Pacific Salmon Commission

1991/92 Seventh 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

Seventh Annual Report 1991/92

Vancouver, B.C.
Canada

PACIFIC SALMON COMMISSION

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

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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 Seventh Annual Report of the Commission.

This report summarizes the activities of the Commission for the fiscal year April 1, 1991 to March 31, 1992.

The Commission had epected to be able to report to the Parties that significant progress had been made during this reporting period on several major longterm issues; discussions aimed at resolving the equity issue, development of long range chinook management approaches, and discussion of coho management approaches for both northern and southern coho stock complexes. A major impediment to progress on these issues occurred as a result of a disagreement which arose between the Canadian and United States sections of the Commission with respect to interpretation of catch ceiling provisions for the United States harvest of Fraser River sockeye. This issue has not been resolved, and as a result other important matters on the Commission's agenda were not addressed during the 1991/92 meeting cycle.

In accordance with agreements reached during the 1990/91 meeting cycle, a workshop on interception valuation methodologies was held in September 1991, and a preliminary review of data available on northern coho stocks took place during the annual meeting of the Commission. A workshop on southern coho stock management was also held in late February.

Reports on the results of the 1991 fishing season, meetings of the Standing Committees on Finance and Administration and Research and Statistics and the activities of the Northern, Southern and Fraser River Panels are presented in summary. Executive summaries of documents 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, 1991 to March 31, 1992, as approved by the Commission, is also included in this report.

Yours truly,

D.A. Colson
Chair

PACIFIC SALMON COMMISSION

OFFICERS for 1991/92

Chair	Mr. P.S. Chamut (to December 13, 1991) Mr. J.R. Blum (from December 13, 1991)
Vice-Chair	Mr. J.R. Blum (to December 13, 1991) Mr. P.S. Chamut (from December 13, 1991)

COMMISSIONERS

United States

Mr. J.R. Blum
Mr. G.R. McMinds
Mr. D.A. Colson
Mr. B. Wallace
Mr. H.R. Beasley
Mr. G.I. James
Mr. D.W. Collinsworth (to October 30, 1991)
Mr. C. Meacham, Jr. (from October 30, 1991)
Dr. J.R. Donaldson (to June 30, 1991)
Mr. R. Rousseau (from October 30, 1991)

Canada

Mr. P.S. Chamut
Mr. R. Wright
Mr. J. Gosnell
Mr. B. Buchanan
Mr. A.F. Lill
Mr. J. Nichol
Ms. S. Paine
Mr. N. Keitlah

SECRETARIAT STAFF

Executive Secretary	Mr. I. Todd
Administrative Officer	Mr. K. Medlock
Chief Biologist	Dr. J.C. Woodey

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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 this 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, Washington and Oregon, 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's stocks of concern are those which originate in rivers located south of Cape Caution, other than Fraser River sockeye and pink salmon. The Fraser River Panel has special responsibilities for stocks of sockeye and pink salmon originating from the Fraser River.

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 June 1, 1991 to March 31, 1991, the Commission met on four occasions:

1. Commission Executive Session
   October 30-31, 1991 - Vancouver, B.C.

2. Post 1991 fishing season meeting of the Commission
   December 9-13, 1991, Vancouver, B.C.

3. Panels' negotiating session
   January 21-25, 1992 - Vancouver, B.C.

4. Sixth Annual Meeting of the Commission
   February 3-7, 1992 - Vancouver, B.C.

This, the seventh annual report of the Pacific Salmon Commission, provides a synopsis of the activities of the Commission and its subsidiary bodies during its seventh fiscal year of operation, April 1, 1991 to March 31, 1992.

During the period covered by this report, the Commission desired to make progress on development of a longer term chinook management regime, to exchange views on each Party's objectives and goals for stocks subject to interception and for major intercepting fisheries, to resolve remaining differences between the Parties on estimates of interception.

The timetable and schedule established by the Commission at the 1991 Annual Meeting was ambitious. Progress made during the period covered in this report, particularly with respect to the major task facing the Joint Committee on Goals and Objectives, remains slower than desired.

A major disagreement arose between the two national sections on interpretation of the catch ceiling provisions with respect to United States harvest of Fraser River sockeye. Efforts to resolve this impasse occupied most of the negotiating time available during the current meeting cycle and, as a result, other important issues were not addressed in any substantive fashion. The Commission did not resolve the Fraser River sockeye issue during the 1991/92 meeting cycle; nor did the Commission reach agreement on amendment of the Portland Canal section of Chapter 2, Annex IV, the one annex provision that was up for renegotiation during this cycle. Therefore, no recommendation for amendments to Annex IV have been forwarded to the governments this year. A copy of Annex IV approved following completion of the 1991 annual meeting is included here in Appendix A. Also included for convenience are the other attachments to the 1991 letter of transmittal which were inadvertently omitted from Appendix D of the Sixth Annual Report.

The challenges facing the Commission in 1992 and beyond are prodigious. Major efforts will have to be advanced by all concerned to ensure that the cornerstone principles of the Treaty are developed and implemented to their full potential to provide security for the future of the combined fisheries resources of the two countries, as well as improved opportunities for the many diverse groups who rely on Pacific salmon for sustenance, pleasure, and profit.

Activities of the Commission

PART I
ACTIVITIES OF THE COMMISSION

A. EXECUTIVE SESSION OF THE PACIFIC SALMON COMMISSION
October 30-31, 1991 -- Vancouver, B.C.

The Commission met to review progress on tasks that had been agreed during the 1990/91 meeting cycle to initiate discussion on topics that might be considered during the 1991/92 meeting cycle, and to prepare instructions for the panels and joint technical committees. At the beginning of the meeting, Mr. Blum introduced new United States commissioner C. Meacham Jr., who replaced Mr. Don Collinsworth, and new United States alternate commissioner R. Rousseau, who replaced Dr. J. Donaldson.

1. Progress on agreed tasks

The Joint Objectives and Goals Committee reported that progress has been slower than anticipated due to the magnitude of the task assigned. The Committee presented a revised schedule for exchange of documents, discussion with Panel Chairs/Vice-Chairs, review and discussion by panels, and consideration by the Commission. This schedule, designed to complete initial reviews within the current meeting cycle, was adopted by the Commission.

The Commission received a report from the Workshop on Valuation Methodologies, which was held September 23-25, 1991. The recommendations of the Workshop to continue exploration of valuation methodologies through development of standardized terminologies and definitions, and to clarify and exchange information relevant to estimating ex-vessel, wholesale, and recreational values, and regional impacts, were adopted by the Commission.

The Joint Interceptions Committee reported that the December 1991 deadline for completion of its update could not be met. All other tasks and assignments on the agreed list are expected to be completed in accordance with their agreed deadlines (Appendix B).

2. Topics for consideration during the 1991/92 meeting cycle.

The Commission discussed and identified an agreed list of topics for consideration at the commission and panels levels as follows:

(a) Commission

(i) Issues for negotiation:

(a) The Commission agrees to consider a reduced risk adjustment level for the Southeast Alaska hatchery add-on in 1992 based upon evaluation and review by the CTC of information provided by the U.S. as described in the May 1991 Letter of Agreement.

(ii) Issues for discussion:

(a) Canada's view on "benefits equivalent to production" followed later in the meeting by a presentation of the United States view (December 1991 plenary session).

(b) Review concerns expressed by the Joint Technical Committees on Chinook and Coho relating to the use of the adipose fin clip as an exclusive mark used to identify coded wire tagged fish. The Commission requests the co-chairs of these two committees to be prepared to review the issue for the Commission in executive session during the December 9-13, 1991 meeting.

(c) United States presentation of a status report on the Endangered Species Act actions pertinent to this Commission since the last presentation.

(d) United States presentation of the status of salmon by-catch in the Alaska trawl fishery (December 1991 plenary session).

(e) Initiate discussion on the concept of "undue disruptions" as it pertains to future Commission deliberations.

(f) Agreement to schedule an informal lunch in the Commission boardroom to discuss generally how the Treaty has served the Parties to date.

(g) Identification of a task group to carry out the recommendations of the Valuation Methodology Workshop.

(b) Instructions to the Panels:

1. Fraser River Panel

No issues were identified. The Panel is instructed to proceed with the development of fishing plans for 1992 in accordance with its usual procedures.

2. Northern Panel

(a) Issues for negotiation

(i) Portland Canal chum - an expiring provision of Annex IV
(ii) Transboundary Rivers - negotiation of "deeming"
(iii) Transboundary Rivers enhancement - Stikine River and Tuya Lake enhancement plans

(b) Issues for discussion

(i) Canada's Area 3 management approach for pinks
(ii) United States catch of sockeye in S.E. Alaska District 104 after week 30.
(iii) Bilateral northern panel planning procedures (May 1990 Letter of Agreement, MOU Attachment 3)
(iv) Discussion of the growth and distribution of the S.E. Alaska sport fishery on chinook.

(v) Discussion of the growth and distribution of the S.E. Alaska sport fishery on coho.

(vi) Discussion of the United States approach to management of the 1991 S.E. Alaska troll fishery.

(vii) Discussion of the steelhead catch in S.E. Alaska net fisheries.

3. Southern Panel

(a) Issues for negotiation

No issues were identified

(b) Issues for discussion

(i) Review of Canada's 1991 Nitinat chum fishery

(ii) Harvest of chinook and coho in Canada's West Coast Vancouver Island sport fishery

(iii) Progress on Canada's Strait of Georgia chinook re-building report

(iv) Progress on Canada's Strait of Georgia coho management

(v) Discussion of the development of a formal in-season communication process

(vi) United States chinook fishery in Areas 4B, 5, and 6C

(vii) Discussion of United States coastal coho fishery off Washington and Oregon in light of the distribution of Canadian stocks in 1991

(c). Instructions to Joint Technical Committees

(i) **Chinook and Coho Technical Committees**

The Commission reviewed concerns expressed by the Joint Technical Committees on Chinook and Coho relating to the use of the adipose fin clip as an exclusive mark used to identify coded wire tagged fish. The Commission requests the co-chairs of these two committees to be prepared to review the issue for the Commission in executive session during the December 9-13, 1991 meeting.

(ii) **Chinook Technical Committee**

The Committee is requested to review Alaska's analysis of the risk adjustment factor as described in the May 1991 Letter of Transmittal, and report to the Commission in executive session during the December 9-13, 1991 meeting.

The Commission noted that additional items or assignments could be developed during the December 9-13, 1991 post-season meeting. This meeting was adjourned at noon October 31, 1991.

B. POST-1990 FISHING SEASON MEETING OF THE COMMISSION
December 9-13, 1991 -- Vancouver, B.C.

The Commission met in plenary sessions three times during the course of this meeting.

1. First Plenary Session

This session was held beginning at 9:00 a.m. December 10, 1991 to enable the Canadian section to present its views on the balance of interceptions and benefits equivalent to production of salmon from rivers of Canadian origin. Mr. P.S. Chamut, Chair of the Canadian Section, made the following statement:

> "Canada signed this Treaty because competitive overfishing was having adverse affect important salmon resources. The Pacific Salmon Commission provided a forum where the two countries could work to control interceptions and improve management and conservation of their shared resources. Improved management and conservation was the first order of business for the new Commission. The second order of business is to ensure that both Parties receive benefits equivalent to their production from their own rivers.
>
> The Canadian perception of benefits expected from the Treaty is very simple - the benefits expected are precisely those specified in the so called "Equity" principle of the Treaty, Article III paragraph 1(b): that is "...benefits equivalent to the production of salmon originating in (Canadian) rivers..." In short, Canada expects to receive benefits that would be equal to those that would accrue to Canada if there were no interceptions by either side. Canada would hope that the United States has an identical perception.
>
> Canada believes that the benefits described under the Equity principle are finite, and quantifiable, and that the principle embodied in that paragraph gives precise direction as to how the Treaty should be implemented. In Canada's view, the paragraph is not a general one, simply requesting the Parties to make their best efforts to conduct their fisheries in a manner that will result in a generally "equitable" result. Canada considers that, when appropriate agreed procedures have been developed for equating benefits accruing to each side, the Commission would make regular reviews of the impacts of the Commission's programs and would take remedial action if such programs had resulted in an imbalance in the flow of benefits. As described in the Memorandum of Understanding accompanying the 1985 Treaty, Canada expects that, and I quote "...in the longer term, if it is determined that one country or the other is deriving substantially greater benefits than those provided from its rivers, it would be expected that the Parties would develop a phased program to eliminate the inequity within a specified time period..."
>
> At the time the Treaty was signed, the United States was firmly committed to this understanding. In submitting the draft Treaty to President Reagan, Secretary of State George Shultz referred to the Commission's "...complex task of developing programs to adjust any inequity...". Chief negotiator Theodore Kronmiller, in presenting the Draft Treaty to the House Committee on Merchant Marine and Fisheries noted that: "It might be found that the United States is in a deficit position in relation to its

production of fish resources. In that case, we will have to make it up to Canada". We hope the same depth of commitment exists today.

Canadian technical specialists have made provisional assessments comparing the aggregate benefits provided to both countries from salmon production in Canadian rivers with the benefits that Canada is actually receiving through conduct of its salmon fisheries. This analysis shows Canada to be on the negative side of the balance sheet, with actual benefits being extracted from the salmon fishery falling substantially short of benefits produced from Canadian rivers. The United States is the beneficiary of this shortfall.

In light of these technical findings, and in accordance with Article III paragraph 1 (b) and the 1985 Memorandum of Understanding, Canada therefore expects that the development of Annex arrangements for 1993 and beyond will take the imbalance into account and move toward reducing it. In the longer term, Canada expects that such imbalances will be brought to zero.

The foregoing outlines Canada's position in a nutshell. Later, I would like to make some specific comments on the short-term implications of the "Equity" issue. I would also like to make some comments on technical aspects of how to measure benefits accruing to each side, recognizing that the Canadian analyses mentioned earlier have not yet been examined in detail by United States technical specialists.

In discussing the Equity Principle, it is important to present it in the context of the other provisions of the Treaty which modify and provide direction to its implementation. Accordingly, it would be appropriate for Canada to provide some comments regarding Article III paragraph 3 of the Treaty. This paragraph gives equal weight to the desirability of reducing interceptions, avoiding undue disruption, and taking into account annual variations in abundance.

Two important points can be made regarding these provisions:

First, the paragraph is a "taking into account" provision; second, all subparagraphs are of equal standing and require both sides to take all of them into consideration when developing fishing regimes.

In the past, it seemed to Canada that the United States has not been prepared to give effect to the concept of reducing interceptions, which was placed at the head of the list of factors to be taken into account when making fisheries arrangements under the Treaty. In particular, Canada has been disappointed in United States responses to Canadian proposals for reductions in interceptions in the northern British Columbia/Southeastern Alaska area.

In reviewing modifications to Treaty arrangements, Canada insists that equal attention be given to Canadian concerns about reducing interceptions. Canada might be prepared to be more sympathetic to United States concerns about disruptions, if the United States was more responsive to Canadian overtures to solve some problems within the PSC through reductions in interceptions, for example, in Southeast Alaska.

Canada is puzzled by the United States position regarding reductions in interceptions. For the past four decades, our two countries have fought side by side in bilateral, multilateral and global negotiations to establish the principles of management for

anadromous fish, almost all of which have been directed towards minimization of high seas interceptions. Furthermore, utilization of salmon by the country of origin is the keystone of the provisions of the Law of the Sea Convention regarding anadromous species.

In addition, on the east coast the U.S. has pressed continually for reductions in Canadian interceptions of U.S. origin salmon, arguing for severe disruptions in Canadian fisheries. Canada agreed to significantly adjust fisheries which resulted in passing through more U.S. origin fish.

We also note that, on occasion, for domestic purposes, the United States has drastically altered some of its west coast fisheries. There would therefore not seem to be any systematic barrier to making changes that might mitigate against the interests of particular groups of fishermen within a country. Of particular note, the United States was little concerned about existing fisheries, when, in 1978, the decision was taken to terminate the reciprocal fishing privileges.

Given these circumstances, Canada cannot seriously believe that the United States holds the principle of non-disruption of fisheries as an issue of inviolable faith.

As I stated earlier, within the context of the "Equity" provisions of the Treaty, Canada believes that the United States has an unfair share of salmon interceptions, and that in the longer term, such an imbalance must be rectified. Canada's favoured approach to righting the imbalance would be through reductions in United States interceptions avoiding "undue" disruptions and I stress the word "undue". There may be other ways, however, and if long term approaches are within the context of expanded levels of production, they will be more acceptable. That is why Canada continues to indicate its willingness to work with the United States to improve management and expand production.

Canada understands that it may take some time for the two sides to agree on a long-term approach to deal with the debt owed to Canada. In the short term, however, as specified in the 1985 Memorandum of Understanding, "the Commission's decision should take into account changes in the benefits flowing to each of the Parties through alterations in fishing patterns, conservation actions, or as the result of changes in the abundance of the runs."

For both sides, the principal benefit of the Treaty is the provision of a framework within which each country can work to increase production through better conservation. To continue to improve conservation for all species, there will be a number of measures proposed to the Commission by each side in the context of planning for 1993 and beyond.

Some of these proposals may involve balancing sacrifices on both sides of the border. In other cases, however, both countries may be asked to make sacrifices to provide benefits for fishermen of only one of the countries. While consistent with one principle of the Treaty, Article III paragraph 1 (a) dealing with cooperation to prevent overfishing, the imbalance of benefits flowing from the cooperative action would clearly not be fair and would therefore be inconsistent with the "Equity" principle unless and I stress the word unless, the side making the sacrifices receives compensation from the other side. In either case, (balancing sacrifices, or requiring unilateral sacrifices for which compensation would have to be provided), there will

be a need for making fair trades. As a basis for making such trades, there is a need for the Parties to develop technical systems for equating benefits between species, fisheries and countries.

The development of such systems represents an urgent challenge. Canada believes that the Commission should immediately embark upon a major effort to develop a system of equating benefits. This will involve important joint technical efforts. It will also require political willingness to achieve some acceptable valuation. In this regard, we believe steps should be taken to prevent technical consideration of the issues from becoming a quagmire of useless debate giving rise to indecision and delay. Canada believes it will be up to the Commission to provide hands-on guidance and leadership in the development of suitable approaches. These approaches are only going to work if they have the full support of the two sides; compromise will therefore have to play an important part in the development of approaches and in their ultimate application.

To provide some perspective to these views on the measurement of "Equity" benefits, I would now like to comment on technical aspects of the issue.

The "Equity" principle requires that the fisheries activities of the countries "...provide for each Party to receive benefits equivalent to the production of salmon originating in its waters." This would seem to require that each Party limit the benefits it gains from interceptions to an amount equivalent to the extent of benefits it loses as a result of the other side's interceptions, i.e., a net benefit of zero.

To assess whether or not a country's activities are being conducted in conformity with Article III paragraph 1 (b), a series of assessments would then be required:

1. an estimate of the total benefits that would flow to the Party if its salmon were not intercepted by the other side;

2. the values to be placed on these "reincarnated" fish;

3. an estimate of the salmon bound for the other country that were intercepted in the home country's domestic fisheries; and

4. the values to be placed on these intercepted fish.

To be in conformity with the "Equity" provision of the Treaty, the benefits accrued from intercepting fish should equal the benefits lost as the result of the other country's interceptions. In this way the home country would end up with the same total benefits as if there has been no interceptions.

This is called singular pricing whereby values used in one country would be applied to its estimates of interceptions of the other Parties fish and to estimates of these "reincarnated" fish that would have returned to home waters had they not been intercepted by the other side.

If the foregoing approach were accepted by the Parties, each side would then be required to develop its own balance sheet, listing gains and losses. Even if the two sides were completely in agreement regarding procedures and the appropriateness of pricing structures, there would be two balance sheets -- a Canadian one and a United

States one. Because prices and harvesting practices differ in the two countries, these two balance sheets would almost certainly be bound to differ to some extent. Resolution of such differences will require imaginative approaches on the part of the Commission, approaches that will depend upon political compromise rather than on formal technical procedures.

The need for such decisions on valuation approaches lies in the future. In the meantime, the most pressing need is to develop a technical base to provide a starting point for the Commission's deliberations. The Commission recognized this need and in 1989, established the Joint Interceptions Committee to provide a vehicle to accomplish three objectives:

- first, to develop annual reports of estimates by the Parties of the quantities of salmon being intercepted;
- second, to attempt to resolve remaining differences in the estimates; and
- third, to develop common methods for estimating interceptions in the future.

In 1990, the Commission agreed that a workshop should be held to explore alternative methods for valuation of benefits.

