OF THE

PACIFIC SALMON COMMISSION

Documents listed herein are available to domestic fishery agencies of Canada and the United States, research organizations, libraries, scientists and others interested in the activities of the Commission, through the offices of the Secretariat, 1155 Robson Street, Vancouver, B.C., V6E 1B5

A. ANNUAL REPORTS

1. Pacific Salmon Commission 1985/86 First Annual Report

This report provides a summary account of the Commission's first year of operation and contains a summary account of the first meetings of the Commission, and incorporates the full text of the Pacific Salmon Treaty including Annexes and Memoranda of Understanding.

2. Pacific Salmon Commission 1986/87 Second Annual Report

This report provides a summary account of the Commission's second year of operation and contains amendments to Annex IV which apply to the 1987 fishery regime.

3. Pacific Salmon Commission 1987/88 Third Annual Report

This report contains a summary account of the Commission's third year of operation and contains amendments to Annex IV which apply to the 1988 fishery regime.

4. Pacific Salmon Commission 1988/89 Fourth Annual Report

This report contains a summary account of the Commission's fourth year of operation and contains amendments to Annex IV which applied to the 1989 fishery regime.

B. REPORTS OF JOINT TECHNICAL COMMITTEES

i. Joint Chinook Technical Committee

1. TCCHINOOK (86)

Draft report of the Chinook Technical Committee to the Pacific Salmon Commission's Southern and Northern Panels. January 21, 1986.

2. TCCHINOOK (86)

Summary Report of the Chinook Technical Committee (1985)- Prepared for the March 1986 meetings of the Pacific Salmon Commission and Northern and Southern Panels. February 24, 1986.

3. TCCHINOOK (86)-1

Final 1985 Report of the Chinook Technical Committee. September 3, 1986.

4. TCCHINOOK (86)-2

Chinook Technical Committee Report - Preliminary Review of 1986 Fisheries. November 3, 1986.

5. TCCHINOOK (87)-1

Chinook Technical Committee Report - Preliminary Review of 1986 Fisheries. February 2, 1987. (An update of Report TCCHINOOK (86)-2 submitted November 1986).

6. TCCHINOOK (87)-2
Assessing Progress towards Rebuilding of Depressed Chinook Stocks. February 12, 1987.
7. TCCHINOOK (87)-3
Data Report of the Chinook Technical Committee on Unaccounted for Sources of Fishing Associated Mortalities of Chinook Salmon in Westcoast Salmon Fisheries. February 1, 1987.
8. TCCHINOOK (87)-4
Chinook Technical Committee Report - 1986 Summary Report. February 26, 1987. (Revised 2/28/87).
9. TCCHINOOK (87)-5
Chinook Technical Committee Report to the November 1987 Meeting of the Pacific Salmon Commission. October 23, 1987.
10. TCCHINOOK (88)-1
Chinook Technical Committee Report - Summary of a Seminar on Genetic Stock Identification (GSI) of Chinook Salmon: Status Needs and Future. August 1988.
11. TCCHINOOK (88)-2
Chinook Technical Committee Report - 1987 Annual Report. October 31, 1988.
12. TCCHINOOK (88)-2 - Appendix 1
Assessment of Escapements through 1987 - A Report of the Rebuilding Assessment Work Group of the Chinook Technical Committee. October 31, 1988.
13. TCCHINOOK (88)-2 - Appendix 2
Exploitation Rate Analysis - A report of the Analytical Work Group of the Chinook Technical Committee. October 7, 1988.
14. TCCHINOOK (89)-1
Joint Chinook Technical Committee 1988 Annual Report. November 10, 1989.
15. TCCHINOOK (90)-1
Chinook Technical Committee Report on Preliminary 1989 Catch and Escapement. February 7, 1990.

ii. Joint Chum Technical Committee

1. TCCHUM (87)-1
Chum Technical Committee Report - Summary Report of Southern British Columbia and Washington Chum Salmon Data for the years prior to 1985. February 1987.
2. TCCHUM (87)-2
Chum Technical Committee Report - Working Paper on Genetic Stock Identification Methods for Southern Chum Salmon. February 1987.
3. TCCHUM (87)-3
Chum Technical Committee Report - Research Needs on Southern British Columbia and Washington State Chum. February 1987.

4. TCCHUM (87)-4
Final 1985 Post Season Summary Report. August 1987.
5. TCCHUM (87)-5
Final 1986 Post Season Summary Report. November 1987.
6. TCCHUM (88)-1
Historical Canadian and United States Chum Salmon Data Report for the Years Prior to 1985. January 1988.
7. TCCHUM (88)-2
Progress Report on Genetic Stock Identification of Chum Salmon in Southern British Columbia and Washington. February 14, 1988.
8. TCCHUM (88)-3
Summary Report on the Current and Future Management and Enhancement Intentions of the United States and Canada for Southern Chum Salmon. February 1988.
9. TCCHUM (88)-4
Final 1987 Post Season Summary Report. November 1988
10. TCCHUM (89)-1
1988 Progress Report on Genetic Stock Identification of Chum Salmon in Southern British Columbia and Washington. February 1989.
11. TCCHUM (90)-1
Final 1988 Post Season Summary Report. January 1990.

iii. Joint Coho Technical Committee

1. TCCOHO (86)-1
Coho Technical Committee Report on 1985 Fisheries. Responses to Questions posed by the Southern Panel March 2, 1986. June 20, 1986.
2. TCCOHO (87)-1
Report of the Joint Coho Technical Committee -Response from Southern Panel Questions. February 7, 1987.
3. TCCOHO (87)-2
Coho Technical Committee Report - Responses to a Request from the Northern Panel for Information on Stock Composition of Coho Harvested in Northern British Columbia and Southeast Alaska. February 1987.
4. TCCOHO (87)-3
Coho Technical Committee Report - Impacts of Swifsure Bank Closure and incidental coho catch estimates for 1987 - Canadian Area 20 and U.S. Areas 7/7A. June 1, 1987.
5. TCCOHO (87)-4
Report of the Coho Technical Committee to the Southern Panel. November 1987.
6. TCCOHO (88)-1
Snapshot of 1988 Coho Fisheries. November 1988.

7. TCCOHO (89)-1
Report to the Southern Panel on Coho Stock Composition Estimates in the Southern Panel Area. September 29, 1989.

iv. Joint Northern Boundary Technical Committee

1. TCNB (86)
Report of the Canada/United States Northern Boundary Technical Committee. January 8, 1986.
2. TCNB (86)-1
Northern Boundary Technical Committee Report - Joint United States/Canada Salmon Research, Northern Boundary Area Adult Tagging Report, 1982 to 1985. November 1986.
3. TCNB (86)-2
Northern Boundary Technical Committee Report - Steelhead Report. November 1986.
4. TCNB (86)-3
Northern Boundary Technical Committee Report - Assessment of an Apparent Weakness in the Early Portion of the Nass River Sockeye Salmon Run. November 1986.
5. TCNB (87)-1
Northern Boundary Technical Committee Report - U.S./Canada Northern Boundary Area 1986 Salmon Fisheries Management Report and 1987 Preliminary Expectations. January 1987.
6. TCNB (87)-2
Northern Boundary Technical Committee Report - Status of Chum Stocks in the Northern Boundary Areas. February 1987.
7. TCNB (87)-3

Northern Boundary Technical Committee Report - U.S./Canada Northern Boundary Area 1987 Salmon Fisheries Management Report and 1988 Preliminary Expectations. November 1987.
8. TCNB (89)-1
U.S./Canada Northern Boundary Area 1988 Salmon Fisheries Management Report and 1989 Preliminary Expectations. January 1989.

v. Joint Transboundary Technical Committee

1. TCTR (86)
Report of the Canada/United States Transboundary Technical Committee. Final Report. February 5, 1986.
2. TCTR (87)-1
Report of the Transboundary Technical Committee. February 8, 1987. Appendix 1. Spawning stock size of Stikine River sockeye salmon 1986. May 1987.
3. TCTR (87)-2
Report of the Transboundary Technical Committee. Stikine River Sockeye Salmon Management Plan 1987. April 1987.

4. TCTR (87)-3
Report of the Transboundary Technical Committee. Enhancement Opportunities for the Transboundary Rivers. April 28-30, 1987.
 5. TCTR (87)-4
Report of the Transboundary Technical Committee. Taku River Sockeye Salmon Management Plan 1987. April 27 - May 1, 1987.
 6. TCTR (87)-5
Preliminary 1987 Salmon Catches and Escapements to the Transboundary Rivers. November 13, 1987.
 7. TCTR (88)-1
Sockeye Salmon Enhancement Feasibility Studies in the Transboundary Rivers. February 1988.
 8. TCTR (88)-2
Salmon Management Plan for the Transboundary Rivers 1988. May 1988.
 9. TCTR (88)-3
Salmon Catches and Escapements to the Transboundary Rivers in 1987. November 1988.
 10. TCTR (89)-1
Salmon Management Plan for the Stikine, Taku, and Alsek Rivers, 1989. April 1989.
 11. TCTR (89)-2
Progress Report and Recommendations for Joint Canada/U.S. Sockeye Salmon Enhancement Projects in the Stikine and Taku River Drainages. May 1989.
 12. TCTR (90)-1
Salmon Catches and Escapements to the Transboundary Rivers in 1988. March 1990.
 13. TCTR (90)-2
Salmon Management Plan for the Stikine, Taku, and Alsek Rivers, 1990. April 1990.
- vi. **Joint Transboundary and Northern Boundary Technical Committees**
1. TCNB/TR (87)-1
Report of the Northern Boundary and Transboundary Technical Committees - Stock Identification of Sockeye Salmon Using Biological Markers. February 1987.
- vii. **Joint Technical Committee on Data Sharing**
1. TCDS (88)-1
Report of the Data Sharing Committee to the Standing Committee on Research and Statistics. February 12, 1988.
 2. TCDS (88)-2
Report of the Data Sharing Committee to the Standing Committee on Research and Statistics concerning the Technical Feasibility of Establishing Coastwide Salmon Catch and Escapement Databases. June 1988.

3. TCDS (89)-1
Information Content and Data Standards for a Coastwide Coded-Wire Tag Database. July 12, 1989.
4. TCDS (89)-2
Activities of the Working Group on Mark-Recovery Statistics 1986-1988. July 26, 1989.

viii. Joint Interceptions Committee

1. JIC (89)
Request to Joint Technical Committees for Assistance in Resolving Differences in the Parties' Estimates of Salmon Interceptions. May 1989.
2. JIC (89)-1
Report on Progress in Resolving Differences in the Parties' Estimates of Salmon Interceptions. December 22, 1989.

C. REPORTS OF THE FRASER RIVER PANEL

1. *Report of the Fraser River Panel to the Pacific Salmon Commission on the 1986 Fraser River Sockeye Salmon fishing season.* P.S.C. Staff. November 1986.
2. *Report of the Fraser River Panel to the Pacific Salmon Commission on the 1987 Fraser River Sockeye and Pink Salmon Fishing Season.* P.S.C. Staff. February 1988.
3. *Report of the Fraser River Panel to the Pacific Salmon Commission on the 1988 Fraser River Sockeye Salmon Fishing Season.* P.S.C. Staff. May 1989.
4. *Report of the Fraser River Panel to the Pacific Salmon Commission on the 1989 Fraser River Sockeye and Pink Salmon Fishing Season.* P.S.C. Staff. May 1990.

D. TECHNICAL REPORT SERIES OF THE PACIFIC SALMON COMMISSION

1. *Technical Information Requirements for Effective Implementation of the Canada-United States Treaty concerning Pacific Salmon.* Prepared for the Pacific Salmon Commission: Natural Resources Consultants, Seattle, Washington, October 1986.

E. PUBLICATIONS BY PACIFIC SALMON COMMISSION SECRETARIAT STAFF

1. Cook, R.C., and I. Guthrie. 1987. *In-season stock identification using scale pattern recognition.* In: H.D. Smith, L. Margolis, and C.C. Wood (ed). *Sockeye Salmon (*Oncorhynchus nerka*) Population Biology and Future Management.* Can. Spec. Publ. Fish. Aquat. Sci. 96.
2. Woodey, J.C. 1987. *In-season management of Fraser River sockeye salmon (*Oncorhynchus nerka*): meeting multiple objectives.* In: H.D. Smith, L. Margolis, and C.C. Wood (ed). *Sockeye Salmon (*Oncorhynchus nerka*) Population Biology and Future Management.* Can. Spec. Publ. Fish. Aquat. Sci. 96, pp 367-374.

3. Guthrie, I.C., and R.M. Peterman. 1988. *Economic evaluation of lake enrichment strategies for British Columbia sockeye salmon*. North American Journal Fish Management. V8,4. Fall 1988.
4. Todd, I. and T.C. Jensen. 1988. *Assessment of the Pacific Salmon Commissions' first three years: disappointment and frustration - but optimism for the future*. Anadromous Fish Law Memo. Lewis and Clark Law School. December 1988.
5. Jensen, T.C. 1988. *New International Policy for North Pacific Salmon*. Pacific Northwest Admiralty Law Inst. Proc. Ch. IV. 1988.

F. REPORTS OF THE INTERNATIONAL PACIFIC SALMON FISHERIES COMMISSION

Responsibility for maintenance of the library of the International Pacific Salmon Fisheries Commission, on its termination December 31, 1985, was transferred to the Pacific Salmon Commission. Work in progress by the IPSFC at that date continues to be published as annual reports, progress reports, and bulletins of the IPSFC. Publications since December 31, 1985 are:

1. *Annual Report of the International Pacific Salmon Fisheries Commission for 1985*. New Westminster, B.C. 1986. This is the final report of this series which was initiated in 1937.
2. Williams I.V. et al. 1989. *Studies of the Lacustrine Biology of the Sockeye Salmon (O. Nerka) in the Shuswap System*. IPSFC Bull. XXIV. New Westminster, B.C.
3. Fretwell, M.R. 1989. *Homing Behavior of Adult Sockeye Salmon in Response to a Hydroelectric Diversion of Homesteam Waters at Seton Creek*. IPSFC Bull. XXV. Vancouver, B.C.
4. Gilhousen P. 1989. *Wounds, Scars and Marks on Fraser River Sockeye Salmon with Some Relationships to Predation Losses*. IPSFC Prog. Rept. No. 42. Vancouver, B.C.