Substantial progress has been made in closing the gap between the two Parties with respect to their estimates of interceptions. Almost complete agreement has been reached for sockeye and chinook, the two most important species subject to interception. In addition, the parties are developing agreed methodologies for the next two priority species, coho and pinks, which should result in a further narrowing of the differences. At some point soon, the Commissioners should ask the Joint Interceptions Committee to array the remaining outstanding differences in ways that will allow the Commission to understand the importance of these differences and to resolve them.

Work on methods for evaluating salmon interceptions has recently been initiated with a Workshop on Valuation of Salmon Interceptions held in mid-September, 1991. The meeting was encouraging in that it appeared that both sides were attempting to develop a conceptual framework on which to base technical analyses without prejudice to the result. The issues of whether to use "singular" or "mutual" pricing or "direct" or "reverse" harvesting were discussed but no recommendations were made.

Canada believes that the work of the two Committees and other groups within the Commission providing interception data should continue.

I would now like to conclude. I believe that, when the Treaty came into force, it was viewed by both sides as being an exciting vehicle that would provide us with a comprehensive framework to solve problems neither of us had been able to solve independently.

If the Treaty does not foster positive measures to increase production, it will not be meeting the objectives established for it by the Parties. It will become stagnant, founding on sterile rehearsals of old issues and grudges. From this perspective, the "Equity" issue is a secondary one, but one that must be solved, and must be solved fairly, if we are to achieve the promise which this Treaty holds for both Parties.

For this reason we cannot let deadlock on the "Equity" issue divert us from the goal of fostering protection and expansion of the resource bases of both countries. However, the "Equity" principle does play a pivotal role by providing us with a basic "formula or yardstick", through which we can assess the fairness of proposals presented by either side for changes in fisheries.

If we can reach understandings on a general, flexible system for equating the benefits that will flow to both sides as the result of proposed actions, we then can proceed to lay the base for mutually desirable fisheries adjustments, either up or down, on an equitable basis.

The Parties must move away from using "equity", and for that matter "undue disruption", alternatively as a shield or a spear whenever it serves their purpose in blocking initiatives of the other side.

In this light, we invite you to join with us in speedily moving towards development of a pragmatic system for equating interception benefits as a basis for developing mutually beneficial fisheries arrangements on a coast-wide basis."

The first plenary session was adjourned at 10:40 a.m. December 10, 1991.

2. Second Plenary Session

The second plenary session was called to order at 4:00 p.m. December 10, 1991 to receive two reports from the United States section.

(a) Status of listings under the Endangered Species Act

Mr. Blum introduced Mr. Gary Smith, Deputy Regional Director of the National Marine Fisheries Service, Seattle, who made the following presentation on the status of listings under the Endangered Species Act:

"On November 14, NMFS announced its decision to list Snake River sockeye salmon as an endangered species under the ESA. This action becomes final on December 20 and NMFS will immediately initiate recovery planning and consultation actions to provide for the conservation of the species and its ecosystem.

The listing of Snake River sockeye culminates nearly 20 months of investigation and review by the NMFS which began in early 1990 and preceded a petition filed on April 2, 1990 by the Shoshone/Bannock Tribe of Idaho. NMFS announced the proposed listing of Snake River sockeye as endangered on April 2, 1991.

During the year review period, an open process was designed to ensure maximum public participation. A biological technical committee was formed to assist in the compilation and review of scientific information required to complete the listing decision. The 34 member biological technical committee includes prominent fisheries scientists from state and federal agencies, tribes, academia, and fishery consultants.

A policy paper also became final on November 20 for the definition of species for Pacific salmon (i.e. distinct population segments) that is an essential component of the listing decision process.

Although the law allowed a full year before announcing a final decision on listing, the NMFS completed the process in seven months in an effort to accelerate recovery planning.

The announced listing of Snake River sockeye which becomes effective on December 20, allows NMFS to proceed with the selection of a recovery team who will be responsible for preparing a recovery plan. The team is expected to be small, probably fewer than ten persons, and comprised of eminent scientists representing biology, economics and engineering disciplines. They will have at their disposal, the BTC, and ETC recently formed to address critical habitat requirements of ESA, and engineering expertise as necessary to consider recovery needs throughout the life cycle of the species.

NMFS expects to have a recovery plan available for public review in about one year.

Another important component of ESA is the Section 7 consultation process. The ESA instructs the Secretary of Commerce or his designee to consult with federal agencies whose actions may affect listed species. An agency action includes activities federally funded or permitted as well as programs carried out by a federal agency. The consultation, concluding with NMFS's written biological opinion, assists the federal agency in meeting its statutory obligation to 2-4ensure that the action will not "jeopardize" the continued existence of the species or adversely affect its habitat. We are currently working with federal agencies which have programs affecting sockeye spawning and rearing areas, down-stream passage for juveniles, ocean and inriver harvests and upstream passage of adults back to their spawning grounds.

Finally, I should mention the status of other Columbia River basin stocks that have been petitioned for listing under the ESA. On June 7, 1990 Oregon Trout and four co-petitioners requested that lower Columbia River coho, spring, summer, and fall Snake River chinook be listed. After scientific review, NMFS found that Snake River spring and summer chinook together were a distinct population segment and along with fall chinook both qualified as a species and were proposed for listing on June 7, 1991. Lower Columbia River coho did not qualify as a species and were not proposed for listing. The decision process for final listing of the Snake River chinook stocks is expected to be completed early next year. If any of those stocks are listed, they will be added to the recovery and consultation process so that all listed species will be treated as a complex within the Snake River basin."

After a series of questions posed for clarification by Canadian commissioners, Mr. Chamut expressed appreciation for Mr. Smith's presentation which provided an opportunity for the Canadian section to gain a better understanding of this complex issue.

(b) Report on salmon by-catch in United States trawl fisheries in the Gulf of Alaska

Mr. Blum described the United States trawl fishery in the Gulf of Alaska, Bering Sea and Aleutian Islands. He stated that by-catch of chinook in these fisheries had become a concern to the North Pacific Fisheries Management Council. The problem is not new as foreign fisheries also used to catch salmon during their groundfish activities.

Numbers of salmon caught have fluctuated, but have escalated significantly in the last two years. In 1990 approximately 28,000 chinook were taken incidentally, while in 1991 the total

to mid-summer reached over 77,000. The Council has reacted to this problem and at its meetings last week initiated plans to reduce this catch in 1992.

Mr. Blum noted that stock composition data are being analyzed now. Coded wire tag recoveries in 1991 totalled between 19 and 22. Of these 2 - 4 are of Alaskan origin and the remainder are from British Columbia and the U.S. Pacific northwest. The analyses are ongoing and more details should be available in January.

Efforts to reduce this by-catch has been focused on two fisheries. The incidence of salmon during the January 1-20 period of the Bering Sea and Aleutian pollock fishery in 1990 and 1991 was high. For 1992, this fishery will not be opened until January 20 at the earliest.

The March rockfish fishery in the Gulf of Alaska also, for some vessels in particular, resulted in a significant level of by-catch. This fishery will not be opened until July of 1992.

In addition to these changes to the fishing season, the Council has established limits on the by-catch of salmon beyond which individual vessels and the fleet as an aggregate could be shut down. For the Bering Sea and Aleutian Islands pollock fishery, the limit is .002 salmon per metric ton. Groundfish quotas respectively are approximately 2,000,000 and 500,000 tons annually. The actions the Council has taken are designed to reduce the by-catch to 10,000 chinook from 78,000, and at the same time enable the groundfish fishery to achieve 90-93% of their quotas.

The Council has instructed NMFS to manage the by-catch on a real time basis to seek compliance from individual vessels as well as the fleet in aggregate. The legal problem of enforcing this approach on individual vessels is being worked on actively at present. If the actions taken during 1992 prove to be not satisfactory, new or modified standards will be set for 1993, including completion of the legal framework with respect to incentives for individual vessels to comply with the standards.

Mr. Chamut expressed appreciation for the reports provided by the United States section and adjourned the session at 5:00 p.m. December 10, 1991.

3. Third Plenary Session

The third plenary session of this meeting was called to order at 10:00 a.m. December 12, 1991 for presentation by the United States section on its views on factors affecting benefits in relation to salmon production and interceptions. Mr. Blum, on behalf of the United States delegation, presented the following statement:

"On behalf of the U.S. Section, it is my pleasure today to present our views on factors which affect our perceptions of benefits in relation to salmon production and interceptions. This presentation is one part of an agreement reached by the Commission in May of 1990 that addressed a number of equity related issues. We found the Canadian presentation very interesting and informative and extend our thanks to the Canadian section for clarifying its perceptions on these important issues.

Let me begin by providing some background and a brief summary of the U.S. position regarding the Treaty principle that "*...each Party (is) to receive benefits equivalent to the production of salmon originating in its waters.*"

I. Background

The basic principles and considerations laid out in Article III of the Treaty represent the results of years of discussion and negotiation between our two countries. The Treaty puts a high priority on two basic principles: the Parties are to work together (1) to prevent overfishing and provide for optimum production, and (2) to provide for each Party to receive benefits equivalent to the production of salmon originating within its waters. These fundamental principles are complemented by some specific considerations, including the desirability of avoiding undue disruption of fisheries, the desirability of reducing interceptions and a recognition of variation in annual stock abundance. The Treaty places these principles on equal footing. The principles, along with the specific considerations, must be interpreted and implemented in concert with one another.

The Treaty and the accompanying Memorandum of Understanding clearly recognized that it would be some time before the Commission would develop programs to implement the provisions of Article III 1(b) in a complete and comprehensive manner. The reasons identified in the M.O.U. include a lack of complete information on interception levels, and a recognition that the methods used to evaluate benefits accruing to each country are complex and may differ. In the short-term, the Commission was instructed to *"ensure that the annual fishery regimes and understandings regarding enhancement are developed in an equitable manner."*

We believe that the Commission has made good progress on the equity issue, and the U.S. is fully committed to continuing these efforts. The U.S. takes all of the Treaty principles seriously and has pursued an approach with Canada that we believe will be productive for both countries. I would briefly like to review that approach.

II. Review of Current PSC Approach

Canada and the U.S. have agreed to pursue a two track approach to address the equity principle. This includes: (1) emphasizing the development of agreed upon estimates of interceptions which also improve the basis for resource management; and (2) discussing long-term objectives for the salmon fisheries of both countries. We have undertaken this two-track approach based on our belief that the Commission's approach to implementing the Treaty must be positive and oriented toward improving the fisheries and salmon production of both countries. We believe that developing a better understanding of interceptions and of each other's long-term objectives for fisheries and fish production will establish an appropriate foundation for addressing management, conservation and equity issues.

III. Comments on Canadian Presentation

We are pleased to note that several of the ideas expressed by Canada in its presentation on Tuesday appear to be consistent with some of our thoughts on the subject of equity.

First, both countries recognize that equity cannot be viewed in isolation, but must be examined within the context of all the principles and considerations expressed in Article III.

Second, lack of agreement on equity and other principles and considerations has interfered with the ability of both countries to work cooperatively.

Third, we share the understanding that in the event that either country receives substantially more benefits than it is due from its own production, it is that country's responsibility to develop proposals to address that imbalance through enhancement or fishery adjustments. This is consistent with statements made in 1985 by George Shultz to President Reagan. We have not wavered from that commitment, but the existence of an equity imbalance in either Party's favour has not been established.

Fourth, we agree that the Commission's approach to implementing the Treaty must be positive and work toward realizing the promises of the Treaty for resource conservation and improved fisheries.

Lastly, it appears that Canada interprets equity under the Pacific Salmon Treaty as a condition where a Party gains as many benefits from its interceptions as it loses as a result of the other Party's interceptions. On the surface, this concept appears to bear some similarities to our preliminary thoughts on a "combination approach". Such an approach would involve direct and reverse valuation and include consideration of both economic benefits, and values of fish and fishing that cannot be expressed in economic terms. We remain sceptical as to the feasibility of expressing these values in a balance sheet under this approach. However, even if the two balance sheets integral to this approach could be developed, four possible outcomes can result, including the possibilities that one Party is in equity at the same time the other is out of equity or that both Parties are out of equity.

While we are encouraged by the many similarities in perspectives between the United States and Canada, important differences still exist.

First, it is our understanding that the singular pricing concept presented by Canada to the valuation workshop rests on a number of problematic assumptions. This includes the general assumption that *all* benefits are finite and quantifiable in common terms.

Second, we differ as to the feasibility of developing, either through technical or political means, some mutually-acceptable equity currency that would adequately capture our respective perceptions of all benefits associated with fish and fishing in the near term. This would require us to ignore issues that are difficult to address, and to make simplifying assumptions that may lead to erroneous conclusions.

Third, the U.S. and Canada differ as to their preferred approaches to correct equity imbalances should they be demonstrated to exist. On Tuesday, Canada stated that its favoured approached would be for the country with the equity advantage to reduce interceptions. We do not share this view. Nor do we believe that a Party is entitled to unilaterally increase its interceptions to correct a perceived equity imbalance. We believe that the Treaty must be supported by both governments and their constituencies if it is to endure. We do not believe that the Treaty can survive if it is viewed as a threat to established fisheries simply because they may intercept salmon. In our view, we prefer actions to correct equity imbalances that improve fisheries and increase resources available to both countries, rather than reduce or disrupt fisheries.

Fourth, the U.S. and Canada differ as to the obligations of one Party to correct equity imbalances resulting from unilateral decisions made by the other Party for domestic conservation or allocation.

Lastly, Canada has concluded that the U.S. enjoys an equity imbalance in its favour. We do not agree that an equity imbalance has been established and we do not concur with this conclusion. Many questions and issues must be addressed before either Party would be capable of making such a determination. We believe that full exploration and understanding of the issues involved in alternative valuation approaches is absolutely essential. It is not realistic to expect a Party to accept the premise that an equity imbalance exists and agree to initiate corrective action based solely on the perceptions and analyses prepared by the other Party.

IV. Factors That Affect the Perception of Benefits

The language that describes the Treaty's equity principle was very carefully chosen. Clearly, it conveys the notion that equity is a national, not a regional, obligation. Use of the term "benefits" means equity involves some assessment of the full range of benefits derived and costs incurred by each Party with respect to salmon resources. Some of these benefits can be expressed in comparable terms such as economic values; some cannot. I do not intend, today, to provide an exhaustive review of all of the potential factors that affect our perception of benefits. Rather, I will focus on some of the more important factors that the U.S. believes must be considered.

- Some benefits can, at least in theory, be quantified and expressed in economic terms. The economic benefits derived from commercial fishing is the most familiar example.

- There are also non-economic benefits associated with fish and fishing that cannot be quantified in economic terms. For example, one of the benefits derived from salmon is the ability to meet obligations to Indian Tribes in compliance with Article XI of the Treaty. Those obligations require that conservation of resources be assured and that fish be available for harvest. Similarly, values associated with the opportunity to fish in a particular place and the value of maintaining genetic diversity of the resource are not readily expressed in simple monetary terms. In some instances, the U.S. has placed a great deal of importance on protecting and restoring specific runs of fish.

- Economic benefits flowing from some fisheries cannot be fully separated from non-economic values. For example, both Parties intentionally allocate a significant portion of their harvest to fisheries and uses which provide less than maximum economic benefits. This clearly reflects the reality that there are benefits, such as social benefits, related to fish and fishing that simply are not fully represented by price alone.

- The U.S. has identified technical issues inherent in the quantification of valuation. For example, if ex-vessel prices are used to represent the benefits from commercial fishing, how would we deal with the fact that ex-vessel prices are not always comparable? In both Canada and the U.S., perhaps even between regions within a country, the prices paid to fisherman may or may not reflect such components as moorage, ice, engineering services, post-season bonuses, seasonal market variations, partial processing, and collective bargaining

arrangements between fishermen and processors. If benefits are measured at the wholesale or regional level, a number of other factors must be addressed.

- Valuation of salmon harvested by sport fisheries raises an entirely new set of issues. Here the benefits derive in part from the experience of fishing rather than directly from the fish that may be caught. With sport fisheries, value is not in the catch *per se* but rather in the opportunity to catch; we can only estimate economic values associated with recreational fishing using indirect means. The results may not be directly comparable to commercial fishery benefits. Furthermore, not all recreational benefits are quantifiable in economic terms.

- Aside from methods of valuation, there is a need to examine the full range of types of benefits associated with fishing and salmon production. For example, a better understanding is required regarding positive and negative equity implications of various types of salmon production; this may include the extent to which enhancement by one Party impacts the fisheries and resources of the other.

- Additional factors affecting our perceptions of evaluating benefits are the reliability and completeness of the data being used. When estimates are used to form the basis of equity discussions and positions between the two Parties, each Party must have confidence in the data and estimates being used.

We hope we have conveyed a sense of the complexity that must be dealt with to address equity in a comprehensive manner. We cannot ignore these important issues, or use invalid assumptions, to circumvent addressing these problems. Equally, we must not use the complexity to prevent progress on Treaty principles.

V. Where Do We Go From Here?

Since 1985, the Parties have worked to develop management regimes that adhere to the Treaty's basic principles. Our joint efforts since that time, have been productive and have advanced our understanding of many of the particular considerations involved. The question, now, is how do we continue to build on this progress?

The U.S. believes that the Commission should continue its joint efforts regarding equity. We believe the U.S. and Canada must continue to address this principle in the full context of all the principles and considerations laid out in Article III of the Treaty. To this end, we recommend the following activities:

1) Continue the Joint Interception Committee (JIC) process to improve our estimates of interceptions, narrow the differences, and address the significance of uncertainty associated with some of the estimates.

2) Increased commitment by both Parties to the Joint Objectives and Goals Committee (JOGC) process to clearly describe their objectives for fisheries and salmon production, and to carry out a process to identify and reconcile areas of incompatibility, as well as to take advantage of opportunities for mutual gain. We believe this approach can produce positive benefits to the fishermen of both countries.

3) Assign a small ad hoc task group to work toward developing a detailed common set of terms and definitions. At the Valuation Workshop, held in Kah-Nee-Ta, Oregon, it became obvious that one task which faces the U.S. and Canada, before we can proceed much further, is the development of common definitions for certain economic terms. Subtle, but important, differences in connotation of some terms held by the two Parties, can make communication difficult and misunderstanding easy.

4) We suggest conducting a workshop to consider, in more technical detail, some of the economic factors affecting values associated with benefits from production.

5) We recognize that the ongoing process of refining estimates of interceptions and establishing and reconciling goals for our respective fisheries will take some time. In the absence of agreement on the status of equity, we need to avoid actions, such as unilaterally increasing interceptions to correct perceived imbalances, which promote conflict and polarization. We need to create and sustain a positive environment within within which the Panels can make substantive progress on important regional issues.

   Accordingly we propose that the parties begin developing, in the 1991/92 cycle, operational guidelines to prevent equity issues from precluding our ability to respond to pressing conservation needs, or to adjust production or the management of fisheries to better meet our respective needs. These guidelines should be designed specifically to allow the Panels to focus on developing practical, "win-win" arrangements.

   We believe that this approach provides the framework within which: (1) each Party can judge benefits across its full range of considerations; and (2) the Commission can coordinate the development of management and production regimes to address imbalances that occur.

VI. Concluding remarks

We appreciate this opportunity to share our perspectives on factors involved in perceptions of benefits. We should all be encouraged by the generally positive tone of both Parties' presentation this week, and by the fact that we appear to share similar views on a number of important issues related to equity. The exchange of views this week, and the other steps undertaken over the last few years on issues related to equity, form a solid foundation for progress on fulfilling the promises of this Treaty. We look forward to continuing these efforts, and to the continuing challenge of finding imaginative, flexible ways to overcome remaining issues so we can improve the fisheries and salmon resources for both Parties."

Mr. Chamut expressed appreciation for Mr. Blum's presentation which has provided the Canadian delegation a better understanding of the United States points of view. The presentations made at this meeting will enable the two sections to improve their focus on this issue. He thanked the efforts of everyone who has worked hard to make this meeting a success. He, joined by Mr. Blum, wished all members of the delegations a happy holiday season.

The plenary session was adjourned at 10:35 a.m. December 12, 1991.

The Commission also met in executive session on December 11, 12 and 13. During the executive sessions, discussion was initiated on a number of the topics identified during the October 1991 meeting. Post-1990 season fishery reports and enhancement program updates were exchanged (see Section IV).

The Commission reached conclusion on a number of administrative items:

1. Planning for the 1992/93 meeting cycle

   The Commission reviewed plans for the 1992/93 meeting cycle and adopted the following amended schedule:

   (a) Commission Executive Session
   October 20-22, 1992 - Juneau, Alaska

   (b) Post-1992 Fishing Season Meeting
   November 30-December 4, 1992 - Vancouver, B.C.

   (c) Panels' Negotiating Session
   January 21-29, 1993 - Vancouver, B.C.

   (d) Eighth Annual Meeting of the Commission
   February 8-17, 1993 - Bellevue, Washington

2. Review of proposals to desequester the adipose fin clip as an exclusive mark used to identify coded wire tagged salmon

The Commission reviewed concerns raised by the Joint Chinook and Coho Technical Committees regarding proposals to desequester the adipose fin clip for use on otherwise unmarked upper Columbia River hatchery fish. The Commission agreed that this approach could jeopardize the coastwide CWT program currently in place, and forwarded a letter to the Pacific States Marine Fisheries Commission registering the Pacific Salmon Commission's concerns and opposition.

3. Identification of Valuation Methodology Workshop Task Force

The Commission, at its October meeting, accepted the report of the Valuation Methodology Workshop. In order to implement the recommendations contained in the Workshop report, the Commission named the following task group:

(a) United States - Mr. M. Seibel
Dr. G. Morishima
others if required

(b) Canada - Mr. C.C. Graham
Mr. A.W. Argue
Ms. Mary Hobbs
An industry representative (to be named later)

4. Appointment of officers for 1991/92

Effective December 13, 1991, the new slate of officers for the Pacific Salmon Commission was identified as follows:

(a)	Commission Chair	U.S.	Joseph R. Blum
(b)	Commission Vice-Chair	Can.	P.S. Chamut
(c)	Fraser River Panel Chair	Can.	F.J. Fraser
(d)	Fraser River Panel Vice-Chair	U.S.	D. Austin
(e)	Northern Panel Chair	U.S.	K. Duffy
(f)	Northern Panel Vice-Chair	Can.	N. Lemmen
(g)	Southern Panel Chair	Can.	P. Sprout
(h)	Southern Panel Vice-Chair	U.S.	T. Cooney
(i)	Meetings of the Northern and Southern Panels - Chair	Can.	P. Sprout
	- Vice-Chair	U.S.	Vacant
(j)	Meetings of the Fraser and Southern Panels - Chair	U.S.	D. Austin
	- Vice-Chair	Can.	F.J. Fraser
(k)	Stan. Comm. on F&A - Chair	U.S.	G.R. McMinds
(l)	Stan. Comm. on F&A - Vice-Chair	Can.	P.S. Chamut
(m)	Stan. Comm. on R&S - Chair	Can.	S. Paine
(n)	Stan. Comm. on R&S - Vice-Chair	U.S.	Vacant

C. PANELS' NEGOTIATING SESSION AND MEETING OF THE COMMISSION
January 21-25, 1992 -- Vancouver, B.C.

The Commission met in executive session beginning at 10:00 a.m. January 22, 1992. The purpose of the sitting was to enable the United States to describe its position regarding Fraser River sockeye caught at Noyes Island in Southeast Alaska. The Commission discussed the implications the United States position could have on harvest sharing arrangements for 1992.

The second sitting of the Commission was held in executive session beginning at 4:30 p.m. January 22, 1992. At this session, the Canadian section responded to the United States position concerning the treatment of the Noyes Island catch of Fraser River sockeye and presented a proposal for resolution of the issue.

No further sittings of the Commission took place during the balance of the meeting.

D. SEVENTH ANNUAL MEETING OF THE COMMISSION
February 3-7, 1992 -- Vancouver, B.C.

The Commission met in executive session throughout the Annual Meeting. At the first sitting, starting at 10:00 a.m. February 5, 1992, the Commission established its agenda and workplan for the balance of the meeting. The United States section reported that low pre-season forecasts for coho and chinook abundance in Washington and Oregon are of serious concern and reported on management actions being taken with respect to stocks listed under the Endangered Species Act.

The second executive session began at 5:00 p.m. February 5, 1992. The United States provided a detailed oral response to the January 22, 1992 Canadian proposal with respect to Fraser River sockeye harvest sharing arrangements for 1992. The Canadian section responded in detail.

The third, and final, sitting of the Commission in executive session was brought to order at 10:30 a.m. Friday, February 7, 1992. The Commission adopted the minutes of the December 9-13, 1991 meeting and received and adopted a report from the Standing Committee on Finance and Administration. In particular, the Commission's budget for fiscal year April 1, 1992 to March 31, 1993 was approved (Appendix C).

The United States section provided an informal response to Canada's position concerning Fraser River sockeye and noted that a formal written response would be forwarded sometime within the next few weeks. The Canadian section withheld response pending receipt of the United States formal written position.

The Commission discussed the possibility of conducting a concluding session of this meeting and agreed that it could not take place prior to the end of April. Consultation will occur between the heads of delegations following Canada's receipt and evaluation of the United States paper. The sitting, and the Seventh Annual Meeting, was adjourned at 11:00 a.m. Friday, February 7, 1992.

Consultations between the heads of delegations took place during March and April. As of April 30, 1992 no further sessions of the Commission had been scheduled to attempt to resolve issues pertaining to the 1991/92 meeting cycle.

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 on two occasions during the 1991/92 fiscal year: on May 17, 1991 in Vancouver, B.C. in conjunction with the concluding session of the Sixth Annual meeting; and on January 3, 1992 in the offices of the Commission, Vancouver, B.C.

1. Meeting of the Committee - May 17, 1991 -- Vancouver, B.C.

The Committee reviewed staff organizational and re-classification proposals presented by the Executive Secretary and discussed the financial implications involved. The Committee reviewed and approved revisions to the budget for FY 1991/92.

2. Meeting of the Committee - January 3, 1992 -- Vancouver, B.C.

The Committee met in the offices of the Commission on January 3, 1992 to review financial reports on 1991/92 operations, discuss budget proposals for 1992/93 and beyond, and to review other administrative items.

The Committee first reviewed reports on expenditures in 1991/92 to date, including forecasts of the Secretariat's financial position at year-end. The staff forecast an unexpended balance of approximately $300,000 at year-end, $210,000 of which comes from a combination of 1991 test fishing operations and a significant recovery of funds owing from 1990 operations. The Committee recommended that these funds be carried forward to FY 1992/93 to provide a partial offset of program costs which are forecast to total approximately $1,994,000. The Parties have agreed to provide an increase of approximately $11,500 each for FY 1992/93, which brings the total from each country to $836,500. This level of contributions, along with forecast interest income, will result in a balanced budget for FY 1992/93.

The Commission was asked to note that 1992/93 operations represent the low point in the Secretariat's operational requirements, particularly in its support of Fraser Panel activities. A significant funding problem will exist in FY 1993/94 if a substantial increase in contributions is not received from the Parties. At 1992/93 contribution levels, the Commission faces a forecast shortfall of $490,000. Funding strategies are currently being explored by the Committee in consultation with the Parties, and the outcome will be reported to the Commission in due course.

The Committee recommended adoption of the budget for FY 1992/93.

The Committee reviewed the previously agreed meeting schedule for 1992/93 and locations and dates proposed for meetings in the 1993/94 and 1994/95 cycles (Appendix D). In order to ensure that the Secretariat is able to secure space requirements on the desirable dates and at the desired locations, the Committee recommended that the Commission adopt the proposed schedule.

The Committee reviewed the status of the Deputy Executive Secretary's position. The United States section of the Committee strongly believes that the Deputy's position should be filled as quickly as possible. The Canadian section does not see the necessity for continuance of this position but accepts the United States' view. The Committee has struck a drafting group comprising Mr. Allen, Mr. Graham and Mr. Todd to review the Deputy's role and prepare a draft job description for submission to the Commission for approval. The Committee recommended that the draft be submitted to the Chair and Vice-Chair of the Commission for approval. It was also agreed that a hiring committee will be established by the Commission.

Other administrative items discussed by the Committee are ongoing and required no action by the Commission.

Secretariat Staffing Activities

(a) Departures

1. Mrs. Glenna Westwood, librarian, resigned effective April 30, 1991 to pursue a family career in Lethbridge, Alberta.

2. Mr. Steve Cox-Rogers, biologist, resigned effective January 31, 1992 to accept a position with Canada Department of Fisheries and Oceans in Prince Rupert.

3. Mrs. Elizabeth Green, receptionist, retired effective February 29, 1992.

4. Ms. Vicki Beck, meeting planner, resigned her full time position February 29, 1992 following her marriage to Mr. Paul Ryall, she resumed her duties part-time effective March 15, 1992.

(b) Arrivals

1. Ms. Teri Tarita, librarian, May, 1991.

2. Ms. Janice Abramson, secretary, May, 1991.

3. Mr. Mike Lapointe, biologist, March, 1992.

The staff organizational structure and list of employees at March 31, 1992 is presented in Appendix E.

Commission Committees and Panels membership list

An updated membership list for standing committees, panels, joint technical committees, sub-committees, and ad hoc working groups as of March 31, 1992 is presented in Appendix F.

B. MEETINGS OF THE STANDING COMMITTEE ON RESEARCH AND STATISTICS

No meetings of this Committee were held during this reporting period, although the Research and Statistics Working Group held two conference calls to develop an agenda for the Committee's meeting originally planned for December, 1991. At the January PSC meeting the agenda and date (April 13-15, 1992 in Victoria) for the full Committee meeting were finalized.

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 1991 fishing season.

The Panel reviewed the outcome of the 1991 season and initiated discussions on fishing plans for 1992 sockeye fisheries at the December 1991 post-season meeting. Discussion ceased, however, following clarification of the United States position with respect to its allowable harvest of Fraser River sockeye for 1992, the fiscal year of the original catch sharing provisions of the Fraser River chapter of Annex IV. This issue has been discussed by the Commission in executive session, but to June 30, 1992 no resolution has been accomplished.

The Commission Secretariat's fishery management staff prepared, on behalf of the Panel, an annual report on the 1991 Fraser River sockeye and pink salmon fisheries. The executive summary is contained within Part IV, Section A of this report.

B. NORTHERN PANEL

The Northern Panel met in conjunction with the Commission during the 1991/92 meeting cycle. During the December 9-13, 1991 post-season meeting, the Panel reviewed and discussed the operation of northern and transboundary area commercial and recreational fisheries and joint enhancement activities during 1991. The United States section also tabled a position paper on an expiring provision of Annex IV regarding Portland Canal chum stocks.

The Panel met again in the course of the January 21-25, 1992 meeting to discuss Canada's management approach with respect to Area 3 pink salmon, and to exchange views on the transboundary rivers "deeming" issue. The Portland Canal chum issue was also discussed.

The Panel met during the Seventh Annual Meeting of the Commission to review a draft report presented by the Joint Northern Boundary Technical Committee concerning the conduct of fisheries and status of sockeye, pink and chum salmon stocks in the northern boundary area. The Panel also conducted a Northern Coho Workshop with first a review of a Joint Coho Technical Committee Northern Panel Area coho stock status report, followed by a discussion on each country's research needs and priorities. A report to the Commission is to be prepared by the Chair and Vice-Chair of the Panel.

C. SOUTHERN PANEL

The Southern Panel did not meet in full bilateral session during this meeting cycle.

Review of 1991 Fisheries and Treaty-related Performance

PART IV
REVIEW OF 1991 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. 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 Pacific Salmon Treaty, the Fraser River Panel is responsible for in-season management of fisheries that target on Fraser River sockeye and pink salmon within the Panel Area. Prior to the onset of the fishing season, the Panel recommends a fishing regime and a management plan for Panel Area fisheries to the Pacific Salmon Commission (PSC). The plan is based on abundance forecasts and escapement goals for Fraser River sockeye and pink salmon stocks provided by Canada Department of Fisheries and Oceans (DFO), international allocation goals set by the Treaty, domestic allocation goals set by each country and management concerns for other stocks and species also identified by each country.

In-season, to achieve the objectives of the management plan approved by the PSC, the Panel uses commercial and test fishing data and various analyses from PSC staff to modify the fishing times in the management plan. In 1991, 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.

Achievement of the domestic allocation goals of Canada and the United States is a major focus of in-season management and, in general, has been met successfully by the Panel. Resource conservation and international allocation goals take precedence over domestic allocation objectives, however, when trade-offs among these three objectives are necessary.

The 1991 fishing season was the third year of the second four-year cycle (1989-92) covered by the Pacific Salmon Treaty. The pre-season forecast of run size was 14,500,000 Fraser River sockeye salmon and the TAC was expected to be about 8,336,000 fish. The forecast run size and TAC of Fraser River pink salmon was 11,000,000 and 6,480,000 fish, respectively.

Canada set the pre-season goals for gross and net escapements of Fraser River sockeye salmon at 4,575,000 and 3,775,000 adults, respectively. The gross escapement goal for Fraser pink salmon was 4,500,000 fish. The net escapement goal for pink salmon was the same since small Indian food fishery catches were anticipated.

The United States elected to harvest 1,800,000 sockeye in Washington State waters from their remaining allocation for 1989-92. For Fraser River pink salmon, the United States allocation was forecast to be 1,666,000 fish (25.7% of the TAC) plus 241,000 fish for a partial payback of catch shortfalls in previous years, giving a total of 1,907,000 fish in 1991.

The United States goals for the domestic allocation of Fraser sockeye among Washington fishermen was: Treaty Indian - 90,000 in Areas 4B, 5 and 6C and 700,000 in Areas 6, 7 and 7A for a total of 790,000 fish; and Non-Indian - 500,000 to purse seines, 450,000 to gillnets and 60,000 to reefnets for a total of 1,010,000 fish. The United States harvest of pink salmon was to be divided equally between Treaty Indian and Non-Indian fishermen. Although no gear allocation goals were set for the pink salmon net fishery, the United States did specify a harvest quota of 160,000 pink salmon in the Washington Non-Indian troll fishery in Areas 3 and 4.

The Canadian share of the TAC was 6,536,000 Fraser sockeye, to which was added 1,889,000 fish because they allowed 276,000 fish from their 1987 TAC to spawn in exchange for future benefits (i.e., Canadian Escapement Add-on Benefit), for a total share of 8,425,000. Out of this amount, commercial fisheries were expected to harvest 7,910,000 sockeye and 525,000 were expected in Indian food and other non-commercial fisheries. The Canadian share of Fraser River pink salmon was a catch of 4,573,000 fish in all fisheries.

Domestic allocation goals in Canada were more complex than previously, involving a different percentage allocation among the commercial gear for the first 3,200,000 fish caught than for catches exceeding this amount, and paybacks among the gear to compensate for catch shortfalls in previous years. The allocation of southerly migrating pink salmon was: purse seines - 58%; outside trollers - 29%; gillnets - 9%; and inside trollers - 4%.

The Fraser River Panel established pre-season regulations and a management plan based on the forecasts for run sizes, migration timing and Johnstone Strait diversion rates; the goals for catch and escapement; and conservation concerns for other species and stocks of salmon identified by the Parties. The peak in migration timing through Juan de Fuca Strait (Area 20) for the major sockeye stocks, Chilko and Adams/Lower Shuswap, was expected to be July 31 and August 16, respectively. Fraser River pink salmon were expected to peak close to August 26. The percentage of fish that migrate through Johnstone Strait was forecast to be 25% for Fraser sockeye and 30% for Fraser pinks.

To ensure that the goals were achieved, the Panel met much more frequently than usual (39 times) throughout the fishing season to enact regulations. The numerous meetings were necessary because of the complex allocation goals and because run sizes, migration timing and diversion rates deviated widely from pre-season forecasts.

The total return of Fraser River sockeye salmon was about 12,291,000 fish, 2,209,000 less than forecast, but the largest return on the cycle since 1899. Total catches were 8,094,000 in commercial fisheries, 696,000 in Indian food fisheries and 176,000 in other fisheries. United States commercial fishermen caught 1,868,000 Fraser River sockeye salmon, including 51,000 in Alaska, while Canadian fishermen caught 6,226,000 Fraser sockeye. For Fraser River pink salmon, the run size of 16,565,000 was 5,565,000 larger than forecast. Catches were 8,712,000 in commercial and 453,000 in non-commercial fisheries. Commercial catches in the United States and Canada were 2,789,000 and 5,923,000, respectively.

The Stock Monitoring program provided in-season estimates of abundance, run timing and migration route proportions of Fraser River sockeye and pink stocks throughout the fishing season. Management difficulties were encountered because of many factors: a very sharp migration peak combined with unrecognized changes to test fishing efficiency confounded the assessment of Early Stuart sockeye; late arrival, high diversion rate and then delay of summer-run stocks off the mouth of the Fraser; low abundance of Adams River sockeye on the coast until their arrival in the Panel Area at half the expected abundance; and the late arrival, unanticipated run strength and high diversion of Fraser River pink salmon through Johnstone Strait.

The Racial Analysis program was successful in using scale and other characteristics to identify the major stock groups of Fraser River sockeye throughout the season, except that difficulty was encountered in identifying Seymour River from Chilko River sockeye. Accurate stock identification was particularly important in 1991 because of the unexpected strength of the summer-run stocks and lack of strength of the late-run stocks. The Genetic Stock Identification method was used again in 1991 to identify Fraser River and other southerly migrating pink salmon stocks in mixed-stock fisheries.

The gross escapement goals for Fraser River sockeye and pink salmon were adjusted during the season to the final goals of 3,894,000 adult sockeye and 7,000,000 pink salmon. The post-season estimate of 3,897,000 adult sockeye escapements was close to the goal, while the pink salmon gross escapement of 7,504,000 fish was 504,000 above the goal. Gross escapements of Early Stuart sockeye were 78,000 short of the goal. Early summer-run sockeye gross escapements were 84,500 below the goal. The goals for summer-run stocks were exceeded by 99,000 while late-run sockeye gross escapements were 66,500 more than the goal.

The total adult spawning escapement of 3,293,000 sockeye was 199,000 over the final goal of 3,094,000 Fraser sockeye. Spawning escapements of Early Stuart fish were 59,000 less than the goal, summer-run escapements were over by 138,500, while late-run escapements were 119,500 over the goal.

The preliminary estimate of Total Allowable Catch (TAC) in 1991 is 7,188,000 Fraser River sockeye salmon, based on a run size of 12,291,000 fish, a Canadian Escapement Add-on Benefit of 1,273,000 and other deductions (including net escapements, the Fraser River Indian food fishery exemption, and test fishing catches) totalling 3,830,000 fish. For Fraser River pink salmon, the run size, TAC and deductions are estimated to be 16,565,000, 9,520,000 and 7,045,000, respectively.

The catch goals for Washington State fisheries were exceeded by 18,000 Fraser River sockeye salmon and 98,000 pink salmon. United States fishermen caught 1,869,000 Fraser River sockeye, including 51,000 in Alaska fisheries, and 2,819,000 Fraser River pink salmon. United States catches of Early Stuart and summer-run sockeye were 75,000 fish above the goal, while catches of late-run sockeye were 6,000 less than the goal.

Canada harvested 69,000 fewer Fraser River sockeye than their catch goal of 6,295,000 fish. Catches of Fraser River pink salmon were under the goal by 498,000 fish, which includes 400,000 fish that Canada chose to allow to escape. Concerns about achievement of domestic allocation goals and conservation concerns for other species limited Canadian fisheries.

With respect to United States domestic allocation goals, the Treaty Indian harvest of Fraser sockeye was 48,000 over the goal while the Non-Indian harvest was 30,000 fish under goal. Within the Treaty Indian catch, the catch in Areas 4B, 5 and 6C was 3,000 fish over the allocation and the catch in Areas 6, 7 and 7A was over by 45,000 fish. Non-Indian gillnet, purse seine and reefnet fishermen, respectively, caught 33,000 under, 2,000 over and 1,000 over their allocations. Treaty Indian fishermen were 14,500 over the catch goal for Fraser River pink salmon, while Non-Indian fishermen exceeded their goal by 83,500 fish.

In Canada, outside troll and inside troll fishermen were over their domestic allocations of Fraser River sockeye salmon by 377,000 and 24,000 fish, respectively. Purse seine and gillnet fishermen were 359,000 and 42,000 fish under their allocation. For southerly migrating pink salmon, purse seines exceeded their allocation by 300,000 and inside trollers by 78,000 fish. Outside trollers were under their allocation by 97,000 fish and gillnetters by 281,000 fish.

There were no major conflicts between the harvest of Fraser River sockeye salmon and the conservation of other species and stocks in 1991. The concerns identified by Canadian and United States agencies were taken into account during the design and implementation of the fishing plans. The planned closure of Canadian Area 29 after September 4 for the protection of chinook and steelhead stocks was relaxed to allow two fisheries at times of low abundances of these species. Catches of non-target species was low or modest in all areas.

In the final year of the 1989-92 cycle of the Treaty, the United States is entitled to catch up to 359,000 or 870,000 Fraser River sockeye salmon, pending the outcome of discussions between the Parties regarding the accounting of Fraser sockeye catches in Alaska.