Two other reports are currently in progress, as is the History of the IPSFC which will be published in book form. Completion of these three documents, expected within the next year, will end the publication series of the International Pacific Salmon Fisheries Commission.

G. DOCUMENTS SUBMITTED BY DOMESTIC AGENCIES AND THE PARTIES

The Following documents have been submitted to the Commission by domestic agencies of the two countries. Individuals or groups who wish to obtain copies of these documents should do so by contacting the issuing agency.

i. To the Joint Chinook Technical Committee

1. *Preliminary Report on 1985 Southeast Alaska Chinook Salmon Catch and Escapement*. Prepared by Southeast Region, Fisheries Divisions Staff, Alaska Department of Fish and Game. January 31, 1986. (Appendix 1 to TCCHINOOK (86)-1).
2. *Observations on Chinook Salmon Non-Retention in the 1985 Southeast Alaska Purse Seine Fishery*. Prepared by B. Van Alen and M. Seibel, Alaska Department of Fish and Game. June 1986. (Appendix 2 to TCCHINOOK (86)-1).

3. *Observations on Chinook Salmon Hook and Release in the 1985 Southeast Alaska Troll Fishery*. Prepared by A. Davis, J. Kelley and M. Seibel, Alaska Department of Fish and Game. June 1986. (Appendix 3 to TCCHINOOK (86)-1).
4. *Data Report on Unaccounted for Sources of Fishing Associated Mortalities of Chinook Salmon in B.C. Fisheries (1977-1986)*. Prepared by the Canadian members of the Chinook Technical Committee. January 1987.
5. *State of Washington Department of Fisheries - Progress Report No. 251. 1976 to 1985 Puget Sound Chinook (*Oncorhynchus tshawytscha*) Net Catch with Regard to Pacific Salmon Treaty Obligations*. Prepared by Steven L. Shepard, Fish Biologist, Planning, Research and Harvest Management Program. January 1987.
6. *Preliminary Review of 1986 Chinook Salmon Hatchery Addon for Southeast Alaska Fisheries and Projected Addon for 1987*. Prepared by Southeast Region Staff, Fisheries Divisions, Alaska Department of Fish and Game. January 12, 1987. Revised May 18, 1987.
7. *Summary of Chinook Escapement and Harvest Rate Indicator Stocks for the Oregon Coast (Excluding Columbia River)*. Prepared by R. Kaiser and S. Jacobs, Oregon Department of Fish and Wildlife. January 13, 1987.
8. *Observation on Chinook Salmon Non-Retention in the 1986 Southeast Alaska Purse Seine Fishery*. Prepared By B. Van Alen and M. Seibel, Alaska Department of Fish and Game. February 1987.
9. *Associated Fishing Induced Mortalities of Chinook Salmon in Southeast Alaska*. Prepared by Alaska Department of Fish and Game and National Marine Fisheries Service, Auke Bay Laboratory. February 1987.
10. *Georgia Strait Chinook Stock Composition: A GSI Simulation Analysis*. Prepared By National Marine Fisheries Service, Genetics Unit, Manchester, Washington and Washington Department of Fisheries, Resource Assessment and Development Unit, Olympia, Washington. February 1987.
11. *Mortality Rates of Sublegal and Legal Sized Chinook Salmon Associated with Incidental Catch during Chinook-Only Troll Closures*. Prepared by Alex Wertheimer, National Marine Fisheries Service, Auke Bay, Alaska. February 4, 1987.
12. *Southeast Alaska Regional Summary - Identification of Indicator Stocks and Assessment of Rebuilding of Natural Chinook Salmon Stocks* (Appendix to TCCHINOOK (87)-2). Prepared by Alaska Department of Fish and Game. February 5, 1987. Updated May 22, 1987.
13. *Regional Summary for Columbia River Chinook Indicator Stocks* (Appendix to TCCHINOOK (87)-2). Prepared by Columbia River Inter-Tribal Fish Commission. February 6, 1987.
14. *Washington Chinook Fishery Stock Composition Estimates - Results from Genetic Stock Identification Studies in Selected Washington State Fisheries*. Prepared by the U.S. Section of the Chinook Technical Committee. February 8, 1987.
15. *History of Chinook and Coho Salmon Catch in Washington State Fisheries Operating in Puget Sound and Juan de Fuca Strait*. Prepared by the Washington State Department of Fisheries. February 8, 1987.

16. *Summary of Chinook Escapement and Harvest Rate Indicator Stock For Puget Sound and the Washington Coast.* Prepared by the Northwest Indian Fisheries Commission and the Washington Department of Fisheries with assistance from Dr. Gary Morishima and Dr. Kenneth Henry. February 9, 1987. (Appendix to TCCHINOOK (87)-2).
17. *Evaluation of Chinook Pass-Through and Evaluation of Associated harvests in Washington-Oregon Fisheries without PSC harvest ceilings.* Prepared by the Washington Department of Fisheries, the Columbia River Inter-Tribal Fish Commission, the U.S. Fish and Wildlife Service, the National Marine Fisheries Service and the Northwest Indian Fisheries Commission. February 11, 1987.
18. *Review of Natural Chinook Salmon Escapement Trends in Transboundary Rivers of Northern British Columbia and Southeast Alaska.* Prepared by Canada Department of Fisheries and Oceans and Alaska Department of Fish and Game. February 12, 1987.
19. *Historical Catch of Chinook Salmon in Juan de Fuca Strait and the Strait of Georgia (1953-1986) and Associated Information on Stock Composition of the Catch.* Prepared by B. Riddell. February 18, 1987.
20. *Supplement to the Canadian Report on Unaccounted for Sources of Fishing Associated Mortalities: Pass-Through Related Information* Prepared by the Canadian members of the Chinook Technical Committee. February 19, 1987.
21. *Observations on Chinook Salmon Hook and Release in the 1986 Southeast Alaska Troll Fishery:* Prepared by A. Davis, J. Kelly and M. Seibel, Southeast Region, Division of Commercial Fisheries, Alaska Department of Fish and Game, Douglas, A.K (February 19, 1987). Updated and retitled version June 1987.
22. *Preliminary Review of 1987 Alaska Hatchery Addon of Chinook Salmon for Southeast Alaska Fisheries and Projected 1988 Hatchery Addon.* Prepared by Regional Staff, Southeast Fisheries Division, Alaska Department of Fish and Game, Juneau, Alaska. December 18, 1987.
23. *Preliminary Review of 1988 Alaska Hatchery Addon of Chinook Salmon for Southeast Alaska Fisheries and Projected 1989 Hatchery Addon.* Prepared by Alaska Department of Fish and Game, Douglas, Alaska. November 22, 1988.

ii. To the Joint Chum Technical Committee

1. *Washington/Oregon Chum Salmon Management and Stock Assessment for years prior to 1985.* Prepared by the United States section of the Joint Chum Salmon Technical Committee. February 1987.
2. *Preliminary Review of 1987 Washington Chum Fisheries in the Strait of Juan de Fuca, San Juan Islands and Southern Georgia Strait (Point Roberts).* November 1987.

iii. To the Joint Coho Technical Committee

1. *Information on Coho Salmon Stocks and Fisheries of Southeast Alaska.* Prepared by Southeast Region, Fisheries Division Staff, Alaska Department of Fish and Game. Juneau, AK. January 1986. (Appendix 2 to TCCOHO(86)-1).

2. *History of Chinook and Coho Salmon Catch in Washington State Fisheries Operating in Puget Sound and Juan de Fuca Strait.* Prepared by the Washington State Department of Fisheries. February 8, 1987.
3. *Canadian Agency Report on Coho Salmon.* Prepared by the Canadian Section of the Coho Technical Committee. (Appendix 1 to TCCOHO (86)-1). June 16, 1987.
4. *Post-Season Report for 1985 U.S. Coho Fisheries from Cape Falcon, Oregon to the Washington/Canadian Border and Coho Stock Status Expectations.* June 20, 1986.

iv. To the Joint Northern Boundary Technical Committee

1. *In-season Management Rationale - Tree Point Gillnet Fishery 1986.* February 1987.
2. *Summary of the 1986 Salmon Net Fishery in Area 3, British Columbia.* February 1987.
3. *Contribution of Alaskan, Canadian, and Transboundary Sockeye Stocks to Catches from Southeast Alaska Districts 101-108, 1986, based on Analysis of Scale Patterns.* Prepared by Glen T. Oliver, Kathleen A. Jensen, Iris S. Frank and Norma Jean Sands. Division of Commercial Fisheries, Alaska Department of Fish and Game, Douglas, Alaska. September 1987

v. To the Joint Transboundary Technical Committee

1. *Management Strategies of the Canadian Commercial Fishery on the Stikine River in 1986.* Prepared by S. Johnston, Department of Fisheries and Oceans, Whitehorse, Y.T. February 8, 1987.
2. *1986 In-season Management Rationale and Post-Season Summary of the Alaskan Drift Gillnet Sockeye Fishery in District 6 and District 8.* Prepared by Alaska Department of Fish and Game. February 11, 1987.
3. *Contribution of Principal Sockeye Salmon Stock Groups to Catches from Southeast Alaska's Districts 106 and 108 and Canada's Stikine River Fisheries, 1986.* Prepared by Kathleen A. Jensen, Glen T. Oliver and Iris Frank. Alaska Department of Fish and Game. August 1987.
4. *Separation of Principal Taku River and Port Snettisham Sockeye Salmon (*Oncorhynchus nerka*) Stocks in Southeastern Alaska and Canadian Fisheries of 1986 based on Scale Pattern Analysis.* Prepared by Andrew J. McGregor and Susan L. Walls. Alaska Department of Fish and Game. Technical Data Report No. 213. August 1987.
5. *Migratory Timing and Escapement of Taku River Salmon Stocks in 1986.* Prepared by Andrew J. McGregor and J.E. Clark. Alaska Department of Fish and Game. September 1987.
6. *Data and Programs for the Transboundary Stikine, Taku, and Alsek Rivers Needed to Implement the Pacific Salmon Treaty.* Regional Informational Report. 1189-09. Prepared by the Division of Commercial Fisheries, Alaska Department of Fish and Game. Juneau, Alaska. April 1989.

- vi. To the Joint Transboundary and Northern Boundary Technical Committees**
1. *Preliminary Report of Fishery Performance in the Northern Boundary and Transboundary Areas 1987.* Prepared by Commercial Fisheries Divisions, Alaska Department of Fish and Game. November 1987.
- vii. To the Joint Interceptions Committee**
1. *Pacific Salmon Interceptions 1980 to 1987 - Canadian Estimates. Data and Methods in Support of Canadian Interception Estimates Exchanged with the United States on January 20, 1989.* Prepared by the Canadian Section of the Joint Interceptions Committee. May 1989.
 2. *Documentation for U.S. Interception Estimates.* Prepared by United States Section of the Joint Interceptions Committee. May 1989.
- viii. To the Commission by Canada**
1. *A summary of the Salmonid Enhancement Program in British Columbia and the Yukon Territory.* Prepared by Canada Department of Fisheries and Oceans. November 14, 1986.
 2. *Canadian catches in 1986 and Pre-Season Expectations for 1987.*
 - a) *Fraser River, Northern B.C. and Yukon Division Summary Review of 1986 Salmon Fisheries and Returns.*
 - b) *Preliminary Review of the 1986 Fisheries and Prospects for 1987.* South Coast Division.
 - c) *Canadian Report of 1986 Salmon Fisheries of Northern British Columbia Including Preliminary Expectations and Fishing Plans for 1987.* Prepared by Canada Department of Fisheries and Oceans. November 1987.
 3. *Canadian Report of the 1987 Salmon Fisheries of Northern British Columbia.* Prepared by Canada Department of Fisheries and Oceans. November 1987.
 4. *1988 Post-Season Report for Canadian Treaty Limit Fisheries.* Canada Department of Fisheries and Oceans. November 1988.
 5. *1989 Post-Season Report for Canadian Treaty Limit Fisheries.* Canada Department of Fisheries and Oceans. November 30, 1989.
 6. *1989 Update Report for the Salmonid Enhancement Program in British Columbia.* Canada Department of Fisheries and Oceans. January 31, 1990.
- ix. To the Commission by the United States**
1. *1986 Post-Season and 1987 Pre-Season Fishery Report.* Prepared by U.S. Section, Pacific Salmon Commission Coho, Chinook, Chum, Northern Boundary and Transboundary Technical Committees in Cooperation with State, Federal, and Tribal Fishery Management Agencies. November 1986.
 2. *Enhancement Report of the United States Section, Pacific Salmon Commission.* Prepared by U.S. Section, Pacific Salmon Commission Coho, Chinook, Chum, Northern Boundary and Transboundary Technical Committees in cooperation with State, Federal, and Tribal Fishery Management Agencies.

3. *Preliminary 1988 Post-Season Report for the United States Salmon Fisheries of relevance to the Pacific Salmon Treaty.* Prepared by U.S. Section. November 1988.
4. *Review of the 1988 Ocean Salmon Fisheries.* Prepared by Pacific Fishery Management Council. Portland, Oregon. February 1989.
5. *Preseason Report I. Stock Abundance Analysis for 1989 Ocean Salmon Fisheries.* Prepared by the Salmon Technical Team. Pacific Fishery Management Council, Portland, Oregon. February 1989.
6. *Preseason Report II. Analysis of Proposed Regulatory Options for 1989 Ocean Salmon Fisheries.* Prepared by the Salmon Technical Team. Pacific Fishery Management Council, Portland, Oregon. March 1989.
7. *Preliminary 1989 Post-Season Report for United States Salmon Fisheries of Relevance to the Pacific Salmon Treaty.* United States Section. November 1989.
8. *Annual Report on the Salmonid Enhancement Activities of the United States in the Areas of the Pacific Salmon Treaty 1990.* United States Section. January 31, 1990.

Report of the Auditors for 1989/90

PART VII
AUDITORS' REPORT AND FINANCIAL STATEMENTS FOR THE
PERIOD APRIL 1, 1989 TO MARCH 31, 1990

AUDITORS' REPORT TO THE COMMISSIONERS

We have examined the balance sheet of Pacific Salmon Commission as at March 31, 1990 and the statements of income and divisional equity and changes in financial position for the year then ended. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests and other procedures as we considered necessary in the circumstances.