ACHIEVEMENT OF OBJECTIVES

The mandate of the Fraser River Panel is to manage fisheries in the Panel Area to achieve the annual goals for gross escapement of Fraser River sockeye salmon, for allocation of the catch between the countries, for domestic allocation of the catch within each country's share, and to consider conservation concerns for other stocks and species of salmon when planning and conducting the fisheries. Panel management strategies are assessed after each season to determine if the goals were met, to estimate catch deficiencies that require future attention and to improve management techniques and data collection programs.

1. Escapement

The primary objective of the Fraser River Panel is to ensure that escapement goals are achieved. In February 1991, Canada set an initial gross escapement goal of 4,600,000 sockeye salmon, including 4,575,000 adults and 25,000 jacks. The gross escapement provided for an anticipated catch of 800,000 in the Fraser River Indian food fishery and an adult spawning escapement of 3,775,000 adults. The gross escapement goal was revised on July 5 to 4,235,000 sockeye to take into account adjustments to the late-run escapement goal. On July 9, Canada adjusted the total upwards to 4,315,000 based on an in-season expectation of a larger-than-forecast Early Stuart sockeye run. Due to an increase in the estimated run size of summer-run stocks and a reduced run size of late-run stocks, Canada made further adjustments to the gross escapement goals to 3,894,000 adults on August 26 (Table 1). Of these, approximately 3,094,000 were expected to reach the spawning grounds.

The actual gross escapement in 1991 was 3,897,000 adult sockeye, of which 3,293,000 reached the spawning grounds. The accounted gross escapement for Early Stuart sockeye was 322,000, 78,000 short of the goal of 400,000. The gross escapement goal of early summer-run stocks totalled 363,000, short of the 447,500 goal. The summer-run goal was set at 1,416,000 fish in-season while the final accounting was 1,515,000, an overage of 99,000. Late-run gross escapements totalled 1,697,000 adults, 66,500 over the goal (1,631,500).

DFO notified the Panel of an increase in the Fraser pink gross escapement goal from 4,500,000 to 6,000,000 on August 30 and to 7,000,000 on September 6. These actions were taken because of the larger-than-forecast pink return, the pre-season plan to raise the goal to 6,000,000 fish if the estimated run size increased sufficiently and because the small females in 1991 would have lower fecundities and potential egg depositions. The preliminary estimate of pink salmon gross escapement is 7,504,000 fish, 504,000 over the goal.

Table 1. Comparison of 1991 in-season goals and post-season estimates of gross escapements of Fraser River sockeye and pink salmon stocks.

Run	Gross Escapement: In-season Goals	Gross Escapement: Post-season Estimates *	Deviation
Sockeye Salmon			
Early Stuart	400,000	322,000	(78,000)
Early Summer	447,500	363,000	(84,500)
Summer	1,416,000	1,515,000	99,000
Late	1,630,500	1,697,000	66,500
Adults	3,894,000	3,897,000	3,000
Jacks	25,000	33,000	8,000
Total	3,919,000	3,930,000	11,000
Pink Salmon			
Pink Salmon	7,000,000	--- **	---

* Includes 84,000 sockeye salmon caught in Fraser River Indian food fisheries below Mission, B.C.

** Final post-season estimate of escapement was unavailable on the date of publication.

2. International Allocation

Achieving the international catch-allocation objectives of the Treaty is the second priority of the Fraser River Panel during the fishing season. The preliminary estimate of the Canadian Add-on Escapement Benefit of Fraser sockeye is 1,273,000 fish, based on the 12,291,000 Fraser sockeye run size. Including these estimates of add-on benefit and run size as well as other deductions totalling 3,830,000, the TAC in 1991 was 7,188,000 sockeye.

For 1991, the United States set a catch goal of 1,800,000 Fraser River sockeye in Washington State. Actual United States catches were 1,818,000 fish in Washington fisheries and 51,000 in Alaska District 104. The United States catch was less than the maximum proportion of the TAC they could have taken in 1991.

The United States catch was to be taken in proportion to the TAC's of the stock groups. In-season changes to run-size estimates caused revision of the United State shares. Early Stuart and summer-run sockeye catches in the United States amounted to 1,089,000 fish, 75,000 over the goal. Late-run sockeye catches were 780,000 fish, or 6,000 under the goal.

In 1991, unusual circumstances affected the achievement of the pink salmon catch objectives. First, the return of 16,565,000 (estimated in-season) was 5,565,000 larger than the forecast return of 11,000,000. As estimates of the larger run developed, DFO advised the Panel of increases to the gross escapement goal. The TAC increased from 6,500,000 prior to the season to 9,000,000 in-season. Canada chose not to catch its full pink salmon allocation because of limited fishing opportunities in Area 20 and Johnstone Straits during September due to purse seines reaching their allocation and concern for other species. In addition, Canadian fish buyers announced in early September that they would refuse to accept pink salmon at negotiated prices.

Canada's choice to allow a larger number of fish to escape to the Strait of Georgia would have reduced the TAC, thereby limiting the United States allocation of Fraser pink salmon. The United States protested this result. To address this concern, on September 17, Canada advised the Panel that on the basis of a 17,000,000 run, a gross escapement goal of 7,000,000 and a

TAC of 9,812,000 pink salmon, Canada agreed that the United States could harvest the balance of the U.S. allocation even if Canada did not fully harvest the balance of its share of the T.A.C. (approximately 900,000 fish). United States fishermen caught 2,819,000 Fraser River pink salmon compared to the allocation of 2,721,000, which included a payback due to catch shortfalls in past years. This leaves a cumulative catch overage of 98,000, based upon the in-season assessment of run size. These figures cannot be finalized until the post-season escapement assessment has been completed.

3. Domestic Allocation

The third priority of the Panel is to achieve the domestic allocation goals of the Parties. The ability of the Panel to meet this objective is somewhat limited because the Panel manages only those fisheries that occur within the Panel Area. In 1991, this included the Canadian Areas 20 and 29 net fisheries, Area 18-1, -4 and -11 and Area 29 troll fisheries, United States net fisheries in Areas 4B, 5, 6, 6C, 7 and 7A and Non-Indian troll fishing in Area 4 and Area 3 north of 48°00'15"N directed at Fraser River sockeye and pink salmon. The Canadian outside troll fisheries, including the fisheries within the Panel Area (Areas 121-124), were regulated by Canada. DFO regulates fisheries in non-Panel areas with the objective of ensuring that the combined fisheries achieve the Canadian domestic allocation goals.

Canadian catches of Fraser River sockeye by gear type deviated from the goals set by the Minister of Fisheries. The largest discrepancy was for outside trollers, who caught 377,000 sockeye more than their allocation of 1,142,000 (18.3%). Purse seine fishermen caught 359,000 less than their allocation of 3,090,000 (49.6%); gillnetters caught 42,000 sockeye less than their allocation of 1,809,000 (29.1%); and inside trollers caught 24,000 more than their allocation of 185,000 (3.0%) sockeye.

Pink salmon allocation in Canada was for all "southerly migrating pink salmon stocks", including Fraser River, southern British Columbia and Washington State stocks. The largest discrepancy from the goals set by Canada was in the purse seine catch, which exceeded the allocation of 4,243,000 by 300,000 fish. Outside trollers caught 97,000 fewer fish than their allocation of 2,122,000. Gillnetters caught 281,000 fish less than their allocation of 659,000. Inside trollers caught 78,000 pinks over their allocation of 293,000.

Pre-season, the United States requested that the Panel divide their 1991 Washington catch goal of 1,800,000 sockeye: 1,010,000 to Non-Indian fishermen and 790,000 to Treaty Indian fishermen. Non-Indian fishermen caught 980,000 sockeye or 30,000 less than their allocation and Treaty Indian fishermen caught 838,000 sockeye or 48,000 more than their allocation. An additional 51,000 sockeye were caught in Alaska District 104. Domestically, Treaty Indian fishermen in Areas 4B, 5 and 6C caught 93,000 sockeye or 3,000 over than their allocation. Treaty Indians in Areas 6, 7 and 7A caught 45,000 fish over their allocation of 700,000. Among Non-Indian fishermen, purse seine fishermen caught 51.2% of the Non-Indian catch, gillnet fishermen caught 42.6%, and reef net fishermen caught 6.2%, which represent 2,000 over, 33,000 under and 1,000 over the respective allocations for these gear based on the pre-season catch goal of 1,010,000 fish.

The Fraser River pink catch was to be divided equally between Treaty-Indian and Non-Indian fishermen. Of the actual catch, Treaty Indian fishermen caught 1,375,000 pinks, 14,500 over their allocation and Non-Indian fishermen (including recreational catch) caught 1,444,000, 83,500 over their allocation. The catch quota of 160,000 pink salmon in the Areas 3 and 4 Non-Indian troll fishery was not taken although weekly fishing opportunities were provided.

4. Conservation of Other Stocks

Part of the mandate of the Fraser River Panel is to accommodate the conservation and management needs of other salmon species and stocks during the management of Fraser River sockeye and pink salmon fisheries in Panel Areas. Total catches of other species and non-Fraser stocks of sockeye and pink salmon during Panel control are summarized in Table 2.

Table 2. Preliminary estimates of catches of non-Fraser sockeye and pink salmon and of other salmon species in commercial net fisheries regulated by the Fraser River Panel in 1991. *

Area	Non-Fraser Sockeye	Non-Fraser Pink	Chinook	Coho	Chum
United States					
Areas 4B, 5 and 6C Net	0	10,700	2,400	30,100	0
Areas 6, 7 and 7A Net	0	37,700	13,500	52,800	1,500
Total	0	48,400	15,900	82,900	1,500
Canada					
Area 20 Net	0	191,900	10,600	173,800	900
Area 29 Net	0	0	11,600	2,300	7,200
Total	0	191,900	22,200	176,100	8,100
Total Catch	0	240,300	38,100	259,000	9,600

* Estimates are provided by the Washington Department of Fisheries and Canada Department of Fisheries and Oceans.

Conservation concerns about the Lake Washington sockeye catch in United States Areas 4B, 5 and 6C led to restricted fishing in these areas during early July. Similar concerns about coho by-catch in Areas 4B, 5 and 6C led to late-season restrictions of fisheries. Canada requested limitation of fisheries in Area 20 after September 7 to minimize the by-catch of Strait of Georgia origin coho salmon. Similarly, Canada requested that no gillnet fisheries take place in Area 29 after September 4 to reduce the by-catch of Harrison River chinook salmon and Thompson River steelhead trout. Although the closure period was modified to allow two fisheries, these occurred at times and in areas where low by-catches were expected. The catches of other species in all Panel Area net fisheries were low or moderate. About 38,000 chinook, 259,000 coho and 10,000 chum salmon were caught. In addition, 240,000 non-Fraser pink salmon were harvested in fisheries targeting Fraser River stocks.

X. Allocation Status 1989-1991 Inclusive

Under the terms of the Treaty, the United States catch entitlement is a maximum of 7,000,000 sockeye and 7,200,000 pink salmon for the period 1989-92, plus adjustments for catch shortfalls of 94,000 sockeye and 113,000 pink salmon that occurred during the four-year management period ending in 1988. Within a given year, the United States can harvest up to a pre-determined percentage of the TAC (34.2% of the TAC for sockeye and 25.7% of the TAC for pink salmon in 1991).

To retain fish for commercial harvest in 1992, the United States elected to harvest below its maximum permissable share of sockeye in 1989, 1990 and 1991. In 1991, the United States could have harvested all of its outstanding sockeye allocation of 2,228,000 fish; however, the United States selected a Panel Area catch goal of 1,800,000 Fraser River sockeye salmon. The

actual harvest of Fraser River sockeye salmon by United States fishermen in Panel Area waters was 1,818,000. In addition, United States fishermen harvested 51,000 Fraser River sockeye in Alaska District 104 for a combined Fraser sockeye harvest of 1,869,000 fish. This leaves an outstanding balance of either 359,000 or 870,000 sockeye for harvest in 1992, pending the resolution of discussions between the Parties on whether the Alaska District 104 sockeye catch counts towards the United States 7,000,000 catch ceiling for the years 1989-92.

Due to the larger-than-forecast return of Fraser River pink salmon in 1991, the United States was entitled to harvest their maximum permissable share of the TAC of Fraser River pink salmon (TAC X 3.6/14.0 = 2,448,000 fish) and the full payment of 273,000 fish for the 1989 catch shortfall, for a total of 2,721,000 fish. The actual harvest of Fraser River pink salmon by United States fishermen was 2,819,000, which was 98,000 above their allocation.

(Source document). *Report of the Fraser River Panel to the Pacific Salmon Commission on the 1991 Fraser River Sockeye and Pink Salmon Fishing Season.* Pacific Salmon Commission staff. April 1992 (Draft).

B. PRELIMINARY 1991 POST-SEASON REPORT FOR UNITED STATES SALMON FISHERIES OF RELEVANCE TO THE PACIFIC SALMON COMMISSION

Northern Boundary Area Fisheries

District 104 Purse Seine Fishery

The U.S./Canada Pacific Salmon Treaty calls for limiting the sockeye harvest in the District 104 purse seine fishery during the period 1990 to 1993 to a maximum four year total catch of 480,000 prior to Statistical Week 31. Under the terms of the agreement when the annual catch reaches 160,000 sockeye salmon, no further fishing periods will be allowed prior to Statistical Week 31. All underages not to exceed 20% of the annex ceiling will add to, and any overages will subtract from, the subsequent four-year period.

With approximately 170,000 sockeye salmon harvested in 1990, a harvest of 310,000 sockeye salmon remained for the next three years of the agreement. In 1991 an informal harvest goal of 100,000 sockeye salmon prior to Statistical Week 31 was set. In 1991 there were three weeks of fishing prior to Statistical Week 31.

In 1991, 98,583 sockeye salmon were harvested in the three statistical weeks fished during the Treaty period. During these weeks, the district was opened for a total of 41 hours. However, during the initial ten-hour opening in Statistical Week 29, only three boats fished, so realistically the district was only fished for 31 hours during the Treaty period. In the next two years, 211,474 sockeye salmon remain to be harvested from the 480,000 sockeye limit agreed to in the District 104 annex provision of the Treaty.

Beginning on July 28 (Statistical Week 31) and continuing through the final opening on September 3, the District 104 fishery was managed according to the strength of the pink salmon return. In the week immediately following the Treaty period, 8.6 million pink salmon were harvested in the district (Table 1). This was the largest single week's harvest of pink salmon in the district. Also during this week 297,726 sockeye salmon were harvested. This constituted the largest single week's harvest of sockeye salmon in the district. The harvest of pink salmon remained at record levels for the next several weeks. In Statistical Week 32, another 8.4 million pink salmon were harvested along with 258,766 sockeye salmon. Through the next four weeks of fishing, the pink run came in at record levels. Catches of sockeye and pink salmon prior to Statistical Week 31 and after Statistical Week 30 are given for 1985 to 1991 in Table 1.

Table 1. District 104 purse seine catches of sockeye and pink salmon prior to Statistical Week 31 and after Statistical Week 30 from 1985 to 1991. For 1985 to 1988 and 1991, there were three fishing weeks prior to Statistical Week 31, while in 1989 and 1990 there were four weeks.

Year	Sockeye Catch to wk 31	Sockeye Catch after wk 30	Pink Catch to wk 31	Pink Catch after wk 30	Ratio sockeye:pink ->31	Ratio sockeye:pink 30->
1985	100,590	330,985	356,881	8,146,252	1:4	1:25
1986	91,304	352,686	1,035,806	8,146,252	1:11	1:51
1987	72,385	98,829	198,479	17,832,996	1:3	1:15
1988	248,759	342,279	108,874	1,475,539	2:1	1:10
1989	157,034	359,035	1,664,750	3,435,060	1:11	1:32
1990	169,943	626,839	459,643	11,345,826	1:3	1:23
1991	98,583	751,248	706,917	27,672,364	1:7	1:37

Tree Point Drift Gillnet Fishery

The Tree Point drift gillnet fishery opens by regulation on the third Sunday of June. The U.S./Canada Pacific Salmon Treaty calls for an average annual harvest of 130,000 sockeye salmon in the Tree Point gillnet fishery. The preliminary estimate of total sockeye harvest in 1991 is 131,492 fish. This brings the average annual harvest since 1985 to approximately 129,154 sockeye salmon (Table 2).

Table 2. The District 101 annual harvest of sockeye salmon and the average annual harvest from 1985 for each successive year.

Year	Annual Harvest	Average Annual Harvest
1985	172,736	172,736
1986	145,631	159,184
1987	107,503	141,957
1988	116,092	135,490
1989	144,936	137,380
1990	85,690	128,765
1991	131,492	129,154

During the early stages of the fisheries, management is based on the run strength of Alaskan wild stock chum and sockeye salmon and on the run strength of Nass River sockeye salmon. Beginning in the third week of July, when pink salmon stocks begin to enter the fisheries in large numbers, management emphasis shifts to that species. The District 101 Pink Salmon Management Plan sets gillnet fishing times at Tree Point in relation to District 101 purse seine fishing time when both fleets are concurrently harvesting the same pink salmon stocks.

The total harvest of sockeye salmon at Tree Point in 1991 was 131,492 fish. The harvest of 600,529 pink salmon is low considering the overall large return of pink salmon to other portions of southern Southeast Alaska. The small average size of pink salmon this season reduced their catchability by gillnet gear. The harvest of 70,319 coho salmon was well above the ten-year average of 37,000 fish. The contribution of enhanced coho and chum salmon returning to Nakat Inlet to the Tree Point fishery catch has not been determined yet.

Programs to estimate sockeye salmon escapements are only in place for two systems in southern Southeast Alaska, Hugh Smith and McDonald Lakes. The weir count of 6,024 sockeye salmon escaping to Hugh Smith Lake was more than the 1,285 escapement in 1990 but well below the escapement target of 27,000. A record 176,178 sockeye salmon were estimated in the escapement to McDonald Lake. This escapement is well above the 52,787 escapement target.

Portland Canal Chum Salmon

The U.S./Canada Pacific Salmon Treaty requires steps to be taken to minimize interception of Portland Canal chum salmon. Portland Canal was closed to fishing north of Akeku Point throughout the season in order to conserve chum salmon stocks returning to Portland Canal. In the Tree Point fishery, the chum harvest of 183,822 is below the ten year average of 212,000.

Escapements of chum salmon into Portland Canal systems were poor in 1991. The peak escapement count of 1,721 chum salmon in Fish Creek was lower than that observed since the early 1970's. Chum salmon escapements in Portland Canal have declined annually since the high levels observed in 1988.

Transboundary Area Fisheries

Stikine River Area Fisheries

Harvest sharing of Stikine sockeye stocks is determined based on in-season abundance forecasts produced by the Stikine Management Model (Table 3). Scale pattern analysis is used to estimate stock composition in the U.S. marine catches. Only a small proportion of the District 106 sockeye catch was of Stikine River origin. The Sumner Strait fishery (Subdistricts 106-41 & 42) harvested 3,234 Stikine sockeye salmon, 3.6% of the total sockeye harvest in that subdistrict; the Clarence Strait fishery (Subdistrict 106-30) took 916, 1.7% of the catch in that subdistrict; and the terminal area fishery near the mouth of the Stikine (District 108) harvested 6,256, 28.1% of the District 108 catch. An estimated 10,406 Stikine sockeye salmon were taken in commercial gillnet fisheries from both districts.

Table 3. Weekly forecasts of run size and total allowable catch for Stikine River sockeye salmon as determined in-season by the Stikine Management Model, 1991.

Stat Week	Start Date	Forecasts		Fishing Regimes[a]			CUMULATIVE CATCH	
		Run Size	TAC	6	8	U.S. TAC	CANADA TAC	U.S.	CANADA
25	16-Jun	94,000	34,000	I	D	14,000	20,000	282	0
26	23-Jun	94,000	34,000	I	D	14,000	20,000	2,387	133
27	30-Jun	72,449	12,449	I	I	2,449	10,000	3,617	2,734
28	07-Jul	159,459	99,459	I	D	69,459	30,000	5,897	7,529
29	14-Jul	192,246	132,246	I	D	102,246	30,000	8,221	12,740
30	21-Jul	151,205	91,205	I	D	61,205	30,000	8,756	17,562
31	28-Jul	130,329	70,329	I	D	40,329	30,000	9,180	22,020
32	04-Aug	130,487	70,487	I	D	40,487	30,000	9,646	22,326
33	11-Aug	120,493	60,493	I	D	30,493	30,000	9,646	22,326

[a] I indicates indirect fishery allowed; D indicates directed fishery allowed.

An in-season adjustment was made during Statistical Week 28 to District 108 stock composition estimates. The contribution of Skeena River stocks to early season District 108 catches was judged to be unrealistically high. Historical experience indicates that scale patterns from Tahltan Lake fish most often misclassify as Skeena River fish, and that Skeena River fish are usually found in low abundance in District 108. Therefore, it was decided to omit the Skeena River stock from SPA models used to classify catches in District 108. Catches prior to Statistical Week 28 were reclassified using the new models resulting in revised stock composition estimates for these weeks; the in-season estimate of the contribution of Tahltan Lake fish to the District 108 catch increased as a result of this change in methodology.

The District 106 gillnet fishery normally changes from sockeye to pink salmon management by Statistical Week 33. However, the early indicators used to manage the pink fishery were not in agreement with each other. Both southern Southeast Alaska and District 106 were forecasted to have excellent pink returns while the gillnet pink salmon catches in District 106 had been extremely poor prior to Statistical Week 33 (August 11). The low harvest was probably due to the low price for pinks and reluctance of the fishermen to use smaller mesh nets designed for catching pink salmon.

Coho salmon management in the District 106 gillnet fishery usually commences during late August or early September. Due to the lack of fishing effort on pink salmon during the previous two weeks and high coho catch-per-unit-effort (CPUE), the District 106 management concentrated on coho salmon beginning August 25.

During the 1991 season, the gillnet fishery in District 106 was open for a total of 39 days, and in District 108 for 48 days. These were above the 1981 to 1990 averages of 29 and 18 days, respectively. District 106 fishing effort in number of vessels remained near average throughout the season.

The 1991 harvest in the District 106 commercial gillnet fishery included 2,066 chinook, 143,112 sockeye, 197,803 coho, 132,739 pink and 123,730 chum salmon. In the District 108 fishery, 1,504 chinook, 22,275 sockeye, 15,864 coho, 10,935 pink, and 11,402 chum salmon were harvested. District 106 catches of sockeye and pink salmon were below the 1981 to 1990 average, while chinook catches were above average and catches of coho and chum salmon were more than double the average. A test fishery was conducted in District 108 to help managers to ascertain the run

strength of various salmon species in-season. No test fisheries were conducted in District 106 due to inconclusive results from past years.

Taku River Fisheries

The U.S./Canada Pacific Salmon Treaty stipulates that Canada and the U.S. are entitled to 18% and 82%, respectively, of the Total Allowable Catch (TAC) of the sockeye salmon originating in the Canadian portion of the Taku River. The estimated total run size for Taku River sockeye salmon in 1991 was 238,900 fish (Table 4). Since the escapement goal for Taku sockeye salmon ranges from 71,000 to 80,000, the TAC in 1991 ranged from 158,900 to 167,900 fish. The U.S. harvested approximately 87,700 Taku sockeye salmon, representing 52% to 55% of the TAC. The estimated escapement of sockeye in 1991 was 125,200 fish, well exceeding the escapement goal.

Scale pattern analysis (SPA) has been used in-season and post-seasonally to provide stock composition estimates of District 111 sockeye catches since the early 1980's. However, estimates for 1991 did not follow historical trends and were not corroborated by analysis of the incidence of brain parasites in samples from the sockeye catch. The in-season SPA estimates were therefore judged unreliable. The problem with SPA apparently occurred because of inter-annual changes in basic growth patterns in the scales within stocks. Postseason analysis of scale data, which will be updated with spawning ground samples from 1991, will eliminate this problem and will provide revised stock composition estimates. While the 1991 stock composition of catches are currently unknown, the relative magnitudes of the Taku River and Port Snettisham escapements and the fishery restrictions designed to reduce the harvest of Snettisham sockeye salmon suggest that the catch was predominantly of Taku River origin. Taku River sockeye salmon comprised an average of 78.4% of the District 111 sockeye catch from 1983 to 1990. This average was used in the preliminary run reconstruction (Table 4).

Table 4. Taku River and Port Snettisham sockeye salmon run reconstructions, 1991. The Taku River sockeye salmon run and escapement estimates do not include fish which spawn below the U.S./Canada border.

	Taku	Snettisham
Escapement	125,203	a/
Canadian Harvest		
Commercial	25,067	
Indian Food	74	
Total	**25,141**	
% of Harvest	22.3%	
Test Fishery	163	
Above Border Run	150,507	
U.S. Harvest		
District 111	86,135	23,733
Personal Use	1,531	
Total	**87,666**	
% of Harvest	77.7%	
Test Fishery	719	198
Total Run	238,892	
Escapement Goal	71,000 - 80,000	
TAC	158,892 - 167,892	
Canadian Take	15.0% - 15.8%	
U.S. Take	52.2% - 55.2%	

a/ Total escapement to Snettisham systems are currently unavailable; biometric analysis of Crescent Lake mark-recapture studies will be conducted this winter.

Catches in the District 111 drift gillnet fishery were among the largest in the history of the fishery, with records being exceeded by summer chum and coho salmon harvests. The total harvest consisting of 3,217 chinook, 109,877 sockeye, 126,436 coho, 74,183 pink, and 161,175 chum salmon. The chinook salmon harvest of 3,214 fish was 47% above the 1981 to 1990 average and was comprised primarily of small immature chinook. Approximately 64% of this year's chinook harvest was caught during the initial two weeks of the fishery (Statistical Weeks 25 and 26), when the CPUE was over two and a half times above the 1981 to 1990 average. The sockeye harvest of 109,877 fish was the fourth largest sockeye catch on record, 53% above the 1981 to 1990 average, and 13% below last year's historical high.

The summer chum salmon return was exceptional this year and was primarily comprised of five year old fish (approximately 80%). The total summer chum salmon catch of 147,404, i.e. the District 111 chum harvest prior to August 18, Statistical Week 34, was 330% above the 1981 to 1990 average, and was the largest District 111 summer chum harvest on record. Local hatcheries contributed the majority of these fish.

In contrast to the summer chum salmon run, the fall chum salmon run was poor in 1991. The total fall chum salmon harvest, i.e. chum salmon caught after August 18, Statistical Week 34, was 13,610 fish. This is 64% below the 1981 to 1990 average and is the third smallest fall chum salmon harvest on record. Chum salmon that are taken in the fall in District 111 are exclusively wild chum salmon stocks from the Taku River and Port Snettisham.

The District 111 pink salmon harvest of 74,183 fish was approximately 68% below the 1981 to 1990 odd-year average of 234,000 fish, but does not accurately represent the strength of the return. A combination of factors were responsible for low catches. Pink salmon were smaller than average this year, with average weights less than three pounds, thereby reducing their susceptibility to harvest in the traditional sockeye gillnet mesh. In addition, pink salmon prices were depressed and consequently stymied the motivation of fishermen to switch to smaller mesh sized gear to target this species.

The total coho catch of 123,375 fish was the largest on record, over three times larger than the 1981 to 1990 average, and almost double the previous record catch of 67,310 coho salmon taken in 1990. The exceptional harvest resulted from large wild coho salmon returns to both the Taku River and the DIPAC hatchery near Juneau. The preliminary estimated DIPAC contribution to the District 111 gillnet catch is approximately 26,000 fish, or 21% of the coho catch.

Several other fisheries in District 111 harvested transboundary river stocks. The U.S. personal use fishery located in U.S. portions of the Taku River harvested approximately 32 chinook, 1,531 sockeye, 70 coho, 108 pink, and 6 chum salmon. The spring sport fishery near the mouth of the Taku River, open from mid-April to mid-June for the last three years, is estimated to have increased the spring sport catch of chinook salmon in the Juneau area by approximately 880 mature fish. A number of stocks are thought to contribute to the fishery, including those from the Taku, Chilkat, King Salmon and Unuk Rivers, and local hatchery stocks; however, the majority of the mature fish are believed to be of Taku River origin. The purse seine fishery in Chatham Strait was not opened north of Point Marsden during the month of July because pink salmon test fishery catches were low and the escapement of the Taku River appeared weak until late July.

Alsek River Fisheries

The U.S. Dry Bay commercial set gillnet fishery harvested 103 chinook, 17,542 sockeye, 5,956 coho, 0 pink, and 103 chum salmon. Catches of sockeye and coho salmon were about equal to the 1981 to 1990 averages, while chinook, pink, and chum salmon catches were below average.

ADF&G managers have used a model to assist in managing the Alsek sockeye harvest since 1984. This model worked well in predicting the total season catch and escapement during the years 1984 through 1988. It did not work well in 1989, but a postseason review indicated that the model had not been correctly updated. In 1990 a second model was developed and the two models were used during that year. Both models provided extremely accurate predictions of the Alsek River sockeye run in 1990 and were useful in managing the fishery. In 1991 the models predicted the total catch fairly well throughout the season, with the final in-season estimates exceeding the actual catch by 8% to 15%. The models generally overpredicted the Klukshu escapement, with the final in-season estimates exceeding the actual weir count by 22% to 23%.

Transboundary River Joint Enhancement Activities

Fry were outplanted to Tahltan, Tatsamenie, and Trapper Lakes over the period June 2 to June 22, 1991. All fish were transported by Dehavilland Otter or Twin-Beechcraft float planes. Numbers of fry outplanted are given below:

Tahltan Lake:	3,585,000
Tatsamenie Lake:	934,000
Trapper Lake:	673,000

In 1991, sockeye eggs were taken at Tahltan Lake (Stikine River) for the third year and at Little Tatsamenie and Little Trapper Lakes (Taku River) for the second year. They were collected by Canada and flown to the central incubation facility at Port Snettisham. At Tahltan Lake, approximately 4.7 million eggs were taken, with an average fertilization rate of about 92%. At Little Trapper Lake, approximately 3.1 million eggs were taken and they had an average fertilization rate of about 80%. At Little Tatsamenie Lake, approximately 1.5 million eggs were taken with an average fertilization rate of about 90%.

Construction plans at the Port Snettisham Central Incubation Facility (CIF) continue. Bids received in 1991 for the construction of the permanent CIF were too high for the contract to be awarded. A revised plan was developed in which ADF&G will remodel an existing large hatchery building at Snettisham. An incubation room formerly used for chum salmon will become the sockeye salmon CIF. Adequate funding is currently available to proceed with the modification; the completion date is uncertain and the temporary CIF will continue to be used for transboundary incubation until construction is completed.

A number of modifications have been made to the existing facility to prevent reoccurrence of white spot disease which occurred in March, 1991, in two incubators containing approximately 1 million Little Trapper Lake alevins (1990 brood year). Modifications to the hatchery have focused on eliminating or controlling environmental and operational stressors.

Chinook Salmon Fisheries

Southeast Alaska Chinook Salmon Fisheries

All Gear Harvest

The preliminary estimate of the 1991 chinook salmon catch by all Southeast Alaska fisheries was 364,900. While the commercial catches are close to final, the sport fish catch is still only a projection. A final estimate will be ready sometime in 1992. The base catch, that is the total catch minus the hatchery add-on, was 299,300 and the hatchery add-on was 65,600. The base catch exceeded the 1991 target of 273,000 by 26,300. This brought the cumulative deviation to +38,600 (Table 5). Based on a base catch of 263,000, this exceeds the management range by 18,900.

Table 5. Chinook all-gear catches in Southeast Alaska, 1987 to 1991, and deviation from the ceiling for each year. Catches in thousands.

Year	Preliminary Catches Total	Add-on	Base	Base Ceiling	Deviation from Base Number	Percent
1987	281.9	16.7	265.2	263.0	+2.2	0.8%
1988	278.9	23.7	255.2	263.0	-7.8	3.0%
1989	291.1	26.7	264.4	263.0	+1.4	0.5%
1990	366.8	48.3	318.5	302.0	+16.5	5.5%
1991	364.9	65.6	299.3	273.0	+26.3	9.6%
Cumulative	1,583.6	181.0	1,402.6	1,364.0	+38.6	

Troll Fishery

The winter troll fishery harvested 42,400 chinook salmon from October 1, 1990 to April 14, 1991. A total of 10,100 (23.8%) of these were produced by Alaskan hatcheries.

During June, experimental, hatchery access and terminal troll fisheries were conducted. The experimental fisheries were designed to increase the harvest of chinook salmon produced in Alaskan hatcheries by allowing trolling for two to three days per week in small portions of the suspected migratory path close to the hatchery. The hatchery access fishery was designed to increase the harvest of Alaskan hatchery chinook salmon while providing general access to wild Southeast Alaska stocks. Terminal fisheries occurred directly in front of hatcheries or remote release sites.

The June fisheries were managed in-season in order to maximize the number of Alaskan hatchery chinook salmon and to comply with a limit of 40,000 non-Alaskan hatchery chinook salmon. Eight different areas were open nine days each for the experimental fishery. A total of 13,900 chinook salmon were harvested of which 6,600 (47.5%) were produced in Alaskan hatcheries. This was the largest catch since the inception of the fishery in 1986.

The total June catch was 66,300 of which 21,700 (32.7%) were from Alaskan hatcheries. A total of 44,600 chinook salmon harvested in June were not of Alaskan hatchery origin.

The summer fishery began on July 1 and continued through noon on July 8 (7.5 days). A total of 154,000 chinook salmon were harvested of which 6,400 were from Alaskan hatcheries. Following the closure of the chinook salmon harvest, areas of high chinook salmon abundance were closed.

The 1991 total troll harvest of chinook salmon was 262,800 of which 38,200 were of Alaskan hatchery origin.

Net Fisheries

Net fisheries have a guideline harvest of 20,000 chinook salmon plus Alaska hatchery add-on. Catches of chinook salmon in the net fisheries are incidental to the harvest of other species and constitute only a fraction (< 1%) of the total net harvest. In 1991, the net fisheries harvested a total of 32,000 chinook salmon of which 10,900 were Alaskan hatchery chinook harvested in

terminal fisheries and an additional 3,800 chinook salmon were Alaskan hatchery origin harvested in the traditional, non-terminal areas.

Recreational Fisheries

There is no harvest guideline established for recreational fisheries. They are managed under a 2 fish-per-day bag limit and a 28" minimum size limit. The final harvest estimate will not be available until mid-1992; however, the preliminary projection is 68,400 chinook salmon. The recreational harvest has increased tremendously during the last several years with harvests of 26,200, 31,100, and 51,200 in 1988, 1989 and 1990 respectively.

Southern U.S. Chinook Salmon Fisheries

The following is a preliminary summary of 1991 and 1990 chinook catches in Southern U.S. fisheries of interest to the Pacific Salmon Commission (PSC).

Fishery	1991 Estimate	1990 Estimate
Central Oregon		
Troll	0	0
Recreational	NA	NA
Columbia River		
Net	108,700	150,900
Recreational	NA	77,900
Ocean (North of Falcon)		
Troll	51,100	64,500
Recreational	13,500	33,100
Net	100	100
Washington Coastal		
Marine Net	42,300	41,600
River Net	11,800	16,300
Strait of Juan de Fuca		
Net	3,100	5,200
Troll	19,500	45,700
Recreational	NA	NA
San Juan Islands		
Net	13,700	9,300
Troll	100	600
Recreational	NA	NA
Puget Sound		
Recreational	NA	NA
Marine Net	69,100	150,300
River Net	18,100	28,700

Ocean Fisheries off Central Oregon

Ocean fisheries off Oregon's central coast primarily harvest a mixture of southern chinook stocks not involved in the PSC rebuilding program; these stocks do not migrate north into PSC jurisdiction to any great extent. Some stocks that spawn in Oregon coastal streams do migrate into PSC fisheries, including the Northern Oregon Coastal (NOC) stock aggregate. These north migrating stocks are harvested incidentally (probably <10%) in Oregon ocean fisheries. The only troll fishery that predominately harvests the NOC stock aggregate is the late season near-shore fishery off the mouth of the Elk River. In both 1990 and 1991, this Elk River fishery was not conducted due to conservation concerns. Recreational catch estimates for 1990 and 1991 are not available at this time.

Columbia River

Columbia River 1991 freshwater recreational and commercial net fisheries are incomplete. Preliminary estimates of 1991 spring and fall chinook net catch total 108,700, compared to 150,900 in 1990 and 274,900 in 1989. Total freshwater recreational catch estimates for 1991 are not yet available, although preliminary estimates of catch in the Buoy 10 recreational fishery total 12,000 chinook, compared to 5,200 in 1990 and 16,300 in 1989. Total 1990 recreational catch of all stocks (including Buoy 10 and tributary catch) is estimated at 77,900, compared to 84,300 in 1989. As in 1990 and 1989, there was no 1991 commercial summer sockeye fishery. As a result, no incidental impacts on the Upriver Summer chinook run occurred. A ceremonial and subsistence dipnet fishery did occur, but harvested less than 50 summer chinook.

Ocean Fisheries North of Cape Falcon

In 1991, ocean commercial and recreational fisheries operating in the Pacific Fisheries Management Council (PFMC) region north of Cape Falcon were constrained by domestic quotas for both chinook and coho salmon. Separate quotas were established for the tribal troll and non-tribal fisheries.

Under PFMC quota management, ocean fisheries are terminated either when coho or chinook quotas are achieved or when seasons expire. Overall, in 1991, chinook catch success was poor, consistent with 1991 pre-season expectations for low abundance of key stocks. Chinook quotas were not fully harvested. Preliminary estimates of 1991 tribal troll chinook catch total 21,400, 65% of the 33,000 chinook quota and down from 31,400 in 1990. Preliminary recreational catches are estimated at 13,500 (1,000 Oregon and 12,500 Washington), about 34% of the 40,000 chinook quota and down from 33,100 in 1990. Preliminary estimates of non-tribal troll chinook catch total 29,700 (900 Oregon and 28,800 Washington), about 74% of the 40,000 chinook quota and down from 33,100 in 1990. Approximately 27,300 of these non-tribal troll caught chinook were taken during the early season chinook fishery (May 1 through June 15, 1991).

In 1991, there was no experimental fishery conducted in the inside ocean waters north of Destruction Island to Cape Alava. In 1990, this fishery harvested a total of 11 chinook.

Washington Coast

Ocean escapements of northern Washington coastal stocks were above minimum spawning levels, allowing both commercial and recreational fisheries. Although coastal fisheries are incomplete, preliminary 1991 estimates of Grays Harbor and Willapa Bay net catch total 42,300 chinook, compared to 41,600 in 1990. The 1991 commercial net fisheries in north coastal rivers have harvested an estimated 11,800 chinook, compared to 16,300 in 1990.

A small recreational fishery has historically occurred in the Grays Harbor estuary. In 1991, effort and catch in this fishery increased significantly in response to the large coho run returning to Grays Harbor. This fishery was sampled through September 29, and the estimated catch is approximately 400 chinook. Catch from this fishery is not included in Chinook Table 1.

Strait of Juan de Fuca

Preliminary estimates of 1991 net catch in the Strait of Juan de Fuca total 3,100 chinook, compared to 5,200 in 1990. Through November 22, the Straits tribal troll fishery has harvested an estimated 19,500 chinook, compared to 32,600 caught through November 22, 1990. Tribal troll catch through December 31, 1990 in this area was 45,700. Note that tribal troll catch estimates from this area do not include tribal catch in Area 4B during the May 1-September 30 PFMC management period; catches during this period have been included in the North of Cape Falcon troll summary.

Recreational catch estimates for 1991 and 1990 in Areas 5 and 6 are not available at this time. In 1991, about 400 chinook were caught in the Area 4B state waters fishery, after the PFMC fishery compared to 400 in 1990. Preliminary 1989 recreational chinook catch for Areas 5 and 6 is estimated at 52,300, compared to 39,300 in 1988.

San Juan Islands

Preliminary 1991 estimates of chinook net catch in the San Juan Islands total 13,700, compared to 9,300 in 1990. Recreational catch estimates for 1991 and 1990 in Area 7 are not available at this time. Preliminary 1989 recreational chinook catch for Area 7 is estimated at 9,500, compared to 9,400 in 1988.

Puget Sound

Recreational and commercial fisheries in Puget Sound were regulated by time and area closures to protect depressed spring chinook stocks. Preliminary estimates of 1991 net catch in Puget Sound marine areas total 69,100 chinook, compared to 150,300 in 1990. Preliminary estimates of 1991 catch in Puget Sound freshwater areas total 18,100 chinook, compared to 28,700 in 1990.

Puget Sound recreational catch estimates for 1991 and 1990 are not available at this time. Recreational fisheries were managed in the same general manner as in recent years. Preliminary recreational chinook catch for 1989 in Areas 8-13 is estimated at 66,500, compared to 59,600 in 1988.

Coho Salmon Fisheries

Southeast Alaska Coho Salmon Fisheries

No specific provisions of the Annex IV chapter on coho salmon 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 1991 fisheries were managed in a manner similar to that used since 1980. No catch ceilings are used, rather they are managed in-season with time/area regulations and recreational bag limits based on run strength assessment.

Preliminary all gear harvest was 3,035,400 coho salmon. Harvest by gear type are shown on Table 6.

Table 6. Coho salmon harvest in Southeast Alaska in 1991 by gear type.