In our opinion, these financial statements present fairly the financial position of the Commission as at March 31, 1990 and the results of its operations and the changes in its financial position for the year ended in accordance with the Financial Regulations of the Commission applied on a basis consistent with that of the preceding year.

Leat Marwick Thorne

Chartered Accountants

New Westminster, Canada
May 15, 1990

PACIFIC SALMON COMMISSION
Balance Sheet
March 31, 1990
(With comparative figures for 1989)

	1990	1989
Assets		
General Fund		
Current assets		
Cash and term deposits	\$ 482,457	\$ 701,791
Accounts receivable		
Travel advances	1,751	300
Other	346	22,331
Interest receivable	18,374	8,957
Prepaid expenses	39,580	38,621
Prepaid pension contributions	-	30,947
	\$ 542,508	\$ 802,947
Working Capital Fund		
Term deposit	\$ 96,483	100,000
Fixed Asset Fund		
Fixed assets (note 1)	\$ 391,785	\$ 556,488
International Pacific Salmon Fisheries Commission Fund		
Cash and term deposits	\$ 155,973	\$ 194,947

See accompanying notes to financial statements.

PACIFIC SALMON COMMISSION
Balance Sheet
March 31, 1990
(With comparative figures for 1989)

	1990	1989
Liabilities and Fund Balances		
General Fund		
Current liabilities		
Accounts payable and accrued liabilities	\$ 70,386	\$ 54,717
Deferred revenue	-	77,601
Fund balance (note 2)		
Reserves	472,122	670,629
	\$ 542,508	\$ 802,947
Working Capital Fund		
Fund balance	\$ 96,483	\$ 100,000
Fixed Asset Fund		
Fund balance	\$ 391,785	\$ 556,488
International Pacific Salmon Fisheries Commission Fund		
Fund balance	\$ 155,973	\$ 194,947

On behalf of the Commission

 Chair, Standing Committee on Finance and Administration

 Vice-Chair, Standing Committee on Finance and Administration

See accompanying notes to financial statements.

PACIFIC SALMON COMMISSION
General Fund
Statement of Revenue and Expenditures
For the year ended March 31, 1990
(With comparative figures for 1989)

	1990	1989
Revenue		
Contributions from contracting parties	\$ 1,430,000	\$ 1,430,000
Return of unappropriated funds	-	155,202
	<u>1,430,000</u>	<u>1,274,798</u>
Gain on sale of fixed assets	2,413	7,709
Interest	123,999	122,657
Test fishing	927,434	1,320,635
	<u>2,483,846</u>	<u>2,725,799</u>
Expenditures		
Salaries and employee benefits	1,271,219	1,069,950
Travel and transportation	90,641	107,466
Rents and communication	95,334	95,999
Printing and reproductions	23,283	45,413
Contract services	325,513	199,692
Materials and supplies	47,956	40,498
Test fishing	781,661	918,644
Total expenditures	<u>2,635,607</u>	<u>2,477,662</u>
Excess (deficiency) of revenue over expenditures	<u>(151,761)</u>	<u>248,137</u>
	<u>\$ 2,483,846</u>	<u>\$ 2,725,799</u>

See accompanying notes to financial statements.

PACIFIC SALMON COMMISSION
Working Capital Fund
Statement of Revenue and Expenditures
For the year ended March 31, 1990
(With comparative figures for 1989)

	1990	1989
Revenue		
Interest	\$ 10,762	\$ 8,052
Expenditures		
Meeting expenses	-	908
Program costs	14,279	-
Excess (deficiency) of revenue over expenditures	\$ (3,517)	\$ 7,144

See accompanying notes to financial statements.

PACIFIC SALMON COMMISSION
International Pacific Salmon Fisheries Commission Fund
Statement of Revenue and Expenditures
For the year ended March 31, 1990
(With comparative figures for 1989)

	1990	1989
Revenue		
Interest earned on term deposit	\$ 19,986	\$ -
Expenditures		
Publications	58,960	33,135
Excess of expenditures over revenue	\$ 38,974	\$ 33,135

See accompanying notes to financial statements.

PACIFIC SALMON COMMISSION
Statement of Fund Balances
For the year ended March 31, 1990
(With comparative figures for 1989)

	1990	1989
General Fund		
Fund balance, beginning of year	\$ 670,629	\$ 580,182
Transfer (to) from funds		
Fixed Asset Fund	(46,746)	(164,834)
Working Capital Fund	-	7,144
Excess (deficiency) of revenue over expenditures	(151,761)	248,137
Fund balance, end of year	\$ 472,122	670,629
Working Capital Fund		
Fund balance, beginning of year	\$ 100,000	\$ 100,000
Transfer to General Fund	-	(7,144)
Excess (deficiency) of revenue over expenditures	(3,517)	7,144
Fund balance, end of year	\$ 96,483	\$ 100,000
Fixed Asset Fund		
Fund balance, beginning of year	\$ 556,488	\$ 665,520
Transfer from General Fund	46,746	164,834
Depreciation	(211,449)	(273,866)
Fund balance, end of year	\$ 391,785	\$ 556,488
International Pacific Salmon Fisheries Commission Fund		
Fund balance, beginning of year	\$ 194,947	\$ 228,082
Excess of expenditures over revenue	38,974	33,135
Fund balance, end of year	\$ 155,973	\$ 194,947

See accompanying notes to financial statements.

PACIFIC SALMON COMMISSION
Statement of Changes in Financial Position
For the year ended March 31, 1990
(With comparative figures for 1989)

	1990	1989
General Fund		
Operating activities		
Excess (deficiency) of revenue over expenditures	\$ (151,761)	\$ 248,137
Add (deduct)		
Net changes in non-cash working capital balances relating to operations	(20,827)	(290,641)
Cash used by operations	(172,588)	(42,504)
Financing activities		
Transfer from Working Capital Fund	-	7,144
Transfer to Fixed Asset Fund	(46,746)	(164,834)
Cash used in financing activities	(46,746)	(157,690)
Decrease in cash during the year	(219,334)	(200,194)
Cash and term deposits, beginning of year	701,791	901,985
Cash and term deposits, end of year	\$ 482,457	\$ 701,791
Working Capital Fund		
Financing activity		
Excess (deficiency) of revenue over expenditures	\$ (3,517)	\$ 7,144
Transfer to General Fund	-	(7,144)
Cash used in financing activities	(3,517)	-
Cash and term deposits, beginning of year	100,000	100,000
Cash and term deposits, end of year	\$ 96,483	\$ 100,000
Fixed Asset Fund		
Operating activity		
Item not affecting working capital		
Loss on sale of fixed asset	\$ (2,413)	\$ (7,709)
Cash used for operations	(2,413)	(7,709)
Investing activities		
Additions to fixed assets	(47,800)	(176,073)
Proceeds on sale of fixed assets	3,467	18,948
Cash used for investing activities	(44,333)	(157,125)
Financing activity		
Transfer from General Fund	46,746	164,834
Increase in cash during the year	-	-
Cash, beginning of year	-	-
Cash, end of year	\$ -	\$ -

See accompanying notes to financial statements.

PACIFIC SALMON COMMISSION
Statement of Changes in Financial Position
For the year ended March 31, 1990
(With comparative figures for 1989)

	1990	1989
International Pacific Salmon Fisheries Commission Fund		
Operating Activities		
Excess of expenditures over revenue	\$ (38,974)	\$ (33,135)
Decrease in cash during the year	38,974	33,135
Cash and term deposits, beginning of year	194,947	228,082
Cash and term deposits, end of year	\$ 155,973	\$ 194,947

See accompanying notes to financial statements.

PACIFIC SALMON COMMISSION
Notes to Financial Statements
Year ended March 31, 1990

Nature of organization

The Pacific Salmon Commission was established by Treaty between the Governments of Canada and the United States of America to promote cooperation in the management, research and enhancement of Pacific salmon stocks. The Treaty was ratified on March 18, 1985 and the Commission commenced operations on September 26, 1985.

Effective January 1, 1987 and pursuant to a decision of the International Pacific Salmon Fisheries Commission, balances of funds belonging to that Commission and commitments against those funds were transferred to the Pacific Salmon Commission for administration purposes.

Summary of significant accounting policies

(a) Fund accounting

The General Fund represents funds provided annually through contributions from the Contracting Parties. Any unappropriated balance remaining at the end of one fiscal year is used to offset the contributions by the Parties in the following year.

The Fixed Assets Fund represents the cumulative results of fixed asset transactions. Depreciation is charged to the Fixed Assets Fund.

The Working Capital Fund represents monies contributed by the Parties to be used temporarily pending receipt of new contributions from the Parties at the beginning of a fiscal year, or for special programs not contained in the regular budget but approved during the fiscal year. Any surplus above the fixed limit in the account at the end of the fiscal year is transferred to the General Fund and is treated as income.

(b) Basis of accounting

The operations of the Commission are generally accounted for on an accrual basis except that purchase order expenditures are recognized at the time that the commitment for goods and services are made, rather than at the time that the goods or services are delivered.

(c) Fixed assets

Fixed assets are stated at cost. Costs of repairs and replacements of a routine nature are charged as a current expenditure while those expenditures which improve or extend the useful life of the assets are capitalized. Depreciation is provided using the straight-line method at rates sufficient to amortize the costs over the estimated useful lives of the assets. The rates of depreciation used on an annual basis are:

Automobiles	20%
Boats	20%
Computer equipment and software	30%
Equipment	20%
Films	33%
Furniture and fixtures	10%
Leasehold improvements	10%

PACIFIC SALMON COMMISSION
Notes to Financial Statements
Year ended March 31, 1990

Summary of significant accounting policies (continued)

(d) Income taxes

The Commission is a non-taxable organization under the Privileges and Immunities (International Organizations) Act (Canada).

(e) Foreign exchange translation

Transactions originating in foreign currencies are translated at the exchange rate prevailing at the transaction dates. Assets and liabilities denominated in foreign currency at the balance sheet date are translated to equivalent Canadian amounts at the current rate of exchange.

1. Fixed assets

			1990	1989
	Cost	Accumulated Depreciation	Net Book Value	Net Book Value
Automobiles	\$ 70,419	\$ 47,236	\$ 23,183	\$ 37,268
Boats	90,781	58,899	31,882	29,881
Computer equipment	503,520	456,916	46,604	97,535
Equipment	350,431	245,565	104,866	169,988
Films	1,800	1,800	-	-
Furniture and fixtures	226,645	66,960	159,685	176,346
Computer software	60,362	48,470	11,892	29,844
Leasehold improvements	19,532	5,859	13,673	15,626
	\$ 1,323,490	\$ 931,705	\$ 391,785	\$ 556,488

2. Reserves

Reserves for contractual commitments

Contractual commitments are recognized in the accounts only to the extent that the service or goods have been delivered. Until the service or goods are delivered the obligation is recorded as a reserve against the General Fund balance.

PACIFIC SALMON COMMISSION
Notes to Financial Statements
Year ended March 31, 1990

2. Reserves (continued)

The Commission has approved a carryover of the unexpended funds to be utilized as follows

	1990	1989
(a) Continuing operations	\$ 432,542	\$ 601,061
(b) Reserve for prepaid expenses	39,580	38,621
(c) Reserve for prepaid pension contributions	-	30,947
	\$ 472,122	\$ 670,629

3. Pension plan

The Commission maintains a defined benefit pension plan for its employees. Actuarial valuations of this pension plan are carried out periodically and provide estimates of present value of accrued pension benefits at a point in time, calculated on the basis of various assumptions with respect to pension plan costs and rates of return on investments.

At the date of the most recent actuarial valuation, October 31, 1989, the present value of accrued benefits is \$2,000,544 and the market value of related assets available to provide these benefits is \$2,039,711.

The pension plan surplus was applied to the current year's expense. In addition, the fiscal 1990 pension expense of \$103,000 includes \$43,500 in past service costs which, in accordance with "CCA Accounting for Employee Pension Obligations in Government Financial statements Public Sector Accounting Statement #5", have been expensed in the period of the plan amendment.

Appendices

Appendix A

Recommendations of the Commission to the Parties for Amendments to Annex IV and other understandings to give effect to the agreed fishery regime for 1990

PACIFIC SALMON COMMISSION

May 16, 1990

The Right Honourable Joe Clark, P.C., M.P.
Secretary of State for External Affairs
Ottawa, Ontario
K1A 0G2

The Honorable James A. Baker, III
Secretary of State
U.S. Department of State
2201 C Street N.W.
Washington, D.C. 20520

The Honourable Bernard Valcourt, P.C., M.P.
Minister of Fisheries and Ocean
Ottawa, Ontario
K1A 0E6

The Honorable Robert A. Mosbacher
Secretary of Commerce
U.S. Department of Commerce
14th Street N.W.
Washington, D.C. 20230

Dear Sir:

I have the honour to report to you on understandings that have been reached by the Pacific Salmon Commission and to recommend changes in Annex IV of the Pacific Salmon Treaty.

In accordance with Article XIII, Paragraph 2 of the Treaty, the Commission recommends that Chapters 2, 3, 5 and 6 of Annex IV be amended. The entire text of Annex IV as proposed by the Commission for 1990 is attached (Attachment 1). Pursuant to Article XIII, Paragraph 3 of the Treaty, amendments to the Annex may be implemented through an exchange of notes between the Governments. The Commission expects that the relevant management agencies will manage fisheries under their responsibility in the recommended manner during the 1990 fishing season. The Commission recommends that an exchange of notes occur implementing these proposals as soon as possible.

The Commission has also reached the following understandings as to the implementation of the Pacific Salmon Treaty:

1) With respect to Annex IV, Chapter 1, the Commission agreed to an "Understanding between the United States and the Canadian Sections of the Pacific Salmon Commission concerning Joint Enhancement of Transboundary River Salmon Stocks" in Portland February 1989. In order to facilitate implementation of this understanding, The Commission has now reached agreement with respect to joint enhancement of salmon stocks of the Taku River for 1990 (Attachment 2).

The Commission notes that the cost-sharing responsibilities set out in the Understanding will be reviewed annually by its Finance and Administration Committee.