Gear Type	Harvest	Percent
Troll	1,719,400	56.6%
Drift Gillnet	599,900	19.8%
Purse Seine	411,200	13.6%
Set Net	166,200	5.5%
Trap	300	<0.1%
Recreational	138,400	4.5%
Total	3,035,400	

The 1991 harvest was the second highest since 1960. Returns were strong throughout Southeast Alaska and very strong returns were again seen in the northern inside. Preliminary analysis indicates that Alaskan hatcheries contributed about 517,700 (17.9%) to the commercial fisheries. This is the largest percentage of the total catch contributed by Alaskan hatcheries since contributions began in 1986. An estimated 34,600 Alaska hatchery produced coho salmon were harvested in the recreational fishery.

The troll fishery catch was the third highest since 1960, slightly behind that of second harvest which occurred in 1990. A single 10-day closure occurred in mid-August to comply with the Board of Fisheries directives was implemented for the troll fishery. No coho salmon directed closure was implemented in any net fishery. Coho salmon catches were particularly strong in the northern inside drift gillnet fisheries late in the fall and resulted in the largest harvest ever in this fishery.

Coho escapements were generally strong throughout the region.

Southern U.S. Coho Salmon Fisheries

This review compiles available preliminary coho catch data from 1990 and 1991 southern U.S. fisheries of interest to the Pacific Salmon Commission (PSC).

Fishery	1991 Estimate	1990 Estimate
Columbia River		
Recreational	206,000	18,500
Net	411,200	75,900
Ocean (North of Falcon)		
Troll	159,600	200,800
Recreational	229,300	240,700
Net	0	400
Washington Coastal		
Marine Net	210,800	93,300
River Net	37,800	25,900

Fishery	1991 Estimate	1990 Estimate
Strait of Juan de Fuca		
Net	35,900	31,000
Troll	5,500	1,900
Recreational	NA	NA
San Juan Islands		
Net	61,100	60,200
Troll	500	200
Puget Sound		
Recreational	NA	NA
Marine Net	423,900	826,700
River Net	43,300	104,500

Columbia River Net

The 1991 net catch in the Columbia River was 411,200 coho. This is significantly greater than the 1990 catch of 75,900 and similar to the 1989 catch of 391,500. The 1991 catch reflects an increase in the 1991 run size compared to 1990.

Columbia River Sport

The Columbia River Buoy 10 and Light 26 fisheries harvested 206,000 coho in 1991 compared to 17,300 in 1990. The 1990 Columbia River sport catch of 18,500 coho reported in Table 1 includes mainstream and tributary catches in addition to the Buoy 10 and Light 26 fisheries. Mainstem and tributary catches are unavailable for 1991 and the reported sport catch is limited to the 1991 Buoy 10 and Light 26 fisheries. The Buoy 10 recreational catch was the largest on record.

North of Cape Falcon Ocean

The U.S. ocean fisheries operating north of Cape Falcon, OR were constrained by coho ceilings developed through the domestic regulatory process of the Pacific Fisheries Management Council (PFMC). Coho catch ceilings for the 1991 ocean fisheries were developed to conserve depressed wild coho stocks originating in Puget Sound and Washington coastal rivers. The most constraining coho stock in 1991 was Hood Canal.

North of Cape Falcon Troll

Non-tribal and tribal troll fisheries operated under catch ceilings of 87,000 and 80,000 respectively. Both the 1991 non-tribal troll catch of 81,100 coho and the tribal catch of 78,500 were below the PFMC ceilings. The ocean total for the tribal troll fishery includes the coho caught in Area 4B from May 1 through September 30. The total 1991 troll coho catch was below the 1990 total by approximately 41,200 fish.

North of Cape Falcon Sport

The 1991 recreational fishery north of Cape Falcon was constrained by a ceiling of 233,000 coho, developed through the PFMC process. For allocation purposes, this fishery was managed on the basis of sub-area coho quotas which corresponded to the ports of Ilwaco/Astoria, Westport, La Push, and Neah Bay. Approximately 229,300 coho (98.4% of the ceiling) were caught in 1991. The Area 4B catch was considered ocean catch until the PFMC sub-area quota for Neah Bay was met, at which point the fishery was managed as a State waters fishery. The 1991 ocean recreational fishery harvested approximately 11,400 coho fewer than were harvested in 1990.

Washington Coastal Marine Net

A total of 139,200 coho have been harvested by the non-tribal 1991 Willapa Bay and Grays Harbor net fisheries (Grays Harbor 45,600; Willapa Bay 93,600) compared to a catch of 51,700 in 1990. Tribal fisheries in Grays Harbor landed 71,700 coho compared to 41,600 in 1990. There is no tribal catch in Willapa Bay.

Washington Coastal Marine Sport

A small recreational fishery (less than 200 coho) has historically occurred in late summer and fall in the Grays Harbor estuary. In 1991, effort and catch significantly increased in response to the large coho run returning to Grays Harbor and the August closure of the Area 2 ocean sport fishery. The Grays Harbor sport fishery was sampled through September 29, and the estimated catch is approximately 6,200 coho. Catch from this fishery is not included in Coho Table 1.

North Washington Coastal River Net

The tribal net fisheries in Washington's coastal rivers have harvested approximately 37,800 coho compared to 25,900 in 1990. The coastal river net harvest includes catch for the Quillayute, Hoh, Queets, Quinault, Moclips and Copalis rivers. Catch for the Humptulips and Chehalis rivers are included in the Grays Harbor tribal coastal marine net totals.

Strait of Juan de Fuca Marine Net

The tribal net fisheries in Areas 4B, 5, and 6C harvested 35,300 coho in 1991 compared to 30,700 in 1990. Non-tribal net fisheries landed 600 coho in 1991 compared to 300 in 1990.

Strait of Juan de Fuca Troll

The coho harvested by the tribal troll fishery in Area 4B during the May through September PFMC management period are summarized with the North of Cape Falcon troll data. The tribal troll fishery outside of the PFMC management period in Areas 4B, 5, and 6C harvested 5,500 coho in 1991 compared to 1,900 in 1990.

Strait of Juan de Fuca Sport

A Washington State managed recreational fishery was conducted in Area 4B in 1991. The harvest of 15,100 coho was slightly below the 16,000 coho quota. This 4B recreational fishery harvested 20,300 coho in 1990. 1990 and 1991 estimates for Areas 5 and 6 are unavailable. The 1989 Area 5 and 6 coho catch of 145,800 is approximately 29,800 coho greater than the 1988 catch of 116,000.

San Juan Islands Net Fisheries

The tribal net fisheries in Areas 6, 6A, 7, and 7A have harvested 43,000 coho (36,100 in 7/7A) in 1991 compared to 44,400 (43,100 in 7/7A) in 1990. The non-tribal net fisheries have harvested 18,100 coho (18,000 in 7/7A) compared to 15,800 (15,700 in 7/7A) in 1990. Pre-season domestic management planning, which took into account the conservation needs of Puget Sound native coho stocks, anticipated an Area 6, 6A, 7, and 7A combined coho catch of 80,000 coho compared to the 1990 expected catch of 115,700. Area 6 accounted for 7,000 (11.5%), Area 7 accounted for 40,400 (66.1%) and Area 7A accounted for 13,700 (22.4%) of the combined tribal and non-tribal total catch of 61,100. There was no coho directed fishery in Areas 7/7A in 1991.

Puget Sound Sport

Catch estimates are not available at this time for the 1990 or 1991 Puget Sound sport fishery. The combined 1989 coho catch of 61,600 in Areas 8-13 was less than the catch of 66,500 in 1988. Coho catches declined in 1989 relative to 1988 in most Puget Sound Catch Areas.

Puget Sound Marine Net

1991 tribal and non-tribal net fisheries in Puget Sound marine areas other than 4B, 5, 6A, 6C, 7 and 7A harvested 252,000 and 171,900 coho respectively. This compares to a tribal harvest of 455,400 and a non-tribal harvest of 371,300 coho in 1990.

Puget Sound River Net

River net fisheries in Puget Sound harvested approximately 43,300 coho in 1991 compared to 104,500 in 1990.

Chum Salmon Fisheries

Mixed Stock Fisheries

The mixed-stock fisheries in United States (U.S.) waters that are addressed in the chum chapter of Annex IV 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.

Areas 4B, 5 and 6C

As in previous years, the chum fishery in Areas 4B, 5, and 6C was restricted to Treaty Indian gillnet gear only. Chum fishing began in these areas on October 14, with a five-day opening. The areas were re-opened on October 21 for three days, closing on October 23. The commercial fishery remained closed after October 23 due to concerns for some Washington chum runs and the needs of terminal fisheries. Test fishing for the collection of GSI samples continued for two weeks after the close of the commercial fishery.

Incidental chum catches prior to the chum management period were only 510 fish, and most of that catch was from test fisheries to collect GSI samples during the two weeks immediately prior to the start of chum management. Catches in the Strait fishery were somewhat higher than expected during the two weeks that the directed chum fishery was open. The total chum catch in areas 4B, 5, 6C, reported through November 21, is 53,903. The fishery remains closed and little, if any, additional catch is expected to be reported.

Areas 7 and 7A

Prior to the chum management period, relatively few chum were harvested incidental to fisheries targeting on other species (sockeye and pinks). Total catches of chum salmon in Areas 7 and 7A prior to chum management were only 1,703.

Throughout the chum season, U.S. and Canadian technical staffs kept in close communication on the status of the chum run size entering Johnstone Strait. Indications from the initial evaluation fishery and subsequent test fishing in late September and early October were that the run was lower than expected, with an estimated total run size of 3 million. However, the U.S. was notified by DFO staff in early October that the total catch in Johnstone Strait had exceeded 225,000 chum. Under the provisions of the chum chapter of Annex IV of the Pacific Salmon Treaty, this catch level in Johnstone Strait allows a catch of 120,000 chum to be harvested in U.S. fishing Areas 7 and 7A.

Fisheries conducted in Areas 7 and 7A by Treaty Indian and non-Treaty Indian fisheries have harvested a total of 139,043 chum based on preliminary catch data; this catch exceeds the allowable harvest quota of 120,000 by 19,043 fish.

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, which is less than what has returned the last several years. Most Puget Sound chum runs have been updated in-season near or above what they were predicted pre-season. Overall, the inseason estimates of abundance, as of November 15, indicate a total Puget Sound chum return of about 1.3 million. Many Puget Sound chum fisheries are still underway or just beginning. It is far too early to assess spawning escapement.

(Source Document) - *Preliminary 1991 Post Season Report for United States Salmon Fisheries of Relevance to the Pacific Salmon Treaty.* United States Section, Pacific Salmon Commission. December 1991

C. 1991 POST-SEASON REPORT FOR CANADIAN TREATY LIMIT FISHERIES

Catches reported below for 1991 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 net). The 1991 catches for the north coast are based on inseason hails, sport catch to November 15 and troll sales slips to October 4, 1991; South Coast catches include troll sales slip data to November 5, net sales slips and sport catches to October 31, 1991. 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 are only for those stocks and fisheries covered by the Pacific Salmon Treaty; domestic catch allocations have been excluded. The attached table summarizes 1985-91 catches in Canadian fisheries under limits imposed by the Pacific Salmon Treaty.

Transboundary River Fisheries

Stikine River

- As required by the Transboundary Chapter of Annex IV, a pre-season forecast of 94,000 Stikine sockeye was made to guide initial fishing patterns of both countries. The total run forecast included an estimated Tahltan Lake sockeye run of 42,000 which was above the previous 5-year cycle average, and an estimated run of 52,000 non-Tahltan sockeye, again above the previous five-year average for this stock component.

- The annual harvest sharing arrangements for Stikine sockeye (excluding test fishery catches) from 1988 until 1992, tied to commitments by the Parties to undertake cooperative enhancements, 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. Chinook, pink and chum are to be taken as an incidental harvest in the directed fisheries for sockeye and coho.

- A total of 22,763 sockeye was caught in the combined Canadian commercial and Indian food fisheries. For most of the season, forecasts of the total run based on the Stikine Management Model were in excess of 120,000 sockeye, which translated into a target catch of 30,000 sockeye for Canadian fisheries. However, within the last two weeks of the sockeye season, the forecast declined to a final in-season estimate of 112,600 sockeye and a Canadian catch quota of 20,000 sockeye.

- The preliminary post-season estimates of the total run and TAC are 128,745 and 68,745, respectively, indicating the total in-river catch (excluding the Stikine test fishery) was 7,237 sockeye below the maximum allowed under the Annex. Based on the post-season estimate, the allowable catch for Canadian fishermen was 30,000 sockeye.

- Sockeye escapement past the Tahltan Lake weir was 50,135 which was approximately five times the previous five-year average of 10,600 sockeye, and was well above the escapement goal range of 20,000 to 40,000 sockeye. The preliminary estimate of the total Tahltan stock size is 76,621 sockeye, compared to the pre-season expectation of 42,000 fish. Based on preliminary analysis of in-season stock identification data (egg diameter) and test fishery timing data, the non-Tahltan escapement was approximately 42,800 sockeye. Thus the total Stikine escapement was approximately 93,000 sockeye, which is about 55% above the 60,000 target escapement.

- The target in-river coho catch for 1991 was 4,000 fish; however, the actual catch was only 2,648 coho due to below average catch per unit effort (CPUE) in the commercial fishery. Aerial surveys of coho index areas indicated the escapement was slightly above average.

- The total 1991 gillnet catch of chinook was 1,511 adults and 660 jacks. The combined chinook catch was below the previous ten-year average of 2,426 chinook. The adult chinook count of 4,506 fish at the Little Tahltan weir was similar to the 1985-90 average of 4,531 adult chinook, whereas the return of 313 jacks was 14.5% below the 1985-90 average of 366 jacks.

- Enhancement activities continued in 1991 with approximately 4.7 million sockeye eggs taken at Tahltan Lake and flown to the Port Snettisham hatchery for incubation. Approximately 3.585 million fry were out-planted into Tahltan Lake in June of this year from the 1990 egg-take.

Taku River

- The annual 1988 to 1992 harvest sharing arrangements for Taku salmon stocks of Canadian origin allow for a Canadian harvest of 18% of the sockeye TAC and a coho catch of 3,000 pieces. Other species may be taken incidentally to the sockeye/coho harvest. Like the Stikine River, the harvest arrangements are tied to a commitment by both Parties to undertake a cooperative sockeye enhancement program.

- The Canadian pre-season forecast was for an average to above average return of approximately 171,000 sockeye, and a Canadian harvest of 16,400 to 18,000 sockeye.

- In-season projections for total run size and TAC were made frequently throughout the season based on the joint Canada/U.S. mark-recapture program, the estimated catch of Taku sockeye in the U.S. District 111 gillnet fishery, the catch in the Canadian in-river fishery, and historical run timing information. The in-season forecasts indicated a run size greater than expected ranging from 185,589 sockeye in mid-July to 318,943 sockeye in early August. The final in-season forecast was for a total run of 257,175 sockeye, a TAC of 177,175 to 186,175 sockeye, and a Canadian allowable harvest of 31,891 to 33,511 sockeye.

- The preliminary post-season estimate of the total run is 238,903 sockeye based on tagging and preliminary harvest data.

- The 1991 Canadian sockeye catch was 25,067 in the commercial fishery and 37 in the Indian Food Fishery (IFF). Preliminary analysis suggests that the total catch of 25,104 sockeye was 15.0% to 15.8% of the preliminary TAC estimate of 158,903 to 167,903 sockeye. Therefore, the preliminary indication is the Canadian catch was approximately 3,500 to 5,100 short of the allowable catch.

- Based on the Canada/U.S. mark-recapture program, the estimated total escapement of 125,255 sockeye was above the interim escapement goal of 71,000 to 80,000 fish. Weir counts at Little Trapper and Little Tatsemenie lakes were 22,942 and 8,381 respectively. Both counts were above average; the Little Trapper count established a new record for this system.

- The coho catch was 3,415 fish in the commercial fishery and 7 coho in the IFF, slightly above the 3,000 quota. The coho run strength was the highest ever observed in the Taku River. The preliminary mark-recapture and test fishery data suggest the interim escapement goal of 27,500 to 35,000 was surpassed and the total escapement will likely exceed 100,000 coho.

- The Canadian chinook catch consisted of 1,177 large fish and 432 jacks. The catch of large chinooks was roughly 2.9 times the previous ten-year average of 410 chinook, and the catch of chinook jacks was the highest on record, 2.7 times the average catch of 160 jacks. Chinook escapement counts were above average in most of the index streams that were surveyed. Although the total combined index count was 10,153 chinook, the second highest on record, it was below the index goal of 13,200 chinook.

- Enhancement activities continued in 1991 with approximately 3.1 million sockeye eggs taken at Little Trapper Lake and 1.4 million sockeye eggs from Little Tatsamenie Lake. The eggs were flown to the Port Snettisham hatchery for incubation. Approximately 934,000 sockeye fry were out-planted into Trapper Lake and 673,000 fry into Tatsamenie Lake in June of this year from the 1990 egg-takes.

Alsek River

- Although catch sharing between Canada and the United States has not been specified for the Alsek River salmon stocks, both countries have agreed to attempt to rebuild depressed chinook and early sockeye stocks.

- Canada does not commercially fish in the Alsek drainage, but does conduct important IFF and sport fisheries. In keeping with Annex provisions, Canadian catches of Alsek chinook and early sockeye continued to be restricted. The 1991 IFF catch included 336 chinook and 1,476 sockeye. The chinook catch was above average, whereas, the sockeye catch was below average. Similarly, the sport catch of 388 chinook was slightly above average, whereas, the 303 sockeye angled was below average. The sport harvest of 260 coho was above average.

- At the Klukshu River, an Alsek River tributary, the total weir counts were 2,485 chinook (above average), 1,924 early sockeye (below average), 17,053 late run sockeye (below average), and a phenomenal 8,540 coho (compared to the previous ten-year average of 899 coho). An average escapement of 4,300 sockeye was estimated in Village Creek from electronic counter data.

Northern British Columbia - Pink Salmon Fisheries

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 harvestable surplus of 5.0 million pink salmon in 1991.

- 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 1991, based on in-season hailed data, was 5,724,000 in Areas 3-1 to 3-4 and 5-11 and the 1985-91 average catch is 2,046,000. The 1991 catch reflects exceptionally high pink returns to Areas 3, 4, and 5. The proportion of catch taken in subareas 3-1 to 3-4 during the 1991 season (61%) was similar to the 1985-90 average of 60%, and below the pre-Treaty average of 74%.

- Pink escapements to rivers and streams in Area 3 were at or above target while the preliminary Area 4 escapement of 4,100,000 was well above the 1,000,000 target.

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. The annual Area 1 troll catch of pinks must not exceed 1.95 million and there is a four-year cap (1990-93) of 5.125 million.

- Based on in-season estimates, the Canadian troll catch in the A-B line strip was 71,620 when it closed to trolling at midnight on July 22.

- The Area 1 troll fishery for pink salmon was closed on September 30. Based on preliminary sales slip data the catch was 1.59 million in 1991.

Chinook Salmon Fisheries

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)

- In 1991, Annex IV, Chapter 3 of the PST allowed for a base chinook catch of 263,000 plus 10,000 for a 273,000 total.

- The 1991 troll catch was 217,000 based on sales slips to October 4, 1991. This troll catch plus the net catch estimate of 47,000 from sales slip data and the sport catch estimate of 30,000 gives a total North/Central catch of 294,000. Terminal sport and net catches of 5,000 chinook have been excluded from this total subject to review.

- The troll fishery opened on June 28 and major chinook areas closed to all trolling on August 27. All areas closed to chinook trolling on September 3. Coho trolling closed at the end of September.

- Based on preliminary information, chinook escapements in 1991 were similar to recent years.

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

- The troll ceiling for West Coast of Vancouver Island (WCVI) was 360,000 chinook (within a 7.5 percent management range).

- Trolling opened on June 28 and continued until midnight September 18 (coho closed on September 6). There were no chinook non-retention fisheries in 1991.

- There were four major time/area closures on the West Coast of Vancouver Island (WCVI) in 1991:

    1) Areas F1 and G closed from June 28 to July 14; Area F1 opened July 15 but Area G remained closed. This area closure was implemented in order to moderate the coho catch rate early in the fishery. Area G opened for the duration of the sockeye fishery (August 11 to August 20).

    2) Complete closure to all trolling from August 7 to 10, four days prior to the sockeye fishery.

3) Complete closure to all trolling from August 21 to 23, three 3 days following the sockeye fishery.

4) Areas F1, G and the waters east of Loran-C line 5990-Z-14740 closed August 24. This action was taken initially to slow the coho catch rate and to provide additional protection for Strait of Georgia coho stocks. Following closure for coho retention on September 6, the preceding area closure was maintained in order to avoid coho shakers.

- The preliminary estimate of the 1991 WCVI troll catch is 195,700 based on sales slips as of November 5.