2) With respect to Annex IV, Chapter 2, the Commission agrees that:

- (a) the Northern Panel will undertake a planning process designed to consider opportunities/options for improved management, conservation and enhancement in the Northern Boundary Area for the November 1991 meeting of the Commission (Attachment 3);
- (b) in recognition of the need for improved information on stock status and catch composition of salmon harvested in Northern Boundary Area fisheries, the Northern Boundary Technical Committee is instructed to present an interim progress report at the February 1991 Commission meeting on its evaluation of the status of sockeye, pink and chum salmon stocks of the area (Attachment 4); and

- (c) in recognition of the need for improved information on stock status and harvest patterns of steelhead in the Northern Boundary Area, the Northern Boundary Technical Committee is instructed to present a report at the November 1990 Commission meeting which summarizes steelhead catch trends, knowledge of stock status, migration patterns, sport fisheries, enhancement, and any specific conservation concerns (Attachment 5).
- 3) With respect to Annex IV, Chapter 3, the Commission agrees that:
- (a) in 1990, the Southeast Alaska all-gear catch of chinook salmon shall consist of the base catch and 1990 ceiling adjustment specified in Annex IV, Chapter 3, plus a catch of new Alaska hatchery add-on to be calculated inseason using the procedures approved by the Commission for the 1989 add-on and as described in Alaska's January 29, 1990 report to the Commission. The preseason expectation for the 1990 hatchery add-on is 43,700 chinook salmon;
 - (b) with regard to the chinook troll fishery in North/Central British Columbia, it is Canada's intent to take management measures consistent with Chapter 1(e)(vii) to address the interim 1989 cumulative deviation of 39,400 chinook salmon;
 - (c) with regard to the chinook troll harvest off the west coast of Vancouver Island, it is Canada's intention in 1990 to manage this fishery in a manner so as not to exceed the 1985-87 average troll fishery harvest rate. The Department of Fisheries and Oceans Pacific Stock Assessment and Review Committee review on the Harrison stock and related information for the west coast of Vancouver Island fishery will be provided to the Chinook Technical Committee for its analysis;
 - (d) with regard to the Strait of Georgia fishery, Canada agrees to provide a report by December 1990 to the Joint Technical Committee on the evaluation of the effectiveness of the management measures taken in 1989 to reduce the harvest rates on depressed chinook stocks and provide data regarding the harvests, harvest rates, chinook stock composition and management measures for all fisheries prosecuted in Georgia Strait and Area 20 in 1989;
 - (e) with regard to the exclusion of selected terminal area chinook catches from Northern and Central British Columbia chinook catch ceilings, the Commission agrees to the provisions detailed in Attachment 6;
 - (f) with respect to the adjustments in catch ceilings for the 1990 Southeast Alaska and North/Central B.C. fisheries, the Parties agree that the overage/underage policy set forth in Chapter 3, paragraph 1(e)(vii) is to be applied to the base ceiling levels of 263,000 chinook; and
 - (g) With respect to long-term management concepts for chinook, the Parties are committed to developing management regimes that better address their long-term objectives and are consistent with the fundamental principles established in Article III of the Pacific Salmon Treaty. Through the Joint Objectives and Goals Committee, the Parties are exchanging, among other things, goals and objectives for their respective fisheries. This initiative will benefit from a joint exploration of alternative management approaches. Accordingly, the Parties agree to conduct a Workshop in 1990 to explore alternative chinook management approaches that are responsive to variations in abundance, address the needs of the chinook rebuilding program, and are designed to meet the Parties' respective management objectives. Management alternatives will be explored and will include those approaches that incorporate ceiling adjustment mechanisms as well as others more directly incorporating harvest rate management. The Commission will establish a Steering Group that will meet in June 1990 to develop a specific agenda and appropriate goals for the Workshop. Participants in the Workshop will include representation from the fisheries managers, agency biological staff, Commission and Panel members, and user representatives. Workshop discussions will be structured around selected papers developed by Workshop participants and distributed in advance.

At the conclusion of the Workshop, the Steering Group and the Chinook Working Group, supported by Commission staff, will compile the papers, comments, discussion summaries and will develop recommendations from the Workshop, consistent with the principles of the Treaty, and provide these to the Commission, at its 1990 post-season meeting.

4) With respect to Annex IV, Chapter 5, the Commission agrees that:

- (a) The Parties are committed to developing management regimes that better address their respective long-term objectives and are consistent with the fundamental principles established in Article III of the Pacific Salmon Treaty. Through the Joint Objectives and Goals Committee, the Parties are exchanging goals and objectives for their respective fisheries. This initiative will benefit from a joint exploration of alternative management approaches.

Accordingly, the Parties agree to conduct a workshop in November 1991 to explore coho management approaches for the Southern Panel area that are designed to improve the ability of the Parties to meet their respective management objectives. The Commission will establish a Steering Group which will meet in November 1990 to develop a specific agenda and appropriate goals for the workshop. Participants in the workshop will not exceed 10 representatives from each Party and may include representation from the fisheries managers, agency biological staff, Commission and panel members and user representatives. Workshop discussions will be structured around selected papers developed by Workshop participants and distributed in advance.

At the conclusion of the Workshop, the Steering Group, supported by Commission staff, Panel members, and technical committee members, as appropriate, will compile the papers, comments, discussion summaries, and develop recommendations from the Workshop, consistent with the principles of the Treaty, and provide these to the Commission.

Beginning in January of 1992, the Commission and Panels, as appropriate, will discuss the results of the workshop and determine by February 1992 if it would be of benefit to continue this initiative, considering further provisions if necessary; and

- (b) Canada will not conduct a directed coho net fishery in Area 20 in 1990 and the U.S. may conduct a directed coho fishery in Areas 7 and 7A subject to U.S. domestic management processes. In addition, in the event the U.S. does conduct a directed coho fishery (between the time period when the Fraser River Panel relinquishes control of the area and commencement of chum management), the Commission agrees that discussions leading to an agreement on the form and scope of appropriate compensating measures for the 7/7A fishery to be implemented in 1991 will be concluded by November 1990. The discussions shall address both the species and number of fish and shall include the use of new enhancement to benefit the fisheries and long-term interests of the Parties.

5) With respect to Northern British Columbia and Southeast Alaska Coho Stocks, the Commission agrees that:

The Parties are committed to developing management regimes that better address their respective long-term objectives and are consistent with the fundamental principles established in Article III of the Pacific Salmon Treaty. Through the Joint Objectives and Goals Committee, the Parties are exchanging goals and objectives for their respective fisheries. This initiative will benefit from a joint exploration of coho management approaches.

Accordingly, the Parties agree to conduct a workshop in late October 1991 to explore coho management approaches for the Northern Panel area that are designed to improve the ability of the Parties to meet their respective management objectives. The Commission will establish a Steering Group which will meet in January 1991 to develop a specific agenda and appropriate goals for the workshop. Participants in the workshop will not exceed 6 representatives from each Party and may include representation from the fisheries managers, agency biological staff, Commission and panel members and user representatives. Workshop discussions will be structured around selected papers developed by Workshop participants and distributed in advance.

At the conclusion of the Workshop, the Steering Group, supported by Commission staff, Panel members, and technical committee members, as appropriate, will compile the papers, comments, discussion summaries, and develop recommendations from the Workshop, consistent with the principles of the Treaty, and provide these to the Commission.

Beginning in January of 1992, the Commission and Panels, as appropriate, will discuss the results of the workshop and determine by February 1992 if it would be of benefit to continue this initiative, considering further provisions if necessary.

6) With respect to Annex IV, Chapter 6, the Commission recognizes that the U.S. fishery harvested in 1989 approximately 41,700 chum salmon less than the harvest permitted under Annex IV, Chapter 6, paragraph 3(c)(ii). The U.S. agrees that the additional chum will be taken in years when the Johnstone Strait catch exceeds 225 thousand.

7) With respect to implementation of Article III, paragraph 1 of the Pacific Salmon Treaty, the Commission has agreed to "An Understanding between the Canadian and the United States sections of the Pacific Salmon Commission concerning equity-related issues" (Attachment 7).

8) The Commission also wishes to note its continuing concern about its significant funding problem, brought to the attention of the Parties by letter dated January 12, 1990. The Standing Committee on Finance and Administration met again May 10, 1990 to undertake a comprehensive review of expenditure needs identified by the Secretariat. The Commission endorses the Committee finding that contributions of \$1,100,000 (Canadian) will be required from each Party beginning April 1, 1991 if the Secretariat is to continue its responsibilities to provide administrative support to the Commission and scientific support to the Fraser River Panel. The Commission would appreciate your support to assist us in continuing to carry out the important work of the Pacific Salmon Treaty.

The Commission respectfully requests your approval of these recommendations.

Yours truly,
PACIFIC SALMON COMMISSION

D. W. Collinsworth, Chair

Appendix B

Revised Annex IV

to the Pacific Salmon Treaty in effect for 1990

Annex IV

Chapter 1

TRANSBOUNDARY RIVERS

1. Recognizing the desirability of accurately determining exploitation rates and spawning escapement requirements of salmon originating in the Transboundary Rivers, the Parties shall maintain a Joint Transboundary Technical Committee (Committee) reporting, unless otherwise agreed, to the Northern Panel and to the Commission. The Committee, inter alia, shall
 - (a) assemble and refine available information on migratory patterns, extent of exploitation and spawning escapement requirements of the stocks;
 - (b) examine past and current management regimes and recommend how they may be better suited to achieving preliminary escapement goals;
 - (c) identify enhancement opportunities that:
 - (i) assist the devising of harvest management strategies to increase benefits to fishermen with a view to permitting additional salmon to return to Canadian waters;
 - (ii) have an impact on natural Transboundary river salmon production.
2. The Parties shall improve procedures of coordinated or cooperative management of the fisheries on Transboundary River stocks.
3. Recognizing the objectives of each Party to have viable fisheries, the Parties agree that the following arrangements shall apply to the United States and Canadian fisheries harvesting salmon stocks originating in the Canadian portion of
 - (a) the Stikine River:
 - (i) Assessment of the annual run of Stikine River sockeye salmon shall be made as follows:
 - a. A pre-season forecast of the Stikine River sockeye run will be made by the Transboundary Technical Committee prior to March 1 of each year. This forecast may be modified by the Transboundary Technical Committee prior to the opening of the fishing season.
 - b. In-season estimates of the Stikine River sockeye run and the Total Allowable Catch (TAC) shall be made under the guidelines of an agreed Stikine Management Plan and using a mathematical forecast model developed by the Transboundary Technical Committee. Both U.S. and Canadian fishing patterns shall be based on current weekly estimates of the TAC. At the beginning of the season and up to an agreed date, the weekly estimates of the TAC shall be determined from the pre-season forecast of the run strength. After that date, the TAC shall be determined from the in-season forecast model.

- c. Modifications to the Stikine Management Plan and forecast model may be made prior to June 1 of each year by agreement of both Parties. Failure to reach agreement in modifications shall result in use of the model and parameters used in the previous year.
 - d. Estimates of the TAC may be adjusted in-season only by concurrence of both Parties' respective managers. Reasons for such adjustments must be provided to the Transboundary Technical Committee.
- (ii) Harvest sharing of naturally occurring Stikine River sockeye salmon for the period 1988 to 1992, contingent upon activities specified in the February 1988 Understanding between the United States and the Canadian Section of the Pacific Salmon Commission concerning Joint Enhancement of Transboundary River Salmon Stocks (Understanding) shall be as follows:
- a. When the estimated TAC of Stikine River sockeye salmon is zero or less:
 - 1. Canada may conduct its native food fishery but the catch shall not exceed 4,000 fish, there will be no commercial fishing;
 - 2. The United States shall not direct commercial fisheries at Stikine River sockeye salmon in District 108;
 - 3. The United States may fish in the commercial gill net fisheries in the Sumner Strait portion of District 106 so long as the in-season estimate of the contribution of Stikine River sockeye salmon is less than 20 percent of the total catch to date of sockeye salmon in Sumner Strait.
 - b. When the estimated TAC of Stikine River sockeye salmon is between 1 and 20,000 fish:
 - 1. Canada shall conduct its commercial and native food fisheries so that the all gear catch is at least 10,000 fish and may increase its catch to include any surplus available in-river total allowable catch but not to exceed 15,000 fish;
 - 2. The United States shall not direct commercial fisheries at Stikine sockeye salmon in District 108;
 - 3. The United States may fish in the commercial gill net fisheries in the Sumner Strait portion of District 106 so long as the in-season estimate of the contribution of Stikine River sockeye salmon is less than 25 percent of the total catch to date of sockeye salmon in Sumner Strait. If the contribution of Stikine River sockeye salmon is greater than 20 percent but less than 25 percent only one day of fishing per week will be permitted, if greater than 25 percent, no fishing will be permitted in Sumner Strait.
 - c. When the estimated TAC of Stikine River sockeye salmon is between 20,001 and 60,000 fish:
 - 1. Canada shall conduct its commercial and native food fisheries so that the all gear catch is at least 15,000 fish and may increase its catch to include any surplus total allowable catch but not to exceed 20,000 fish;
 - 2. The United States may direct commercial fisheries at Stikine River sockeye salmon in District 108 if the total TAC of Stikine River sockeye salmon is greater than the actual catch of Stikine River sockeye salmon in District 106 plus 20,000.
 - d. When the estimated TAC of Stikine River sockeye salmon is greater than 60,000 fish:
 - 1. Canada shall conduct its commercial and native food fisheries so that the all gear catch is at least 20,000 fish and may increase its catch to include any surplus total allowable catch but not to exceed 30,000 fish;
 - 2. The United States may direct commercial fisheries at Stikine River sockeye salmon in District 108 if the total TAC of Stikine River sockeye salmon is greater than the actual catch of Stikine River sockeye salmon in District 106 plus 30,000.

- e. United States incidental catches of Stikine River sockeye salmon in District 108 shall not be counted when computing TAC available for the Canadian fishery. For the purpose of calculation, the Canadian inriver allowable catch of sockeye salmon will be based on a 10 percent harvest rate of Stikine River sockeye salmon in the District 106 drift gill net fishery.
- (iii) Canada shall harvest no more than 4,000 coho salmon annually in the Stikine River from 1988 through 1992.
 - (iv) Canadian harvests of chinook, pink, and chum salmon may be taken as an incidental harvest in the directed fishery for sockeye and coho salmon.
 - (v) Both Parties shall take the appropriate management action to ensure that the necessary escapement goals for the chinook salmon bound for the Canadian portions of the Stikine River are achieved by 1995.
 - (vi) If the United States unilaterally withdraws from mutually agreed enhancement goals and activities as specified in the Understanding, then the harvest sharing of naturally occurring Stikine River salmon as stated in sections (ii) through (iv) above shall remain in effect.
 - (vii) If Canada unilaterally withdraws from mutually agreed enhancement goals and activities as specified in the Understanding, then the harvest sharing of naturally occurring Stikine River sockeye salmon shall be as follows:
 - a. When the estimated TAC of Stikine River sockeye salmon is zero or less:
 - 1. Canada may conduct its native food fishery but the catch shall not exceed 4,000 fish, there will be no commercial fishing;
 - 2. The United States shall not direct commercial fisheries at Stikine River sockeye salmon in District 108;
 - 3. The United States may fish in the commercial gill net fisheries in the Sumner Strait portion of District 106 so long as the in-season estimate of the contribution of Stikine River sockeye salmon is less than 20 percent of the total catch to date of sockeye salmon in Sumner Strait.
 - b. When the estimated TAC of Stikine River sockeye salmon is between 1 and 20,000 fish:
 - 1. Canada shall conduct its commercial and native food fisheries so that the all gear catch is at least 4,000 fish and may increase its catch to include any surplus available in-river total allowable catch but not to exceed 7,000 fish;
 - 2. The United States may direct commercial fisheries at Stikine sockeye salmon in District 108 if the total TAC of Stikine River sockeye salmon is greater than the actual catch of Stikine River sockeye salmon in District 106 plus 7,000;
 - 3. The United States may fish in the commercial gill net fisheries in the Sumner Strait portion of District 106 so long as the in-season estimate of the contribution of Stikine River sockeye salmon is less than 25 percent of the total catch to date of sockeye salmon in Sumner Strait.
 - c. When the estimated TAC of Stikine River sockeye salmon is between 20,001 and 60,000 fish:
 - 1. Canada shall conduct its commercial and native food fisheries so that the all gear catch is at least 7,000 fish and may increase its catch to include any surplus total allowable catch but not to exceed 15,000 fish;
 - 2. The United States may direct commercial fisheries at Stikine River sockeye salmon in District 108 if the total TAC of Stikine River sockeye salmon is greater than the actual catch of Stikine River sockeye salmon in District 106 plus 15,000.

- d. When the estimated TAC of Stikine River sockeye salmon is greater than 60,000 fish:
 - 1. Canada shall conduct its commercial and native food fisheries so that the all gear catch is at least 15,000 fish and may increase its catch to include any surplus total allowable catch but not to exceed 25,000 fish;
 - 2. The United States may direct commercial fisheries at Stikine River sockeye salmon in District 108 if the total TAC of Stikine River sockeye salmon is greater than the actual catch of Stikine River sockeye salmon in District 106 plus 25,000.
- e. United States incidental catches of Stikine River sockeye salmon in District 108 shall not be counted when computing TAC available for the Canadian fishery. For the purpose of calculation, the Canadian inriver allowable catch of sockeye salmon will be based on a 10 percent harvest rate of Stikine River sockeye salmon in the District 106 drift gill net fishery.
- f. Canada shall harvest no more than 2,000 coho salmon annually.
- g. Canadian harvest of chinook, pink, and chum salmon may be taken as an incidental harvest in the directed fishery for sockeye and coho salmon.

(b) the Taku River:

- (i) Harvest sharing of naturally occurring Taku River sockeye salmon for the period 1988 to 1992, contingent upon activities specified in the February 1988 Understanding concerning Joint Enhancement of Transboundary River Salmon Stocks (Understanding), shall be as follows:
 - a. Canada shall harvest no more than 18 percent of the TAC of the sockeye salmon originating in the Canadian portion of the Taku River each year.
 - b. Canada shall harvest no more than 3,000 coho salmon each year.
 - (ii) Canadian harvests of chinook, pink and chum salmon may be taken as an incidental harvest in the directed fishery for sockeye and coho salmon.
 - (iii) Both Parties shall take the appropriate management action to ensure that the necessary escapement goals for chinook salmon bound for the Canadian portions of the Taku River are achieved by 1995.
 - (iv) If the United States unilaterally withdraws from mutually agreed enhancement goals and activities as specified in the Understanding, then the harvest sharing of naturally occurring Taku River salmon as stated in sections (i) and (ii) above shall remain in effect.
 - (v) If Canada unilaterally withdraws from mutually agreed enhancement goals and activities as specified in the Understanding, then Canada's share of naturally occurring Taku River sockeye salmon shall be 15 percent of the TAC. Furthermore, Canada shall commercially harvest coho, chinook, pink, and chum salmon only incidentally during a directed sockeye salmon fishery.
4. The Parties agree that if the catch allocations set out in paragraph 3 are not attained due to management actions by either Party in any one year, compensatory adjustments shall be made in subsequent years. If a shortfall in the actual catch of a Party is caused by management action of that Party, no compensation shall be made.
 5. The Parties agree that the following arrangements shall apply to United States and Canadian fisheries harvesting salmon stocks originating in Canadian portions of the Alsek River: recognizing that chinook and early run sockeye stocks originating in the Alsek River are depressed and require special protection, and in the interest of conserving and rebuilding these stocks, the necessary management actions shall continue until escapement targets are achieved.
 6. The Parties agree to consider cooperative enhancement possibilities and to undertake as soon as possible studies on the feasibility of new enhancement projects on the Transboundary Rivers and adjacent areas for the purpose of increasing productivity of stocks and providing greater harvests to the fishermen of both countries.

7. Recognizing that stocks of salmon originating in Canadian sections of the Columbia River constitute a small portion of the total populations of Columbia River salmon, and that the arrangements for consultation and recommendation of escapement targets and approval of enhancement activities set out in Article VII are not appropriate to the Columbia River system as a whole, the Parties consider it important to ensure effective conservation of up-river stocks which extend into Canada and to explore the development of mutually beneficial enhancement activities. Therefore, notwithstanding Article VII, paragraphs 2, 3, and 4, during 1985, the Parties shall consult with a view to developing, for the transboundary sections of the Columbia River, a more practicable arrangement for consultation and setting escapement targets than those specified in Article VII, paragraphs 2 and 3. Such arrangements will seek to, inter alia
 - (a) ensure effective conservation of the stocks;
 - (b) facilitate future enhancement of the stocks on an agreed basis;
 - (c) avoid interference with United States management programs on the salmon stocks existing in the non-transboundary tributaries and the main stem of the Columbia River.

Chapter 2

NORTHERN BRITISH COLUMBIA SOUTHEASTERN ALASKA

1. Considering that the chum salmon stocks originating in streams in the Portland Canal require rebuilding, the Parties agree in 1990 and 1991 to jointly reduce interceptions of these stocks to the extent practicable and to undertake assessments to identify possible measures to restore and enhance these stocks. On the basis of such assessments, the Parties shall instruct the Commission to identify long-term plans to rebuild these stocks.
2. With respect to sockeye salmon, the United States shall
 - (a) with respect to District 4 purse seine fishery:
 - (i) for the four year period, 1990 through 1993, limit its fishery in a manner that will result in a maximum four-year total catch of 480,000 sockeye salmon prior to United States Statistical Week 31;
 - (ii) when the annual catch reaches 160,000 sockeye salmon, no further daily fishing periods in District 4 will be allowed prior to Statistical Week 31;
 - (iii) all underages not to exceed 20% of the Annex ceiling will add to, and overages will subtract from, the subsequent four-year period.
 - (b) limit its drift gillnet fishery in Districts 1A and 1B in a manner that will result in an average annual harvest of 130,000 sockeye salmon.
3. With respect to pink salmon, Canada shall
 - (a) limit its net fishery in Areas 3-1, 3-2, 3-3, 3-4, and 5-11 in a manner that will result in an average annual harvest of 900,000 pink salmon;
 - (b) with respect to the Area 1 troll fishery:
 - (i) for the four year period, 1990-1993, limit its Area 1 pink salmon troll catch to a total of 5.125 million;
 - (ii) during the period 1990 through 1993, close the pink salmon troll fishery in the most northerly portion of Area 1 in management units 101-4, 101-8, 101-3 north of 54 degrees 37 minutes N. and 103 north of 54 degrees 37 minutes N to pink salmon trolling when the pink salmon fishery has lasted 22 days starting with the beginning of the troll season in Area 1, but no earlier than July 22, except that the most northerly portion of the area shall close to pink salmon trolling whenever the catch in that area reaches 300,000 pinks.

- (iii) limit the maximum harvest in the entire Area 1 in any one year to 1.95 million pink salmon; and,
 - (iv) all underages, not to exceed 20% of the Annex ceiling, will add to, and overages will subtract from, the subsequent four-year period.
4. In 1987 and thereafter, in order to ensure that catch limits specified in paragraphs 2 and 3 are not exceeded, the Parties shall implement appropriate management measures which take into account the expected run sizes and permit each country to harvest its own stocks.
 5. In setting pink salmon fisheries regimes for 1987 and thereafter, the Parties agree to take into account information from the northern pink tagging program.
 6. The Parties shall at the earliest possible date exchange management plans for the fisheries described herein.
 7. In order to accomplish the objectives of this Chapter, neither Party shall initiate new intercepting fisheries, nor conduct or redirect fisheries in a manner that intentionally increases interceptions.
 8. The Parties shall maintain a Joint Northern Boundary Technical Committee (Committee) reporting, unless otherwise agreed, to the Northern Panel and the Commission. The Committee, inter alia, shall
 - (a) evaluate the effectiveness of management actions;
 - (b) identify and review the status of stocks;
 - (c) present the most current information on harvest rates and pattern on these stocks, and develop a joint data base for assessments;
 - (d) collate available information on the productivity of stocks in order to identify escapements which produce maximum sustainable harvests and allowable harvest rates;
 - (e) present historical catch data, associated fishing regimes, and information on stock composition in fisheries harvesting these stocks;
 - (f) devise analytical methods for the development of alternative regulatory and production strategies;
 - (g) identify information and research needs, including future monitoring programs for stock assessments; and,
 - (h) for each season, make stock and fishery assessments and recommend to the Northern Panel conservation measures consistent with the principles of the Treaty.

Chapter 3

CHINOOK SALMON

1. Considering the escapements of many naturally spawning chinook stocks originating from the Columbia River northward to southeastern Alaska have declined in recent years and are now substantially below goals set to achieve maximum sustainable yields, and recognizing the desirability of stabilizing trends in escapements and rebuilding stocks of naturally spawning chinook salmon, the Parties shall
 - (a) instruct their respective management agencies to establish a chinook salmon management program designed to meet the following objectives:
 - (i) halt the decline in spawning escapements in depressed chinook salmon stocks; and,
 - (ii) attain by 1998, escapement goals established in order to restore production of naturally spawning chinook stocks, as represented by indicator stocks identified by the Parties, based on a rebuilding program begun in 1984;

- (b) continue the chinook working group to clarify policy issues relating to the execution of this Chapter; for example, the definition of pass-through, and the development of common procedures for adjusting catch ceilings in response to changes in abundance, positive incentives and enhancement add-ons; the chinook working group will develop options for consideration by the Commission and Panels as appropriate;
- (c) jointly initiate and develop a coordinated chinook management program;
- (d) maintain a Joint Chinook Technical Committee (Committee) reporting, unless otherwise agreed, to the Northern and Southern Panels and to the Commission, which *inter alia*, shall
 - (i) evaluate management actions for their consistency with measures set out in this Chapter and for their potential effectiveness in attaining these specified objectives;
 - (ii) evaluate annually the status of chinook stocks in relation to objectives set out in this Chapter and, consistent with paragraph (d) (v) beginning in 1986, make recommendations for adjustments to the management measures set out in this Chapter;
 - (iii) develop procedures to evaluate progress in the rebuilding of naturally spawning chinook stocks;
 - (iv) recommend strategies for the effective utilization of enhanced stocks;
 - (v) recommend research required to implement this rebuilding program effectively; and,
 - (vi) exchange information necessary to analyze the effectiveness of alternative fishery regulatory measures to satisfy conservation objectives;
- (e) ensure that
 - (i) in 1990, the all gear catch in Southeast Alaska shall not exceed the base catch of 263,000 plus 39,000 chinook salmon; Alaska shall open its general summer troll fishery July 1; the harvest in the June fishery shall not exceed 30,000 chinook salmon (excluding Alaska hatchery add-on chinook) taken in a similar manner to 1989, and areas of high chinook abundance shall be closed during chinook non-retention periods to reduce incidental mortalities;
 - (ii) in 1990, the all-gear catch in northern and central B.C. shall not exceed the base catch of 263,000 plus 39,000 chinook salmon; the added increment to be harvested in the northern portion of the region; these catches exclude a portion of the catch in selected extreme terminal areas as described in the letter of transmittal;
 - (iii) in 1990, the annual troll catch off the west coast of Vancouver Island shall not exceed 360,000 chinook salmon;
 - (iv) in 1990, the total annual catch by the sport and troll fisheries in the Strait of Georgia shall not exceed 275,000 chinook salmon; Canada will undertake management measures to minimize further reductions in spawning escapements in 1990;
 - (v) adjustments to the ceilings may be made in response to reductions in chinook abundance so that the indicator stocks are rebuilt by 1998;
 - (vi) fishing regimes are reviewed by the Committee and structured so as not to affect unduly or to concentrate disproportionately on stocks in need of conservation;
 - (vii) starting with the 1987 season, a 7.5 percent management range is established above and below a catch ceiling. On a continuing basis, the cumulative deviation (in numbers of fish) shall not exceed the management range. In the event that the cumulative deviation exceeds the range, the responsible Party shall be required in the succeeding year, to take appropriate management actions to return the cumulative deviation, plus any penalty assessed, to a level within the established management range. Negative cumulative deviations shall not accumulate below the management range. It is the intent of this section to insure that, on average, the annual catch in ceilinged fisheries is equal to the agreed target ceiling; and,