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, Canada continued a series of area and gear-specific management actions to reduce the LGS harvest rate by 20 percent. Therefore the Canadian management objectives in the Strait of Georgia for 1991 were to manage sport and troll fisheries for harvests below the Treaty ceiling.

- The Canadian objective for troll fishery was to manage for a 31,000 chinook harvest (62 cm minimum size limit). The troll catch based on sales slips as of November 5 was 32,000.

- The troll season for chinook started June 27 and went until August 10 without any interruptions. When an early season troll ceiling of 29,000 was reached chinook non-retention and non-possession with single barbless hooks was implemented (August 2 to August 9). On August 20 chinook retention was again permitted. The objective was to allow for incidental chinook catch during the remainder of the sockeye and pink salmon fisheries. The chinook catch rate proceeded at a faster rate than anticipated and the ceiling of 31,000 was attained September 12. Beginning September 13 and continuing until the season closed September 30 chinook non-possession and non-retention were in effect.

- For the sport fishery, a management plan to reduce harvest rates, implemented in Georgia and Johnstone Straits in 1989, was continued in 1991. 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). For the Canadian portion of Juan de Fuca Strait (Victoria area) in 1991, the size limit was 45 cm and the annual was 20.

- To the end of October 1991 the Georgia Strait sport catch of chinook, including the Victoria area, was 112,700 based on creel survey results.

Fraser River Sockeye and Pink Salmon Fisheries

- For the four year period of 1989 through 1992, the United States interception of Fraser River salmon is capped at 7 million sockeye and 7.2 million pink salmon in aggregate. In addition, payback of 94,000 Fraser sockeye and 113,000 Fraser pinks are added to these totals.

- The return of Fraser River sockeye in 1991 was 12.0 million, about 17 percent less than forecast (14.5 million). The allowable catch was approximately 7.0 million.

- The return of pink salmon to the Fraser River was 16.8 million, some 53 percent greater than forecast (11.0 million). The allowable catch was approximately 9.8 million.

- The total U.S. catch of 1.868 million left an uncaught balance of approximately 0.360 million sockeye for 1992.

- The United States Treaty catch objective for Fraser pinks was limited to 25.71% of the available TAC plus a payback of 275,000 pieces which was a result of previous years' shortfalls. The actual United States catch was 2.797 million.

- The total Fraser sockeye spawner escapement is currently under review, but is expected to approach 3.2 million adults. Although not reaching the pre-season objective, this would be a modern day record escapement on the cycle. The bulk of the escapement occurred at the Early Stuart, Seymour, Chilko, Birkenhead and Adams Rivers. The Adams River spawners made up nearly 40% of the total.

- The total Fraser pink escapement is also currently under review, but is expected to exceed the in-season projection of 7.4 million spawners. As usual, Fraser River mainstem spawners made up the majority of the total, but large numbers of spawners were found on the Seton, Thompson and Harrison Rivers.

- For the 1991 fishing season, the Minister of Fisheries established Fraser River Indian food fishery catch objectives of up to 800,000 sockeye for in-river fishermen and up to 125,000 sockeye for Native fishermen fishing outside the Fraser River. The actual 1991 in-river Indian food fishery caught an estimated 605,000 sockeye and a further 91,000 sockeye were taken outside the Fraser River. The Fraser River IFF catch was the largest reported catch on this cycle. The IFF catch of 104,000 Fraser pinks was near the average for the last 6 cycles.

- Current estimates of the Canadian (commercial and total) catches of Fraser River sockeye are 6.055 million and 6.821 respectively. The Canadian commercial catch of Fraser sockeye was the largest cycle year catch in this century. The 1991 fishing season was the first year of a four year commercial salmon allocation plan announced by the Minister of Fisheries. With the payback provisions for Fraser sockeye, the intent of the plan is to provide improved long term stability to the commercial salmon fishing industry.

- The Canadian (commercial and total) catches of Fraser River pink salmon are currently estimated at 6.179 million and 6.546 million respectively. The commercial catch was about 1 million less than the average for the previous six cycles.

- The Canadian sport fishery caught 24,000 Fraser sockeye and 245,000 pinks. The sport catch of Fraser pink salmon was the largest on record.

Coho Salmon Fisheries

Area 20 Net Catch

- There were no targeted coho fisheries in Area 20 in 1991.

- Based on sales slip information to October 31, incidental net catches during the five weeks (five weeks gillnet, two weeks seine) of Fraser River sockeye and pink fishing in July and August totalled 156,000 coho, 9,500 chinook and 900 chum. An additional 6,750 coho were taken in PSC test fisheries.

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

- The Canadian objective was to manage a catch ceiling of 1.8 million coho.

- There were four major time/area closures during 1991 (see WCVI section above). Two of these actions were taken in order to reduce the coho catch rate to provide additional protection to Strait of Georgia coho stocks and to avoid coho shakers.

- The preliminary estimate of troll catch is 1.86 million based on sales slips as of November 5, 1991.

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 3,279,000 chum salmon which included 100,000 U.S. chum.

- The only chum fishery in Johnstone Strait (Areas 12 and 13) occurred on September 23-26 (fourth week of September). The catch for this assessment fishery totalled 154,200 chum and indicated a run size of 2.6 million, which allowed a harvest of 10 percent under the clockwork plan. A commercial troll fishery occurred in Johnstone Strait during the period September 25-29 which harvested 45,000 chum. The Johnstone Strait clockwork catch totalled 287,000 fish broken down as follows -- 215,500 in the Johnstone Strait assessment fishery, the directed commercial fishery and chum caught in the pink-directed fishery in the first two weeks of September; 32,000 Indian food fishery catch (Areas 11-13); 13,000 in Johnstone Strait test fishery and 26,500 Fraser River chum caught in non-terminal Area 14 fisheries. Subsequent analysis of test fishing catch data suggested run sizes ranging between 2.9 and the final in-season run size estimate of 2.7 million. No commercial harvesting occurred after the September assessment fishery. Post season run assessments will be completed once escapement enumeration is finished.

Georgia Strait

- Terminal fisheries in the mid Vancouver Island area occurred on October 14, 21, 28 and November 4. Boundaries were similar to 1990 and included Areas 14-(4, 5, 9, 10) and a portion of Area 14-11. Catches from these early terminal fisheries totalled 265,000. No additional fisheries are anticipated.

- To date, one fishery in Area 17 (starting October 21) and three in Area 18 (starting November 4, 11 and 18) have produced catches of 16,000 and 142,300, respectively. Additional Area 18 harvests are anticipated.

Fraser River

- Chum fisheries occurred on October 22 and November 12. The total catch was 46,000 fish.

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 25,000 and 350,000 chum, based on return-at-age correlations and average Nitinat survivals, respectively. The escapement objective is 200,000 for the Area including 175,000 for Nitinat Lake.

- Gillnet fisheries were initiated on September 23 to assess chum salmon abundance and run timing for the fishing area. Catches in assessment fisheries conducted over a three week period totalled 113,500 chum, 1,407 coho, and 249 chinook. The fishing area was limited to inside a line two miles south of Pachena Point and Bonilla Point. Assessment from these fisheries permitted a seine fishery on October 15 in the same fishing area. The resulting catch was 163,710 chum, 860 coho, and 5 chinook.

- A high rate of escapement of chum into Nitinat Lake was evident starting about October 10-11 and continued for the next few weeks. The escapement goal was achieved by October 15. Fisheries were conducted daily (except October 21 due to poor weather) until October 26. Total catch during the cleanup period was 296,867 chum. The gillnet fishing area was expanded to include the portion of Area 20-1 inside a line two miles south of Bonilla Point and Camper Creek. This was necessary to increase the exploitation rate on Nitinat chums and for safety of the fleet.

- The total season catch was 574,077 chum, 2,267 coho, and 254 chinook from 13 days gillnet fishing and eight days seine fishing.

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

- The 1991 troll catch of chum was 12,500, taken predominantly in the northwest portions of WCVI during July.

G.S.I. Sample Collection

- In Johnstone Strait, ten weeks of both test and commercial fishery catches were sampled for a total of 4,263 fish. In the mid Vancouver Island area, 1,866 fish were sampled from commercial fisheries over a four week period. At Nitinat, approximately 1,000 chum were sampled from the commercial fisheries over a four week period. There was no GSI sampling in the WCVI troll fishery due to low chum catches.

(Source Document) - *Post-Season Report for Canadian Treaty Limit Fisheries.* Prepared for the December 9-13, 1991 meeting of the Pacific Salmon Commission. Department of Fisheries and Oceans Canada. November 1991.

Preliminary 1991 Catches in Canadian Treaty Limit Fisheries and 1985-90 Catches for Comparison. Prepared for the December 9-13, 1991 meeting of the Pacific Salmon Commission.

Fisheries/Stocks	Species	1991*	1990**	1989	1988	1987	1986	1985
Stikine River	Sockeye	22,763	18,024	20,032	15,291	9,615	17,434	25,426
(all gears)	Coho	2,648	4,037	6,098	2,117	5,731	2,280	2,175
	Chin Adults	1,511	2,250	2,669	2,352	2,201	1,936	1,111
	Chin Jacks	660	959	229	444	444	975	185
	Pink	394	496	825	418	646	142	2,383
	Chum	208	499	674	733	459	307	536
	Steelhead	71	199	127	261	219	194	240
Taku River	Sockeye	25,067	21,100	18,545	12,014	13,554	14,739	14,244
(commercial gillnet)	Coho	3,415	3,207	2,876	3,123	5,599	1,783	1,770
	Chin Adults	1,177	1,258	895	555	127	275	326
	Chin Jacks	432	128	139	186	106	77	24
	Pink	296	378	695	1,030	6,250	58	3,373
	Chum	2	12	42	733	2,270	110	136
	Steelhead	5	22	24	86	223	48	32
Areas 3 (1-4) and 5-11 (commercial net)	Pink	5,724,000	803,000	2,259,000	425,000	1,851,000	1,983,000	1,277,000
Area 1 (commercial troll)	Pink	1,590,000	1,169,000	1,377,000	1,630,000	495,000	416,000	687,000
North/Central Coast (commercial/sport)	Chinook	294,000	254,000	303,000	247,000	283,000	261,000	275,000
West Coast Van. Is.	Chinook	195,700	296,000	204,000	409,000	379,000	342,000	358,000
Area 12 (com. troll)	Chinook	1,000	2,000	2,000	2,000	2,000	4,000	4,000
Georgia Strait								
(sport)	Chinook	112,700	112,000	133,000	119,000	121,000	182,000	235,000
(troll)	Chinook	32,000	34,000	29,000	20,000	39,000	44,000	56,000
	Total	144,700	146,000	162,000	139,000	160,000	226,000	291,000
Fraser River stocks	Sockeye	6,821,000	13,233,000	12,784,000	1,615,000	3,783,000	9,363,000	8,754,000
(total Canadian Catch)	Pink	6,546,000	-	6,333,000	-	2,546,000	-	8,725,000
Fraser River stocks	Sockeye	1,868,000	2,398,000	2,382,000	679,000	1,932,000	2,748,000	2,925,000
(total U.S. Catch)	Pink	2,797,000	-	2,007,000	-	1,339,000	-	3,834,000
West Coast Van. Is. (commercial troll)	Coho	1,860,000	1,862,000	1,953,000	1,596,000	1,821,000	2,157,000	1,389,000
Johnstone Strait clockwork catch#	Chum	287,000	1,080,000	487,000	1,112,000	127,000	1,258,000	623,000

+ 1991 catches for North Coast are based on in-season hails, sport catch to November 15 and troll sales slips to October 4, 1991; South Coast catches include troll sales slip data to November 5, net sales slips and sport catches to October 31, 1991.

** The 1990 catch figures are still preliminary but have been updated from the earlier numbers presented in the 1990 post season review of treaty limit fisheries.

* North Coast catch less terminal exclusion catches of 5,000 in 1991 (under review); 5,500 in 1990 and 4,800 in 1989.

Canadian clockwork catch includes commercial, IFF and test fish catches in Areas 11-13 and 29 for 1985-87 and in Areas 11-13 for 1988-91.

D. 1991 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:

- detailed reports on existing enhancement facilities of the type produced in 1987 be prepared every four years;

- the Parties will annually update 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

- the Parties will provide periodic reports through the appropriate panels on new enhancement plans.

1. 1991 Update Report for the Salmonid Enhancement Program in British Columbia

In Canada, the Salmonid Enhancement Program (SEP) is a jointly funded program of the federal and provincial governments designed to enhance British Columbia and the Yukon Territory's five salmon and two sea-run trout species. SEP was initiated in 1977 to assist the Department of Fisheries and Oceans in reaching the objective of doubling salmonid stocks. Funding was provided to construct, operate, maintain, and assess salmonid culture facilities as well as to operate existing facilities. Including facilities formerly operated by the International Pacific Salmon Fisheries Commission, SEP currently operates 32 major hatcheries and/or spawning channels, 32 community or native band run hatcheries, 43 groundwater channels, 3 smaller channels, numerous fishways and flow control facilities and a large public involvement program.

Results of enhancement to date have been encouraging. In 1990, SEP production contributed 11.2% by pieces and 9.6% by weight of the commercial and Georgia Strait sport catches. SEP also contributes to sport fisheries outside of Georgia Strait and to the Indian food fish catch, but no estimate of this contribution is available.

SEP is currently developing a new Ten Year Plan for its enhancement projects. To prepare this plan, the program is evaluating existing enhancement projects, expansion options for existing projects, and soliciting and evaluating proposals for new projects. This information will be presented as a set of program options to client groups for consultation in the spring and summer of 1992. The results of this process will be used to develop a program submission for consideration by Treasury Board in the fall, with implementation beginning in 1993.

SEP has been reorganized since the 1987 report. The former North Coast, South Coast, and Fraser Units of the Enhancement Operations Division were combined and split into two divisions: Coastal Operations, and Fraser River and Northern B.C. Operations. The Community Economic Development Program and the Public Involvement Unit of the Special Projects Division have been combined into the Community Involvement Division and the Small Projects Unit is now the Resource Restoration Division. The Engineering Division (Minor Facilities) has been renamed the Development Division. The Lake Enrichment Program remains the same.

catches", "actual and planned salmon releases by brood year", and "expected adult production by recovery year" for each region are presented in the report.

Significant Changes Since 1987

North Coast

1. In response to the coho conservation initiative in the Skeena River, enhancement efforts have focused on increasing coho production to support the fishery initiatives and to rebuild certain stocks. Marking and return enumeration of enhanced upper Skeena stocks were increased to obtain better information on these stocks, including distribution and exploitation rates.

2. Orford Channel was completed in August 1990 for the expected peak return of adult summer chums.

3. In 1987 and 1988 experimental enhancement of chinook was conducted at Pallant Hatchery, with donor stock from Quinsam River. In 1990, up to 100 returning adults were given access to the river.

4. A pilot facility was constructed on the Wannock River in Rivers Inlet for increased production of chinook. The community-based project will assess several rearing and release strategies over the next several years.

5. Work began on the Nass system in cooperation with the Nisga's Tribal Nation. Initial work includes reconnaissance and stream obstruction removal.

West Coast of Vancouver Island

1. Preliminary estimates of sockeye escapement in 1990 to Barkley Sound from enriched lakes were 30% below target, party due to significant pre-spawning mortality in the terminal marine area. A lower than average egg-to-fry survival is anticipated due to extreme flood events on the spawning grounds.

2. A large sport fishery has developed in Alberni Inlet, catching chinook returns to the Robertson Creek Hatchery. A significant, as yet unassessed chinook sport fishery, is also developing in Nootka Sound, harvesting Conuma River returns.

Inside Vancouver Island

1. The most significant new initiative is the effort to assist the Lower Georgia Strait chinook stocks in rebuilding. Nanaimo and Cowichan hatcheries have been modified to assist in the rebuilding. The quality of the Nanaimo facility was improved and egg targets raised from 500k to 700k. Cowichan Hatchery has been redeveloped, including new wells and back-up systems, and rearing ponds. The egg target was increased from 500k in 1987 to 3.5 million 1991. Eggs will be taken from wild brood stock and from a group of 1987 brood which are being reared to maturity in seapens.

2. The rearing of chinook fry in seapens in Howe Sound and Burrard Inlet has increased significantly from the experimental levels reports in 1987. Chinook juveniles are moved into the pens about three weeks before their normal release time. The goal is for the adults to home to a site where brood stock can be seined and a local sport fishery supported. Strong

returns to the Britannia Beach area from seapen releases at Porteau Cove resulted in a record egg take in 1991.

Results suggest improved ocean survival from seapen releases. The program has been expanded throughout Howe Sound and Burrard Inlet, and on a smaller scale, at several Coastal Operations facilities. In 1991, 3.1 million chinook were released from pens in Howe Sound and Burrard Inlet.

3. Mainland Inlet pink salmon stocks are being enhanced to stabilize production. Glendale Channel, built in 1988, was loaded to full capacity in 1990. Low flows and high water temperatures in the watershed resulted in up to 90% pre-spawn mortality in the river. Fish in the channel were kept alive by oxygen supplementation. Kakweiken Channel was successfully loaded in 1990, its first full year of operation.

4. Declining coho stocks in Georgia Strait have led to a consultative planning process for rebuilding wild stocks, through habitat protection, the enhancement of existing stocks and the use of regulations to prevent overfishing. The Department is now midway through the consultative planning process, having conducted initial workshops with members of the various fishing sectors and the public.

5. A native co-management project exists in Kingcome. Feasibility studies and test well drilling are underway.

Fraser River

1. Fish passage for low level water conditions has been improved in the Fraser Canyon. By-passes were installed at Little Hell's Gate and Saddle Rock and a low level fishway was put in at Hell's Gate. Lighting was added at several sites, with excellent results, to improve passage at night.

2. Sockeye spawning channels were constructed on the Chilko and Horsefly Rivers. Horsefly Channel, built in 1989, sustained flood damage in 1989 after the fry migration. Major repairs were completed and the channel was fully loaded since 1989. The 12 million fry produced by the channel in 1990 represented 16% of total system output. Chilko Channel was built in 1988. Approximately 10,000 sockeye successfully spawned in the channel in 1990, of which 8,000 were air-lifted in by helicopter. In 1991, approximately 10,000 sockeye voluntarily swam into the channel to spawn. In addition to the channels, a flow control structure was installed on the Mitchell River to reduce overwinter mortality of sockeye.

3. Funding for Birkenhead Project was terminated in 1990 and in 1991 the project transferred to the Community Involvement Program. Chinook enhancement continued in 1990 by satelliting the Birkenhead stock into Inch and Tenderfoot Creek hatcheries where there are more favourable rearing conditions.

4. Chilko Lake was partially enriched in 1988. Escapement of sockeye in 1990 was significantly higher than expected.

5. The strategy at Quesnel Hatchery has changed. Enhancement efforts are now focused on fewer stocks, particularly the Quesnel and Upper Cariboo systems, rather than enhancing numerous upper Fraser chinook stocks.

6. Experimental net pen rearing of Upper Pitt sockeye is being conducted at Pitt Lake.

7. A program to rebuild the heavily damaged pink salmon run in the Chilliwack River is occurring. Chilliwack Hatchery has been expanded with Zenger boxes to a capacity of 8 million eggs. Construction of a small experimental spawning channel is being discussed.

8. In 1990, funding for Clearwater Hatchery was reduced. The objective of this cut was to reduce costs and to reassess the current enhancement strategy used for the Clearwater chinook and coho stocks. The facility has been converted to a Native Co-Management project to continue operations.

Yukon and Transboundary Rivers

1. A joint venture between Canada and the United States is enhancing sockeye on several transboundary rivers. In 1991, the Trapper and Tatsamenie systems achieved their targets (3.1 million and 1.4 million respectively). However, only 4.8 of the 6.0 million egg target for the Tahltan was achieved due to incubation space limitations resulting from variability in egg takes, delivery and partial filling of incubators.

2. Responsibility for the continuing operation of the Whitehorse mitigation project now rests with the Yukon Territorial Government. The 1990 escapement of chinook at the fishway was the second highest on record, of which one-quarter were estimated to be of hatchery origin. The 1991 escapement was high, with one quarter estimated to be of hatchery origin.

(Source document) *1991 Update Report for the Salmonid Enhancement Program in British Columbia.* Canadian Section of the Pacific Salmon Commission. November 1991.

2. 1991 Annual Report on the Salmonid Enhancement Activities of the United States

The United States provided a report dated January 31, 1990 to Canada that combined under one cover all pertinent biological data for United States enhancement projects with a detailed account of plans for net projects. The 1991 Annual Report incorporates updated information, including projections for releases from the 1990 brood year, as well as preliminary data on numbers of adults returning to hatcheries, and the number of eggs taken during 1990. **Please note that whenever updated, or preliminary new data, were not available, the 1991 report is the same as the 1990 report.** Final information and projections current through the end of the 1990 calendar year are contained in this report.