- (viii) in 1987 and thereafter, the United States will continue to monitor fisheries in Juan de Fuca Strait (Areas 4B, 5, 6A, 6C) and the outer portions of Puget Sound (6B, 7, 7A, 9) so as to assess the levels and trends in the interceptions of Canadian chinook salmon;
 - (f) maintain the following program, recognizing that associated fishing mortalities can affect the rebuilding schedule. The Parties shall
 - (i) minimize the effects of such mortalities;
 - (ii) monitor, assess, and report associated fishing mortalities;
 - (iii) provide the information required by the Chinook Technical Committee to estimate the magnitude and assess the impacts of associated mortalities on an on-going basis;
 - (iv) beginning in 1989, the Chinook Technical Committee shall
 - a. review reports provided by the Parties on an annual basis, unless directed by the Commission, and estimate the magnitude of all quantifiable sources of associated fishing mortalities;
 - b. evaluate their impact on the rebuilding schedule and recommend management actions that will achieve the objectives of the chinook rebuilding program, taking into account the effects of all fishing mortalities; and
 - c. develop technical procedures and standardize methodologies to quantify the magnitude of associated fishing mortalities, including savings of fish, and assess their impacts upon the rebuilding program, including pass-through commitments.
 - (v) the Commission shall annually take into account, starting in 1988, the impacts of fishing mortalities, as determined by the Chinook Technical Committee, in establishing regional fishing regimes and may adjust allowable catches accordingly, to assure rebuilding by 1998;
 - (g) manage all salmon fisheries in Alaska, British Columbia, Washington and Oregon, so that the bulk of depressed stocks preserved by the conservation program set out herein principally accrue to the spawning escapement;
 - (h) establish, at the conclusion of the chinook rebuilding program, fishery regimes to maintain the stocks at optimum productivity and provide fair internal allocation determinations. It is recognized that the Parties are to share the benefits of coastwide rebuilding and enhancement, consistent with such internal allocation determinations and this Treaty; and,
 - (i) exchange annual management plans prior to each season.
2. The Parties agree that enhancement efforts designed to increase production of chinook salmon would benefit the rebuilding program. They agree to consider utilizing and redirecting enhancement programs to assist, if needed, in the chinook rebuilding program. They agree that each region's catches will be allowed to increase above established ceilings based on demonstrations to the Commission and assessment by it of the specific contributions of each region's new enhancement activities, provided that the rebuilding schedule is not extended beyond 1998, and provisions of Subsection 1(e)(vi) of this Chapter are adhered to.
3. The Parties shall submit a report to the Commission by December 1990 which presents
- (a) joint recommendations for chinook salmon escapement goals in the transboundary rivers;
 - (b) given the goals recommended in 3(a), a jointly accepted assessment of progress toward rebuilding chinook stocks in these transboundary rivers based on escapement data available through 1989, and the likelihood of achievement of these goals by 1995; and,
 - (c) cooperatively developed management options to be identified by December 1990 and initiated in 1991 and following seasons to ensure rebuilding of chinook stocks in the transboundary rivers which are identified in 3(b) as requiring further management actions.

FRASER RIVER SOCKEYE AND PINK SALMON

1. In order to increase the effectiveness of the management of fisheries in the Fraser River Area (hereinafter the Area) and in fisheries outside the Area which harvest Fraser River sockeye and pink salmon, the Parties agree

- (a) that the preliminary expectations of the total allowable catches of Fraser River sockeye and pink are:

	<u>Sockeye</u>	<u>Pink</u>
1985	6.6 million	11.0 million
1986	12.5 million	
1987	3.1 million	12.0 million
1988	3.6 million	
1989	7.1 million	14.0 million
1990	13.0 million	
1991	3.1 million	14.0 million
1992	3.6 million	

- (b) that

- (i) based on these preliminary expectations, the United States shall harvest as follows:

	<u>Sockeye</u>	<u>Pink</u>
1985	1.78 million	3.6 million
1986	3.0 million	
1987	1.06 million	3.6 million
1988	1.16 million	

- (ii) the United States catches referred to in paragraph 1(b)(i) herein shall be adjusted in proportion to any adjustments in the total allowable catches set out in paragraph 1(a) herein that are due to any agreed adjustments in pre-season or in-season expectations of run-size. When considering such adjustment, the Parties shall take into account all fisheries that harvest Fraser River sockeye and pink salmon including annual Fraser River Indian food fish harvests in excess of 400,000 sockeye. The United States catches shall not be adjusted to any adjustments in the total allowable catch that may be caused by changes in escapement goals that form the basis for the agreed total allowable catches set out in paragraph 1(a) herein;

- (iii) notwithstanding the agreed United States and Canadian catch levels for Fraser River sockeye and for coho off the west coast of Vancouver Island, as provided in paragraph 1(b)(i) herein and in Chapter 5, respectively, and subject to paragraph 1(b)(ii), in 1985 the United States catch of Fraser River sockeye shall be 1.73 million and the Canadian catch of coho off the west coast of Vancouver Island shall not exceed 1.75 million; and in 1986, the United States catch of Fraser River sockeye shall be 2.95 million and the Canadian catch of coho off the west coast of Vancouver Island shall not exceed 1.75 million;

- (c) in 1985, to instruct the International Pacific Salmon Fisheries Commission to develop regulatory programs in the Area to give effect to the provisions of paragraph 1(b);
- (d) to instruct the Fraser River Panel for 1986 through 1992 to develop regulations to give effect to the provisions of paragraphs 1(b) and 1(f);
- (e) to instruct the Fraser River Panel that if management measures fail to achieve such sockeye and pink catches, any difference shall be compensated by adjustments to the Fraser fishery in subsequent years;

- (f) in the period 1989 to 1992, the Fraser River Panel shall determine the annual United States catch level so that the total United States catch in this period shall not exceed 7 million sockeye in the aggregate. In the years 1989 and 1991, the United States harvest shall not exceed 7.2 million pink salmon, in the aggregate. Notwithstanding the foregoing, these levels shall be reduced in proportion to any decreases in the total allowable catches set out in paragraph 1(a) herein that are due to any agreed decreases in pre-season or in-season expectations of run size. When considering such reductions, the Parties shall take into account all fisheries that harvest Fraser River sockeye and pink salmon including annual Fraser River Indian food fish harvests in excess of 400,000 sockeye. The United States catches shall not be reduced due to any decreases in the total allowable catch that may be caused by changes in escapement goals that form the basis for the agreed total allowable catches set out in paragraph 1(a) herein;
 - (g) to consider no sooner than 1989 adjusting the regime in accordance with the principles of Article III;
 - (h) to instruct the Fraser River Panel that in managing Fraser River sockeye and pink salmon, it shall take into account the management requirements of other stocks in the Area.
2. Notwithstanding the provisions of Paragraphs 1(b) and 1(f), and to ensure that Canada receives the benefits of any Canadian-funded enhancement activities undertaken following entry into force of this Treaty, any changes in the total allowable catch due to such activities shall not result in adjustment of the United States catch.
 3. The Parties shall establish date-sharing principles and processes which ensure that the Parties, the International Pacific Salmon Fisheries Commission, the Commission and the Fraser River Panel are able to manage their fisheries in a timely manner consistent with this Chapter.
 4. The Parties may agree to adjust the definition of the Area as necessary to simplify domestic fishery management and ensure adequate consideration of the effect on other stocks and species harvested in the Area.
 5. In managing the fisheries in the Area, the Parties, the Commission, and the Fraser River Panel shall take into account fisheries inside and outside the Area that harvest Fraser River sockeye and pink salmon. The Parties, the Commission, and the Fraser River Panel shall consider the need to exercise flexibility in management of fisheries outside the Area which harvest Fraser River sockeye and pink salmon.
 6. The Parties shall establish a technical committee for the Fraser River Panel:
 - (a) the members shall coordinate the technical aspects of Fraser River Panel activities with and between the Commission staff and the national sections of the Fraser River Panel, and shall report to their respective national sections of the Panel. The committee may receive assignments of a technical nature from the Fraser River Panel and will report results directly to the Panel.
 - (b) membership of the committee shall consist of up to 3 such technical representatives as may be designated by each national section of the Commission.
 - (c) members of the technical committee shall analyze proposed management regimes, provide technical assistance in the development of proposals for management plans, explain technical reports and provide information and technical advice to the respective national sections of the Panel.
 - (d) the technical committee shall work with the Commission staff during pre-season development of the fishery regime and management plan and during in-season consideration of regulatory options for the sockeye and pink salmon fisheries of Fraser Panel Area waters to ensure that:
 - (i) domestic allocation objectives of both Parties are given full consideration;
 - (ii) conservation requirements and management objectives of the Parties for species and stocks other than Fraser River sockeye and pink salmon in the Fraser River Panel Area during periods of Panel regulatory control are given full consideration; and,
 - (iii) the Commission staff is timely informed of management actions being taken by the Parties in fisheries outside of the Fraser River Panel Area that may harvest sockeye and pink salmon of Fraser River origin.

- (e) the staff of the Commission shall consult regularly in-season with the technical committee to ensure that its members are fully and timely informed on the status of Fraser River sockeye and pink salmon stocks, and the expectations of abundance, migration routes and proposed regulatory options, so the members of the technical committee can brief their respective national sections prior to each in-season Panel meeting.

Chapter 5

COHO SALMON

1. Recognizing that for the past several years some coho stocks have been below levels necessary to sustain maximum harvest and that recent fishing patterns have contributed to a decline in some Canadian and United States coho stocks, and in order to prevent further decline in spawning escapements, adjust fishing patterns, and initiate, develop, or improve management programs for coho stocks, the Parties shall
 - (a) instruct their respective management agencies to continue to develop coho salmon management programs designed to meet the following objectives
 - (i) prevent overfishing; and,
 - (ii) provide for optimum production;
 - (b) maintain a Joint Coho Technical Committee (Committee), reporting, unless otherwise agreed, to the Panels and the Commission. The membership of the Committee shall include representation from the Northern and Southern Panel Areas. The Committee, *inter alia*, shall, at the direction of the Commission and relevant Panels
 - (i) evaluate management actions for their consistency with measures set out in this Chapter and for their potential effectiveness in attaining the objectives established by the Commission;
 - (ii) annually identify, review, and evaluate the status of coho stocks in relation to the objectives set out in this Chapter and make recommendations for adjustments to the management measures consistent with those objectives;
 - (iii) present the most current information on exploitation rates and patterns on these stocks, and develop a joint data base for assessments;
 - (iv) collate available information on the productivity of coho stocks in order to identify the management objectives necessary to prevent overfishing;
 - (v) present historical catch data and associated fishing regimes;
 - (vi) estimate stock composition in fisheries of concern to the Commission and Panels;
 - (vii) devise analytical methods for the development of alternative regulatory and production strategies;
 - (viii) identify information and research needs, including future monitoring programs for stock assessments;
 - (ix) investigate the feasibility of alternative methodologies for implementing indicator stock programs in all areas;
 - (x) for each season, make stock and fishery assessments and recommend to the Commission conservation measures consistent with the principles of the Treaty;
 - (xi) develop programs to assure the attainment of spawning escapement goals and prevent overfishing;
 - (xii) exchange information necessary to analyze the effectiveness of alternative fishery regulatory measures in achieving conservation objectives; and,
 - (xiii) work to develop, under the direction of the Joint Northern and Southern Panels, standard methodologies for coho stock and fishery assessment; and,

- (c) unless otherwise agreed, in any area where fisheries of one Party may intercept coho stocks originating in the rivers of the other which require conservation action or such other action as the Commission may determine, that Party will endeavor to limit incidental coho catches in fisheries targeting on other species.
2. For coho stocks shared by fisheries of the United States and Canada, recommendations for fishery regimes shall be made by the Northern Panel for coho salmon originating in rivers with mouths situated between Cape Caution and Cape Suckling and by the Southern Panel for coho salmon originating in rivers with mouths situated south of Cape Caution, as provided in Annex I. At the direction of the Commission, each Party shall establish regimes for its troll, sport, and net fisheries consistent with management objectives approved by the Commission.
3. The Parties agree
- (a) for 1990, the west coast of Vancouver Island (Canadian Management Areas 21, 23, 24, 25, 26, 27, 121, 123, 124, 125, 126, 127, and 130-1) troll harvest shall not exceed 1.8 million Coho;
 - (b) for 1990, the Swiftsure Bank area will be closed to chinook and coho salmon trolling in order to address conservation concerns expressed by both Parties. Troll fishing for sockeye and pink salmon shall, upon appropriate prior notice, be permitted only in order to attain Canadian domestic troll allocation objectives on sockeye and pink;
 - (c) to avoid any alterations in coho fisheries along the west coast of Vancouver Island that would increase the proportional interception of U.S. coho stocks;
 - (d) that in 1990, for Canadian Area 20, and U.S. Areas 7 and 7A, fisheries directed at coho salmon will be permitted. Notwithstanding this agreement, if the Commission determines that conservation concerns expressed by either Party warrant further restrictions, then the Parties shall limit their catch of coho salmon to that taken incidentally during fisheries under the control of the Fraser Panel and those permitted under the provisions of Annex IV, Chapter 6. Both Parties agree that in 1987, due to conservation concerns expressed by both Parties and agreed to by the Commission, coho fisheries in Canadian Area 20 and U.S. Areas 7 and 7A shall be limited by the levels of incidental coho catch anticipated during fisheries conducted under the control of the Fraser Panel and provisions of Annex IV, Chapter 6;
 - (e) for 1990, the United States shall adhere to presently agreed management objectives in Strait of Juan de Fuca Areas 4B, 5, and 6C; and,
 - (f) to develop in 1991 and thereafter, troll fishery regimes for the west coast of Vancouver Island that
 - (i) implement conservation measures approved by the Commission and take into account any increased contributions by the Parties to the fishery; and,
 - (ii) provide for the sharing of benefits of coho production of each Party consistent with the principles of Article III.
4. Notwithstanding any other provisions of this Chapter, the Commission, for 1991 and thereafter, may set specific fishery regimes as appropriate, which may include troll harvest ceilings, for coho salmon in the intercepting fisheries restricted under this Chapter that
- (a) implement conservation measures approved by the Commission;
 - (b) take into account increased production;
 - (c) provide for the recognition of benefits of coho production of each Party consistent with the principles of Article III;
 - (d) take into account actions taken by each Party to address its conservation concerns; and,
 - (e) take into account time and area management measures which will assist either Party in meeting its conservation objectives while avoiding undue disruption of fisheries.

5. Starting with the 1987 season, a 7.5 percent management range is established above and below a catch ceiling. On a continuing basis, the cumulative deviation (in numbers of fish) shall not exceed that management range. In the event that the cumulative deviation exceeds the range, the responsible Party shall be required, in the succeeding year, to take appropriate management actions to return the cumulative deviation, plus any penalty assessed, to a level within the established management range. Negative cumulative deviations shall not accumulate below the management range. It is the intent of this section to insure that, on average, the annual catch in ceilinged fisheries is equal to the agreed target ceiling.
6. The Parties agree that enhancement efforts designed to increase production of coho salmon would, when combined with catch ceilings and/or time/area management measures, aid in rebuilding depressed natural stocks by reducing the exploitation rates on these stocks. They agree that utilizing this opportunity in the future to rebuild natural stocks is, in most cases preferable to reductions in fishing levels. A major objective of enhancement is to lay the foundation for improved fisheries in Annex areas in the future.

Chapter 6

SOUTHERN BRITISH COLUMBIA AND WASHINGTON STATE CHUM SALMON

1. The Parties shall maintain a Joint Chum Technical Committee (Committee) reporting, unless otherwise agreed, to the Southern Panel and the Commission. The Committee, *inter alia*, will undertake to
 - (a) identify and review the status of stocks of primary concern;
 - (b) present the most current information on harvest rates and patterns on these stocks, and develop a joint data base for assessments;
 - (c) collate available information on the productivity of chum stocks to identify escapements which produce maximum sustainable harvests and allowable harvest rates;
 - (d) present historical catch data, associated fishing regimes, and information on stock composition in fisheries harvesting those stocks;
 - (e) devise analytical methods for the development of alternative regulatory and production strategies;
 - (f) identify information and research needs, to include future monitoring programs for stock assessment; and,
 - (g) for each season, make stock and fishery assessments and evaluate the effectiveness of management.
2. In 1990, Canada will manage its Johnstone Strait, Strait of Georgia, and Fraser River chum fisheries to provide continued rebuilding of depressed naturally spawning chum stocks, and, to the extent practicable, minimize increased interceptions of United States origin chum. Terminal fisheries conducted on specific stocks with identified surpluses will be managed to minimize interception of non-targeted stocks.
3. In 1990,
 - (a) for Johnstone Strait run sizes less than 3.0 million
 - (i) Canada, taking into account the catch of Canadian chum in United States Areas 7 and 7A, will limit its harvest rate in Johnstone Strait to less than 10 percent, resulting in a Johnstone Strait catch level of up to 225,000 chum; and,
 - (ii) when the catch in Johnstone Strait is 225,000 chum or less, the United States catch of chum in Areas 7 and 7A shall be limited to chum taken incidentally to other species and in other minor fisheries, but shall not exceed 20,000, provided, however, that catches for the purposes of electrophoretic sampling shall not be included in the aforementioned limit;

- (b) for Johnstone Strait run sizes from 3.0 million to 3.7 million
 - (i) Canada, taking into account the catch of Canadian chum in United States Areas 7 and 7A, will limit its harvest rate in Johnstone Strait to 20 percent, resulting in a Johnstone Strait catch level of 225,000 to 640,000 chum; and,
 - (ii) when the catch in Johnstone Strait is from 225,000 to 640,000 chum, the United States catch of chum in Areas 7 and 7A shall not exceed 120,000;
 - (c) for Johnstone Strait run sizes of 3.7 million and greater
 - (i) Canada, taking into account the catch of Canadian chum in United States Areas 7 and 7A, will harvest at a rate in Johnstone Strait of 30 percent or greater, resulting in a Johnstone Strait catch level of 640,000 chum or greater; and,
 - (ii) when the catch in Johnstone Strait is 640,000 chum or greater, the United States catch of chum in Areas 7 and 7A shall not exceed 140,000;
 - (d) it is understood that the Johnstone Strait run sizes, harvest rates, and catch levels referred to in 3(a), 3(b), and 3(c) are those determined in season, in Johnstone Strait, by Canada; and,
 - (e) the United States shall manage in a manner that, as far as practicable, maintains a traditional proportion of effort and catch between United States Areas 7 and 7A, and avoids concentrations of effort along the boundary in Area 7A.
4. In 1990, the United States shall conduct its chum fishery in the Strait of Juan de Fuca (United States Areas 4B, 5 and 6C) so as to maintain the limited effort nature of this fishery, and, to the extent practicable, minimize increased interceptions of Canadian origin chum. The United States shall continue to monitor this fishery to determine if recent catch levels indicate an increasing level of interception.
 5. If the United States chum fishery in Areas 7 and 7A fails to achieve the 1990 catch levels specified in paragraphs 3(a)(ii), 3(b)(ii), and 3(c)(ii), any differences shall be compensated by adjustments to the Areas 7 and 7A fishery in subsequent years, except that chum catches below the level specified in paragraph 3(a)(ii) shall not be compensated.
 6. Catch compositions in fisheries covered by this chapter will be estimated by post-season analysis using methods agreed upon by the Joint Chum Technical Committee.
 7. Canada will manage the Nitinat net chum fishery to minimize the harvest of non-targeted stocks.
 8. In 1990, Canada shall conduct electrophoretic sampling of chum taken in the West Coast Vancouver Island troll fishery if early-season catch information indicates that catch totals for the season may reach levels similar to 1985 and 1986. Sampling, should it occur, will include catches taken from the southern areas (Canadian Areas 121-124).

Chapter 7

GENERAL OBLIGATION

With respect to intercepting fisheries not dealt with elsewhere in this Annex, unless otherwise agreed, neither Party shall initiate new intercepting fisheries, nor conduct or redirect fisheries in a manner that intentionally increases interceptions.

Appendix C

Understanding between the United States and Canadian Sections of the Pacific Salmon Commission concerning Joint Enhancement of Transboundary River Salmon Stocks

In order to implement the Understanding signed February, 1989, where it deals with joint enhancement of the Taku River, the Parties agree:

I. Project Selection:

In 1990, up to 2.5 million sockeye salmon eggs will be taken from each of Tatsamenie and Little Trapper lake stocks. Prior to the 1991 eggtakes, project selection will be reevaluated taking into account experience gained during the initial year of enhancement and further appraisal of alternative projects. Eggs will be incubated at the Port Snettisham central incubation facility. Fry will be backplanted into the agreed lake system.

Eggtakes will continue at a minimum of 5 million eggs per year through 1994. By 1995, the Parties agree to embark upon an expanded enhancement program to maximize sockeye salmon production from Tatsamenie Lake, based upon estimated juvenile rearing capacity, or to develop alternative projects of similar potential, subject to:

- a) successful renegotiation by the two Parties of the harvest share of wild and enhanced fish, the new harvest shares to start up when returns from the increased level of production are realized;
- b) evidence that enhancement of Taku River sockeye to date has been successful; and
- c) expectation of a favorable benefit: cost ratio for both Parties.

II. Harvest Sharing:

- i) To avoid impacts on co-migrating stocks and species, exploitation rates applied to Taku River sockeye in existing mixed stock fisheries in Canada and the United States, shall be at levels compatible with the maintenance of wild stocks.
- ii) The Parties agree to manage the returns of Taku River sockeye to ensure that each country obtains catches in their existing fisheries equivalent to each country's share of wild sockeye and a 50% share of enhanced sockeye.
- iii) In November 1999, the Parties shall review the harvest sharing arrangement for both wild and enhanced fish returning to the Canadian section of the Taku River.

III. Cost Sharing:

The country on whose soil the work is conducted shall bear the costs of programs associated with producing enhanced fish. The costs of producing these enhanced fish shall be shared as follows:

- i) To be paid by Canada:
 - a) Egg take;
 - b) Egg transport;
 - c) Smolt sampling;

- d) Sampling and numerical analysis necessary to determine the contribution of enhanced Taku River sockeye stocks to Canadian fisheries;
 - e) Limnology sampling and hydroacoustics; and
 - f) Investigations to determine the feasibility of using sockeye from terminal areas, surplus to brood stock and spawning requirements in enhanced systems, for cost recovery purposes.
- ii) To be paid by the United States:
- a) Construction and operation of that portion of the Port Snettisham central incubation facility that is dedicated to enhancement projects on the transboundary rivers;
 - b) Transport of fry to the enhancement site;
 - c) Sampling and analysis necessary to determine the contribution of the enhanced transboundary river sockeye salmon to the United States fisheries; and
 - d) Processing of sockeye otolith samples collected in the Taku River.
- iii) Projects to be funded jointly:
- a) Disease sampling and analysis; and
 - b) Identification and evaluation of alternative sockeye salmon enhancement opportunities in the Taku River.

Appendix D

Bilateral Northern Panel Recommendations Regarding Joint Planning Process

In recognition of the principles of the Treaty and of the need to provide increased benefits, security, and long term stability of fisheries in the Northern Boundary area, the bilateral Northern Panel will undertake a planning process to prepare for the November, 1991 PSC meetings.

The process will begin with a workshop at the February 1991 PSC meeting in conjunction with the presentation of the interim report of the Northern Boundary Technical Committee, "Bilateral Northern Panel Recommendations Regarding the Joint Technical Evaluation of the Stock Status and Catch Composition of Salmonids Harvested in Northern Boundary Area Fisheries". Each country will present details on current conduct of fisheries and management issues, and potential wild and enhanced production.

Subsequent to the workshop, a planning task force will be struck to consider opportunities/options for improved management, conservation and enhancement in the Northern Boundary Area. The opportunities/options considered should aim at increasing benefits to fishermen of both countries, optimize production, simplify management, and facilitate annual negotiations/discussions. The task force will consist of approximately eight Panel/technical members from each country. The meeting schedule of the taskforce will be established at the workshop.

In development of its report the task force will consider a comprehensive approach to the development of production potential and the improvement of salmon management in the Northern Boundary Area which is compatible with the domestic management systems of the Parties. The approach should take into account annual fluctuations in abundance and availability; control overfishing; be feasible to implement with available technical information; and improve incentives for continued and increased production. The resulting report will be presented at the November 1991 negotiations.

Appendix E

Bilateral Northern Panel Recommendations Regarding Joint Technical Evaluation of the Stock Status and Catch Composition of Salmon Harvested in Northern Boundary Area Fisheries

In recognition of the need for improved information, the bilateral Northern Panel instructs the Northern Boundary Technical Committee to complete the following assignments and present an interim progress report at the February 1991 PSC meeting:

1. Sockeye Salmon

- a. Review past catch and escapement data from the Northern Boundary area fisheries on both sides of the border and provide an assessment of the sockeye stock status and the harvest rates by fishery.
- b. Review the extent of stock composition estimates available for the mixed stock fisheries in the Northern Boundary area and compare the different stock identification methodologies used to obtain these estimates. Reconstruct, as far as possible, the sockeye runs of concern and the exploitation rates on the stocks.
- c. Identify research or monitoring programs required to improve our understanding of sockeye salmon production in the area and to improve our ability to reconstruct individual sockeye runs.
- d. Evaluate escapement goals for major sockeye stocks in the area.

2. Pink and Chum Salmon

- a. Review past catch and escapement data from the Northern Boundary area fisheries on both sides of the border and provide an assessment of the pink and chum stock status and, where feasible, the harvest rates by fishery.
- b. Evaluate the reliability of existing methodologies for stock identification of pink and chum salmon in Northern Boundary area mixed stock fisheries. Identify research or monitoring programs required to develop reliable estimates. Comment on the practicability of developing reliable annual stock composition estimates for these mixed stock catches.
- c. Where data allow, provide a joint view on run reconstruction for the pink and chum salmon runs in the Northern Boundary area.

3. Conservation Concerns

Highlight any identified conservation concerns for Northern Boundary area sockeye, pink, and chum salmon stocks. Where management actions are required to address specific stock conservation problems, identify options and data needs to address such problems.

4. Management and Enhancement Programs

- a. Describe current and proposed management and research programs pertinent to Northern Boundary area sockeye, pink, and chum salmon stocks and evaluate their adequacy in allowing the parties to meet conservation and management objectives. Identify new or expanded management investigations or research programs required by the management agencies to achieve Treaty conservation and management objectives.
- b. Describe current sockeye, pink and chum salmon enhancement programs, future enhancement opportunities that have been identified, and current or planned enhancement evaluation programs, including micro-wire tag recovery programs. Describe expected migratory patterns and contribution of enhanced stocks to Northern Boundary area fisheries and identify potential impacts on existing management programs designed to meet Treaty conservation and management objectives.
- c. Taking into account the above information, identify potential management and new enhancement programs which could provide increased benefits to fishermen of both countries.

5. Common Databases

Provide a listing or reference of agreed upon databases currently available for catch, escapement, stock composition, and other biological data for Northern Boundary area pink, chum, and sockeye salmon. Recommended ways to improve and expand the common databases needed to implement cooperative conservation, management, and enhancement programs for the mutual benefit of both countries.

Appendix F

Northern Panel

Steelhead Data Request

In recognition of the need for improved information, the Bilateral Northern Panel instructs the Northern Boundary Technical Committee (NBTC) to complete the following assignments and report to the Bilateral Northern Panel at the fall meeting in 1990.

A review of the status and harvest patterns of steelhead to include:

1. A summary of steelhead catch trends by appropriate geographic area.
2. An assessment of knowledge of stock status by appropriate geographic area, highlighting any specific conservation concerns.
3. A summary of knowledge of stock migration.
4. A summary of steelhead sport fisheries.
5. A summary of past, present or future enhancement.

Appendix G

Exclusion of Selected Terminal Area Chinook Catches from Northern and Central B.C. Chinook Catch Ceilings

In 1989 and 1990, an exclusion of portions of the chinook catches in the extreme terminal areas of the Skeena River (4-15 and the inner portion of 4-12 (River/Gap/Slough)), upper Kitimat Arm (6-1), and Bella Coola (8-10, 8-11, 8-12, 8-15) from the 1990 Northern and Central B.C. chinook catch ceiling will be allowed subject to a review of the methodologies by the Joint Chinook Technical Committee (CTC). The Parties agree for 1989 and 1990 to exclude from the Northern and Central B.C. chinook catch ceiling, catches of chinook larger than 5 pounds in the above identified areas which exceed these amounts: Skeena River 2,400; Kitimat 3,400; and Bella Coola 2,800.

If the Commission fails to approve the continuation of the terminal area exclusion program for technical reasons at the annual meeting in 1991, the terminal area exclusions for 1989 and 1990 would be deducted from the 1991 chinook catch ceiling.

In October 1990, Canada will provide a report for the 1989 and 1990 seasons to the Commission containing the following elements: the number of chinook harvested in each of the exclusion areas, by age, size, maturity, time, area, and gear; the methods and data employed for determining exclusion area catches; effort statistics by time, area, gear, and target species; estimates of stock composition for each of the exclusion areas, accompanied by the data and procedures employed to derive these estimates; and estimates of spawning escapements for natural chinook stocks.

The CTC shall review the report and provide comments and recommendations regarding the exclusion program, including, but not limited to: (a) the methods and procedures employed to monitor the fishery and estimate catches and stock compositions; (b) the delineation of exclusion areas; (c) potential impacts on depressed chinook stocks; and (d) alternative ways of establishing a base period catch level for exclusion areas. By February 1991, the Chinook Work Group will evaluate the CTC report and provide recommendations to the Commission regarding continuation of the terminal exclusion program, including procedures for estimating base period catches, and criteria to be used for selecting candidates for future terminal exclusion areas.

Appendix H

Understanding between the Canadian and the United States Sections of the Pacific Salmon Commission concerning Equity Related Issues

Recognizing the desire of Canada and the United States to develop a mutually acceptable approach to identify and resolve equity issues in a timely manner, consistent with the Treaty and Treaty Understandings, the Parties agree that the ad hoc Joint Interceptions Committee (JIC) and Joint Objectives and Goals Committee (JOGC), established by the Commission in February 1989, should complete their assigned tasks and further agree to conduct Commission level discussions on benefits and deeming.

Specifically, the Parties agree:

1. To assign to JIC the tasks defined by the Research and Statistics Committee in its recommendation to the Commission (letter to Don Collinsworth dated February 6, 1990) to produce a revised interception report (JIC 89-1) by December 1990.
2. To make every effort to resolve differences in interception estimates using the best available scientific information. In the event they are not successful, either Party may refer outstanding differences in the interception estimates to technical dispute settlement, in accordance with Article XII.
3. To resolve the differences regarding the issue of deeming for transboundary river stocks during the November 1990/February 1991 meeting cycle.
4. To task JOGC with completing its documentation of short and long-term management plans. Documentation is to be provided as envisioned in the August 31, 1989 statement of the JOGC. The Parties should make their best efforts to adhere to the following activities and time schedule:
 - (a) May 1990 - JOGC to exchange initial drafts of chapters for Northern Puget Sound and Fraser River sockeye. Chapters for Southeast Alaska and the Skeena-Nass production areas have already been exchanged.
 - (b) June 25, 1990 - JOGC meeting for evaluation of exchanged chapters and development of recommendations on content and presentation to guide development of further chapters. Exchanged chapters are to be modified to ensure conformity in style and content.
 - (c) September 1990 - JOGC to identify incompatibilities of short and long-term management objectives and production plans for chapters exchanged to date and circulate same to the Commission. The Commission should provide these to the Panels for their review.
 - (d) October 1990 - JOGC to exchange draft chapters for remainder of Fraser River, Strait of Juan de Fuca, Southern Puget Sound, Washington Coast, Upper and Lower Columbia River, West Coast of Vancouver Island and Georgia and Johnstone Straits.
 - (e) November 1990 - Bilateral discussion by the JOGC, appropriate Panel chairs and technical committee members, and others as necessary to identify incompatible short and long-term management objectives and production plans for chapters identified in 4d and circulate same to the Commission. The Commission should provide these to the Panels for their bilateral review and discussion.
 - (f) January 1991 - Bilateral JOGC/Panel discussions of opportunities for cooperative problem solving. This activity could be handled by separate or joint meetings of Panels.
 - (g) February 1991 - Commission review of chapters and problem statements and provision of direction to JOGC and/or Panels on continued development of this process. JOGC to identify and reach agreement on a workplan to ensure completion and exchange of outstanding chapters and problem statements by September 1991.

5. To conduct bilateral Panel deliberations in November 1991 through January 1992 on JOGC problem statements and opportunities for cooperative problem solving in an attempt to reach consensus on specific measures to be undertaken by the Parties to improve the stocks and fisheries to benefit the Parties.
6. In February 1992 to have the Commission review all JOGC chapters, and problem statements and Panel recommendations with a view to preparing plans that will improve the stocks and fisheries examined in this process.
7. To hold a bilateral workshop in September 1991 for the purpose of exchanging alternative technical approaches for determining each Party's benefits in relation to salmon production and interceptions.
8. To exchange views on factors affecting each Party's perceptions of benefits in relation to salmon production and interceptions. Canada will present its view early in the November 1991 meeting, followed by a presentation by the U.S. later in that meeting.
9. Completion of the foregoing is intended to provide the Commission with the information needed to address whether one country is deriving substantially greater benefits than those provided from its rivers, and, if so, how that imbalance should be addressed. The Commission will at that time initiate a process to deal with these questions, consistent with paragraph A of the Memorandum of Understanding of the Pacific Salmon Treaty (1985).

Appendix I

Pacific Salmon Commission

Approved Budget for Fiscal Year 1990/91 and Comparison with Fiscal Year 1989/90

		FY 1990/91	FY 1989/90
1.	Income		
	A. Contribution from Canada	\$ 725,000	\$ 715,000
	B.. Contribution from United States	<u>725,000</u>	<u>715,000</u>
	Sub-Total	\$ 1,450,000	\$ 1,430,000
	C. Carry-over from FY 1989/90	352,292	454,335
	D. Interest	<u>50,000</u>	<u>25,000</u>
	E. Total Income	\$ 1,852,292	\$ 1,909,335
2.	Expenditures		
	A. Salaries and Benefits	\$ 1,293,809	\$ 1,230,871
	B. Travel	108,512	126,257
	C. Rents, Communication, Utilities	120,067	100,115
	D. Printing and Publication	26,000	25,000
	E. Contractual Services	233,825	351,665
	F. Supplies and Materials	52,348	64,615
	G. Equipment	<u>53,114</u>	<u>17,000</u>
	H. Total Expenditures	\$ 1,887,675	\$ 1,915,523
3.	Balance	\$ (35,383)	\$ (6,188)
4.	Test Fishing Program		
	A. Forecast Revenues	\$ 1,065,485	\$ 1,056,211
	B. Forecast Costs	<u>818,968</u>	<u>805,155</u>
	C. Forecast Balance	\$ 246,517	\$ 251,056
5.	Projected Operating Balance (deficit)	\$ 211,134	\$ 244,868

Appendix J

Pacific Salmon Commission Secretariat Staff as of March 31, 1990

EXECUTIVE OFFICE

Ian Todd
Executive Secretary

Greta Grant
Secretary

Whittier W. Johnson
Deputy Executive Secretary

Glenna Westwood
Librarian/Records Administrator

Vicki Beck
Secretary, Meeting Planner

Elizabeth Green
Receptionist

FINANCE & ADMINISTRATION

Kenneth N. Medlock
Finance and Administration Officer

Bonnie Dalziel
Accountant

FISHERY MANAGEMENT

James C. Woodey
Chief Biologist

Jim Gable
Head, Racial Identification Group

Steve Cox-Rogers
Project Biologist, Sockeye

Bruce White
Project Biologist, Pinks

Carol Arffman
Scale Analyst

Holly Derham
Assistant Scale Analyst

Jim Cave
Head, Stock Monitoring Group

Peter Cheng
Project Biologist, Acoustics

Ian Guthrie
Head, Biometrics/Computer Services

Kathy Mulholland
Computer Programmer/Analyst/Operator

Doug Stelter
Statistician

Appendix K

Membership Lists for Standing Committees, Panels, Joint Technical Committees and other Appointments as of March 31, 1990

U.S.A.

CANADA

1 STANDING COMMITTEE ON FINANCE AND ADMINISTRATION

G.R. McMinds (Chair)
S. Stanley
C.K. Walters
J. Curtis
R. Allen

P.S. Chamut (Vice-Chair)
C.C. Graham
H. James
S.J. Brownlee

Editorial Board

N.J. Sands
J.R. Donaldson

C.C. Graham

2 STANDING COMMITTEE ON RESEARCH AND STATISTICS

J.R. Donaldson (Vice-Chair)
G.R. McMinds
D. Bevan
S.L. Marshall
J.C. Olsen
G.S. Morishima
G.R. Graves
M. Grayum
D.C. Cantillon
N.J. Sands
H.A. Schaller

S. Hewlett (Chair)
L.P. Greene
B. Riddell
L. Lapi
D. Peacock
R. Harrison
R. Kadowaki
D. Anderson
W. Saito

Research and Statistics Working Group

N.J. Sands
L. Rutter
P. Mundy
T. Cooney
R. Lincoln
C.K. Walters
J. Van Meter

A.W. Argue
S. Steele

Ad Hoc Joint Interceptions Committee

J.R. Donaldson (Commissioner)
M. Fraidenburg
G.S. Morishima
N.J. Sands

S. Hewlett (Commissioner)
A.W. Argue
R. Kadowaki
B. Snyder

Ad Hoc Joint Objectives and Goals Committee

J.R. Donaldson (Commissioner)
T.D. Cooney
N.A. Cohen
J. Curtis

S. Hewlett (Commissioner)
C.C. Graham
C. MacKinnon
D.C. Schutz

3. FRASER RIVER PANEL

R.P. Zuanich (Vice-Chair)
L. Loomis
R.A. Schmitten
R.A. Turner
R. Allen
L. Phinney
T.E. Kruse
R. Suggs

F.J. Fraser (Chair)
M. Forrest
M. Hunter
R. Kendall
J. Sam
L. Wick
E. Birch
M. Griswold
H. Matsuzaki
J. Hill
M. Williams

4. SOUTHERN PANEL

T.D. Cooney (Vice-Chair)
R.W. Whitener, Jr.
B. Bohn
K. Brigham
T.E. Kruse
R. Haindel
A.D. Austin
J.R. Van Meter
D.B. Sones
M. Cedergreen
J. Nicholas
T.R. Williams

P. Sprout (Chair)
R. Clifton
T. Davis
E. Larson
S. Steele
R. Duncan
G. Tribe
R. Fowler
W. Peterson
E. Safarik, Jr.

5. NORTHERN PANEL

N.A. Cohen (Chair)
D. Bedford
A. Enge
J. Green
D.C. Jones
S. Pennoyer
D.C. Cantillon
J. Brooks
D. Kelley
J. Peckham
J. Shelton
J. Winther

N. Lemmen (Vice-Chair)
B. Lefeaux-Valentine
M. Forand
J. Malcolm
A. Ronneseth
F. Tanaka
L. Iverson
H. Clifton
R. Kendel
R. Holkestad
D. Maxwell
R. Wilson

6. **JOINT CHINOOK TECHNICAL COMMITTEE**

W.A. Schaller (Co-Chair)
D. Bevan
P. Patillo
G.R. Freitag
D. Pitman
K.A. Henry
S.E. Ignell
R.D. Mecum
R.H. Williams
S.L. Marshall
G.S. Morishima
T.W. Roth
J.B. Scott
S. Moore

B. Riddell (Co-Chair)
P. Starr
B. Snyder
P. Ryall
T. Shardlow
N. Schubert

Joint Chinook Working Group

S. Pennoyer
R.W. Whitener, Jr.
H.A. Schaller
T.D. Cooney
J. Martin
D.G. Bedford

A.W. Argue
B. Riddell
R. Fowler
T. Davis
B. Lefeaux-Valentine
J. Malcolm
T. Shardlow

7. **JOINT COHO TECHNICAL COMMITTEE**

G.S. Morishima (Co-Chair)
J. Ramonda-Powell
J.B. Scott
R.A. Hayman
K.A. Henry
B. Williams
R.H. Williams
R. Wunderlich

R. Kadowaki (Co-Chair)
K. Pitre
N. Schubert
T. Shardlow
T. Pendray
L. Lapi
K. Wilson
S. Heizer
P. Ryall

Northern Coho

M.C. Seibel
A.M. Anderson
R. Carlson
S.H. Hoffman
L.D. Shaul
D. Gaudet

8. **JOINT CHUM TECHNICAL COMMITTEE**

G.R. Graves (Co-Chair)
R. Hatch
K.A. Henry
N. Lampsakis
R. Boomer
B. Tweit

D. Anderson (Co-Chair)
A. Gould
T. Beacham
S. Heizer
M. Joyce
W. Luedke
L. Hop Wo

9. JOINT NORTHERN BOUNDARY TECHNICAL COMMITTEE

D.C. Cantillon (Co-Chair)
N.J. Sands
J.H. Helle
P.S. Doherty
G.T. Oliver
B. Van Alen
J.J. Pella
D.B. Romey

D. Peacock (Co-Chair)
L. Jantz
M. Henderson
B. Snyder

10. JOINT TRANSBOUNDARY TECHNICAL COMMITTEE

S.L. Marshall (Co-Chair)
J.H. Eiler
W.R. Bergmann
A.J. McGregor
K.A. Jensen
J.C. Olsen
N.J. Sands
B. Lynch

R. Harrison (Co-Chair)
S. Johnston
C. Wood
P. Milligan
P. Etherton

Enhancement Sub-Committee

B. Sele (Co-Chair)
R. Burkett
J. Koenings
K. Leon

B. Morley (Co-Chair)
P. Milligan
C.J. West

11. JOINT TECHNICAL COMMITTEE ON DATA SHARING

N.J. Sands (Co-Chair)
K.A. Henry
K. Johnson
G.S. Morishima
P. Mundy
D. Bevan
J. Pavel

L. Lapi (Co-Chair)
J.H. Bjerring
M. Birch
M. Hamer

Working Group on Mark-Recovery Statistics

R. Hilborn
J.E. Clark
K.A. Henry
R. Comstock
R. Conrad
P. Lawson
J. Skalski

J. Schnute
C. Cross
L. Lapi
R. Kronlund
T. Mulligan

Working Group on Data Standards

K. Johnson
B. Johnson
C. Corrarino
D. O'Connor
R. Olson

L. Lapi
M. Hamer

Catch Data Exchange Working Group

W. Daspit
S. Johnson
S. Markey
G. Lukas
J. Pavel

J.H. Bjerring
L. Bijsterveld
V. Palermo
B. Kuhn
M. Holmes

12. FRASER RIVER PANEL TECHNICAL COMMITTEE

M. Grayum (Co-Chair)
B. Tweit

W. Saito (Co-Chair)
A. Gould
A. MacDonald

13. NATIONAL CORRESPONDENTS

C.K. Walters
J. Curtis
M.C. Seibel

C.C. Graham
H. James
D. Kowal