Northern Southeast Alaska/Southern Southeast Alaska

New Production

Information available on new production and new production facilities is unchanged from that provided in the Sixth Annual Report.

Major Trends In Production

During the report period from 1983-1989, all hatcheries in Southeast Alaska were undergoing broodstock development. Both State and PNP facilities in Southeast Alaska were involved in applied fisheries research and producing fish from 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 broodstock 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.

Detailed tables of egg takes, releases and adult escapements are presented in the source document by species at each facility for brood years 1983-1990 inclusive.

Washington Department of Fisheries

New Facilities and Production Increases

Information provided in the Sixth Annual Report is unchanged.

Major Trends in Production

Information provided in the Sixth Annual Report is unchanged.

Treaty Tribes of Western Washington, Reported by the Northwest Indian Fisheries Commission

New Production

A major new facility, the Nisqually Tribe's Clear Creek Hatchery, began operations in the spring of 1991. The hatchery has a production goal of 6,800,000 fall chinook, 630,000 yearling coho, and 3,400,000 chum.

Major Trends in Production

Tribal fish release figures (in 1,000's of fish) for 1990 originally provided in the Sixth Annual Report, have been revised as follows but are still to be considered preliminary:

SPECIES	1990
Fall Chinook	14,212
Spring Chinook	471
Summer Chinook	188
Coho sub-yearling	1,167
Coho yearling	7,655
Chum	14,981
Pink	110
Sockeye	0
Steelhead sub-yearling	353
Steelhead yearling	821
Totals	39,958

A synopsis of release trends, by species, is as follows:

1. **Fall Chinook** production (age 0+ smolt releases) fluctuated between 9 and 14 million from 1982 to 1990. Release numbers are expected to increase in the future.

2. Only three stocks of **spring chinook** (N.F. Nooksack, S.F. Nooksack and White River) are currently being reared. Because of the depressed status of the stocks, release numbers are not expected to greatly increase in the near future.

3. Two stocks of **summer chinook** (Quillayute and Stillaguamish) are now being enhanced at tribal facilities.

4. **Coho** production has fluctuated from 8 to 15 million with some increases planned for future years.

5. **Chum** fry releases have undergone the most significant increase. Beginning in 1985, annual chum releases almost doubled to approximately 21 million. Significant increases are also planned for future years.

6. **Pink** salmon are currently being reared at only two tribal facilities (Port Gamble Hatchery and Lummi's Skookum Creek Hatchery). Because of the life history pattern of the species in Puget Sound, fry releases occur only on even numbered years.

7. Only the Lake Ozette stock of **sockeye** is now being reared in a tribal facility (Makah's Umbrella Creek hatchery). Enhancement options for this stock are currently being studied.

8. **Steelhead** releases are predicted to remain at the 1 to 2 million level.

Oregon Department of Fish and Wildlife

New Production

Construction on the Umatilla Hatchery that began in mid-1990 is expected to be completed by 1991. This facility will produce Summer Steelhead, Upriver Fall Chinook and Spring Chinook.

Loss In Production

Information available is unchanged from the Sixth Annual Report.

Major Trends In Production

Information available is unchanged from the Sixth Annual Report.

United States Fish and Wildlife Service

Information available is unchanged from the Sixth Annual Report.

Idaho Department of Fish and Game

New Production

The new Clearwater Fish Hatchery, located across the North Fork of the Clearwater River from Dworshak National Fish Hatchery, is expected to go on line in November of 1991 with production possible in the spring of 1992. The management of this facility, however, is still being discussed as to supplementation of wild stocks in the Clearwater River drainage as well as enhancement of existing hatchery stocks. Brood fish scarcity is influencing the management objective.

Losses In Production

The 1989, 1990, and 1991 spring and summer chinook salmon brood escapements and egg takes were well below potential hatchery capacities. Smolt releases below hatchery capacity in 1991 will be followed by below capacity releases in the springs of 1992 and 1993.

An aberrant fish mortality occurred at the Crooked River Satellite facility. Approximately 375,000 pre-smolts died from a plugged water supply intake structure during a severe thunderstorm event.

Trends In Production

Hatchery production, as well as natural production, is predicted to diminish with the low adult fish numbers returning to Idaho. The continuing trend of drought conditions, low flows in the mainstem drainages, and exacerbated mortality of smolts through the federal hydroelectric system, have again taken their toll on smolts as well as returning adult fish.

Adult brood shortages for hatchery production occurred in both 1990 and 1991 for spring and summer chinook. Approximately 91% and 75% of the spring and summer chinook egg requirements, respectively, were available in 1990. Estimates for 1991 are further reduced to only 47% and 48% of egg requirements for spring and summer chinook, respectively.

The observed decreasing trend in numbers of wild redds counted in trend areas indicates declining abundance of wild chinook. The 1991 count is less than 15% of the average 1960-65 counts, a period of peak counts. Counts have declined since the indicator stock program was initiated.

Summary of United States Hatchery Releases By Agency and Species 1984-1990 (thousands of fish)

Table 1 summarizes releases by agency and species for each of the brood years 1984 to 1990 inclusive.

(Source Document) *1991 Annual Report on the Salmonid Enhancement Activities of the United States.* United States Section of the Pacific Salmon Commission. December 2, 1991.

Table 1. Releases by Agency and Species 1984-1990 (thousands of fish)

		Spring Chinook	Summer Chinook	Fall Chinook	Coho	Chum	Pink	Sockeye	Steelhead
1984	ADFG	1,840			6,210	51,840	7,420		
	WDF	6,993	3,572	103,300	71,400	40,900	400		
	NWIFC	14	96	8,721	8,581	11,286	737	10	1,714
	ODFW	11,748		12,018	31,218	2,963			9,629
	IDFG	2,409	1,083					0	4,859
	USFWS	10,099		19,648	6,908	5,079			360
	Total	33,101	4,751	143,686	124,317	112,068	8,557	10	16,562
1985	ADFG	1,630			7,430	131,030	4,440	560	
	WDF	5,570	3,043	96,600	81,600	72,900	200		
	NWIFC	67	355	9,686	16,110	25,190	0	200	2,654
	ODFW	13,346		7,861	22,243	2,212			9,351
	IDFG	9,184	1,395					850	7,369
	USFWS	15,162		16,742	6,537	4,937			237
	Total	44,959	4,793	130,889	133,920	236,269	4,640	1,610	19,611
1986	ADFG	3,160			6,250	133,470	70,330	890	60
	WDF	6,707	2,411	108,000	73,500	60,900	2,100		
	NWIFC	114	123	11,632	10,429	22,380	0	240	2,401
	ODFW	22,495		8,271	22,658	856			12,222
	IDFG	6,819	2,036					14	6,724
	USFWS	13,058		13,380	6,512	5,401		336	
	Total	52,353	4,571	141,283	119,349	223,007	72,430	1,479	21,408
1987	ADFG	8,140			7,460	15,009	47,370	380	100
	WDF	9,316	3,565	112,100	70,300	58,900	0		
	NWIFC	142	91	11,080	9,541	23,470	0	12	1,910
	ODFW	15,661		15,333	20,216	475			11,559
	IDFG	8,306	2,790					0	6,245
	USFWS	14,209		15,526	7,876	3,367			4,745
	Total	55,774	6,446	154,038	115,392	101,221	47,370	392	24,559
1988	ADFG	4,170			660	165,290	93,140	7,330	130
	WDF	13,411	4,045	123,900	57,500	52,300	6,300		
	NWIFC	4	472	13,094	9,849	21,092	882	133	1,482
	ODFW	15,136		13,614	23,747	1,585			11,213
	IDFG	8,297	2,892					0	6,728
	USFWS	13,848		22,218	6,260	3,105			4,436
	Total	50,696	7,408	172,827	97,356	78,082	7,182	133	23,859
1989	ADFG	5,640			8,320	204,020	44,780	8,890	110
	WDF	9,562	5,424	122,900	67,100	48,100	0		
	NWIFC	231	451	12,102	10,399	20,221	0	200	1,270
	ODFW	5,226		11,609	4,576	0			6,613
	IDFG	5,198	910					0	3,453
	USFWS	14,390		16,633	9,645	2,960			5,422
	Total	40,247	6,785	163,244	100,040	275,301	44,780	9,090	16,868
1990	ADFG	7,740			9,680	163,560		9,170	50
	WDF	7,750	5,155	120,516	77,601	73,121	1,000	551	
	NWIFC	471	188	14,212	8,822	14,981	110	0	1,174
	ODFW	17,752		58,683	18,525	0			8,284
	IDFG	5,525	1,528			3,700		0	3,700
	USFWS	12,770		26,000	8,790	3,695			4,572
	Total	52,008	6,871	219,411	123,418	259,057	1,110	9,721	17,780

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, 1991 to March 31, 1992 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. 1990 Annual Report. TCCHINOOK (91)-3. November 5, 1991

Executive Summary

1990 Chinook Salmon Catches In Fisheries With Ceilings

Estimates of 1990 catch for each fishery managed under a harvest ceiling established by the Treaty are presented below. These data are preliminary, but major changes are not expected.

(in 1,000's)

Area/Fishery a/	Ceiling	Catch	Difference Numbers	Difference Percent
S.E. Alaska (T,N,S) b/	302	318.5	+16.5	+5.5%
North/Central B.C. (T,N,S) c/	302	254.0	-48.0	-15.9%
West Coast Vancouver Island (T)	360	295.4	-64.6	-17.9%
Georgia Strait (T,S)	275	144.3	-130.7	-47.5%

(Compiled with information available as of October 9, 1991)

a/ T=Troll, N=Net, S=Sport; ceiling and catch reported in thousands.
b/ The actual total catch was 366,800 chinook, including a hatchery add-on of 48,300
c/ Excludes 5,549 chinook caught in terminal areas in 1990, which are excluded from the ceiling.

Catches in all chinook fisheries of interest to the PSC are documented in Table 1.

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 Fishery	Ceiling	Catch a/ 1987	1988	1989	1990	Total Deviations	Difference Numbers	Percent
SE Alaska (T,N,S) b/	263 e/	265.2	255.2	264.4	318.5	+12.3	+12.3	+4.7%
North/Central B.C. (T,N,S)	263 e/	283.0	245.6	303.0 c/	254.0 c/	-5.4	-5.4	-2.1%
West Coast Vancouver Island (T)	360	378.9	408.7	203.7	295.5	-153.2	-27.0	-7.5% d/
Georgia Strait (T,S)	275	159.0	138.7	162.0	144.3	-496.0	-20.6	-7.5% d/

a/ Compiled with information available as of October 10, 1991.
b/ S.E. Alaska catches exclude hatchery add-ons of 16,700, 28,700, 26, 700, and 48,300 for 1987, 1988, 1989 and 1990 respectively.
c/ Excludes 4,819 chinook caught in terminal areas in 1989, and 5,549 chinook caught in 1990, for a total of 10,368.
d/ Negative deviations below the 7.5% management range can not be accumulated.
e/ The 1990 ceiling was 302,000

Escapement Assessment

Spawning escapement data were evaluated for a total of 42 indicator stocks to determine their rebuilding status. For the 33 stocks with escapement goals that were classified, 14 (42%) were classified as "Rebuilding" or "Probably Rebuilding" and no stocks were classified as "Not Rebuilding". However, for the second consecutive year, the overall rebuilding status has not improved. Nine (27%) of the indicator stocks were classified as "Indeterminate" (compared to 28% in the 1989 analysis) and ten (30%) were classified as "Probably Not Rebuilding" (compared to 28% in the 1989 analysis).

Category	1990 Number	1990 Percent	1989 Number	1989 Percent
Rebuilding	4	12%	8	22%
Probably Rebuilding 1/	10	30%	7	19%
Indeterminate	9	27%	10	28%
Probably Not Rebuilding	10	30%	10	28%
Not Rebuilding	0	0%	1	3%
Total 2/	33	100%	36	100%

1/ The Stikine (assessed as Rebuilding and Probably Rebuilding based upon the two countries' estimates) was included as Probably Rebuilding for this table.
2/ In 1990, three stocks were not classified, two because their base period average escapements were above their escapement goals and one because escapement data were not provided.

The rebuilding response of the escapement indicator stock has been highly mixed, with some stocks consistently exceeding their goals and others with recent escapements even below base period levels. Given that most stocks are halfway and the remainder are two thirds through their rebuilding programs, it is of serious concern to the CTC that only 42% (14 of 33) of the escapement indicator stocks with goals are currently classified as Rebuilding or Probably Rebuilding. This percentage is especially discouraging since, in 1987, 70% (23 of 33) were in these top two categories. Of particular concern are the ten stocks classified as Probably Not Rebuilding. For seven of these ten stocks, the average escapement during the rebuilding period has actually declined from the base period level and, for the remaining three stocks, the average escapements have increased by only 16% or less.

The SEAK and TBR stocks have a target rebuilding date of 1995 and are entering the final phase of their 15-year rebuilding program with 56% of the stocks (5 of 9) classified as either Indeterminate (4) or Probably Not Rebuilding (1). Three of these Indeterminate stocks, Blossom, Chickamin, and Unuk, are located at Behm Canal. These three stocks were showing a good rebuilding response up through 1986 and were classified as either Rebuilding or Probably Rebuilding. Since that time, escapements of these stocks have shown a steady decline and, in 1990, their status declined to Indeterminate. Chinook returning in years prior to 1988 may have benefitted from above average survival rates for the 1982 and 1983 broods; survival rates for subsequent broods have declined.

The 31 stocks with a target rebuilding date of 1998 are midway through their rebuilding program and also show a mixed response. Of the seven stocks without goals, the five Washington Coastal stocks have shown steady escapement increases while the Lewis River and Oregon Coastal stocks show recent escapement declines. Of the remaining 24 stocks, 58% (14 of 24) were assessed as Indeterminate (5) or Probably Not Rebuilding (9). None of the stocks assessed as Probably Not Rebuilding shows indications of improving escapement trends.

The lack of a clear, positive, response to the rebuilding program by many of the escapement indicator stocks elevates concerns that all stocks may not achieve their escapement goals by the target dates. The mixed response seen in the SEAK and TBR group in 1990 is of particular concern to the CTC since this group has only five years remaining in its rebuilding program. While the other stocks have eight years remaining to rebuild, the CTC is very concerned by the large number of these stocks that are classified as Probably Not Rebuilding. Even for stocks in the top categories, the future rate of rebuilding is likely to decrease under current management regimes, since survival rates have declined for recent broods.

In view of these survival problems and the failure to achieve even the minimum expected harvest rate reductions in many fisheries, the CTC concludes that a number of stocks will not achieve their escapement goals by the target dates in the absence of additional management actions.

Exploitation Rate Assessment

The Exploitation Rate Analysis relies upon CWT release and recovery data to estimate indices of fishery harvest rates and the survival of CWT tag groups. The utility of the indices is dependent on how representative the indicator stocks are of the actual populations harvested in the fisheries.

The primary purpose of the analysis of harvest rates is to assess the effectiveness of management measures in PSC fisheries. The PST established ceilings for the SEAK, NCBC, WCVI, and GS fisheries and constrained the catch in other fisheries which harvest depressed natural stocks (pass-through fisheries). The ceilings were expected to result in an immediate reduction in harvest rates (the "1985 target" level). In subsequent years, it was expected that the fixed ceilings and increases

in chinook abundance would act in concert to continually reduce harvest rates until rebuilding was completed.

For 1990, the initial 1985 target reductions for total fishing mortalities in PSC ceilinged fisheries were achieved only in the NCBC troll fishery. In 1989, initial 1985 target reductions were achieved for the SEAK, NCBC, AND WCVI troll fisheries. When 1985-1990 averages are considered, only the NCBC troll fishery met the 1985 target reduction.

		CHANGE IN FISHERY HARVEST RATE FROM BASE - Total Mortality -							1985
Fishery	Age(s)	1985	1986	1987	1988	1989	1990	1985-90 Average	Target Reduction
SEAK Troll	3,4,5	9%	-22%	0%	-35%	-34%	-8%	-15%	-22%
NCBC Troll	3,4,5	-21%	-8%	-18%	-49%	-35%	-37%	-28%	-16%
WCVI Troll	3,4	-9%	-1%	-22%	4%	-53%	-6%	-15%	-24%
GS Troll/Sport	3,4,5	-47%	-22%	-32%	-29%	-8%	-34%	-29%	-47%
WA/OR Ocean	3,4	-39%	-49%	-29%	-26%	25%	49%	-12%	a/

a/ No target reductions were established for Washington and Oregon ocean fisheries

Trends in the fishery indices for the SEAK and NCBC troll fisheries were consistent with expectations through 1989. The trend was not maintained in the SEAK troll fishery in 1990, where the harvest rate index increased by 39% relative to 1989. The increase in the harvest rate most likely resulted from the increase in the ceiling in 1990 and a reduction in abundance. The fishery index for the NCBC troll fishery in 1990 was 37% below the base period and near the value observed for 1989. Although the ceiling for all gear in this fishery was also increased in 1990, the catch in the troll fishery actually declined by 20% to compensate for the NCBC cumulative deviation through 1989.

Harvest rates in the WCVI troll fishery have varied considerably since 1985. The 1985-90 average reduction in the harvest rate of 15% is nine percentage points above the 1985 target reduction. The 1990 Letter of Transmittal indicated that the fishery would be managed in 1990 to achieve the average harvest rate in the years 1985-1987. The 1990 estimated reduction in the fishery index of 6% fell short of the 11% reduction that would have been consistent with the intent of the Letter of Transmittal.

Harvest rates in the combined GS sport and troll fishery continued to exceed the initial 1985 target reduction by a substantial margin. After increasing in 1989, harvest rates in 1990 in these combined fisheries declined by 34% relative to the base period. The index remains 13 percentage points above the 1985 target reduction.

The fishery index for the WA/OR sport and troll fisheries exceeded base period levels for the second consecutive year. Harvest rates for this fishery have been increasing since 1986, and the 1990 index is 49% above the base period level. Stock specific indices for this fishery indicate that harvest rates for Puget Sound stocks have increased significantly more than for Columbia River stocks.

The abundance of chinook in the fishing areas must exceed recent abundances to further reduce brood year ocean exploitation rates under a fixed catch ceiling policy. Below-average survivals are projected for 10 of 11 major stock groups contributing to fisheries operating under PSC ceilings. Only one stock group, WCVI fall, is expected to have above average survival. Survivals for four of the five major stock groups contributing to the SEAK and NCBC fishery are projected to range from approximately 50% to 80% below their long-term averages. Survivals for all six major stock groups contributing to the WCVI fisheries are projected to range from 22% to 73% below average. Lastly, survival for the five major stock groups contributing to Strait of Georgia fisheries is projected to range from 22% to 73% below average.

Recommendations

1. *Additional management actions should be undertaken in order to increase the probability that stocks achieve their spawning escapement goals by the end of the rebuilding program.* The failure to achieve even the 1985 target reduction in harvest rates in all ceiling fisheries except NCBC, the lack of progress toward rebuilding by many stocks, and the expectations for reduced survival indicate that additional management actions will be required if stocks are to meet their escapement goals by their target dates. The management actions required will depend upon the stocks involved and the definitions ultimately adopted by the PSC for successful completion of the rebuilding program. Two complementary types of management actions should be considered:

    a) The management regimes in ceiling fisheries should be reassessed to determine if additional management actions are required to achieve expected reductions in harvest rates. Management actions in pass-through fisheries should be checked for consistency with an agreed upon definition of pass-through.

    b) Stock specific alternative management actions should be considered for stocks which will not rebuild with PST management actions following from a) above.

2. *Policy issues of what constitutes rebuilding/rebuilt should be resolved.* Southeast Alaska and Transboundary stocks are entering the final phase of the 15 year rebuilding program, and the remaining stocks will be past the midpoint of the program in 1991. The advanced status of the rebuilding program, and the poor progress of some stocks, make it imperative that rebuilding/rebuilt be defined immediately. The definitions should include provisions for stocks without escapement goals, or escapement goals should be established for all escapement indicator stocks.

3. *Policy issues and information needs for interpretation of the pass-through provisions should be resolved.* A definition of pass-through is required in order to assess if this provision of the PST has been met.

4. *Data limitations which are compromising the ability of the CTC to complete the escapement and exploitation rate analyses should be eliminated.* General research needs of the CTC will be addressed in detail in a report which is currently under preparation. Data needs for the annual report which have not been completely satisfied include the following:

    a) *Report estimated CWT recoveries to the PSMFC by July of the year following the fishery.* As requested by the PSC, the CTC is currently conducting the Exploitation Rate analysis on a year-out basis. However, estimated recoveries for the 1988 and 1989 Puget Sound

sport fisheries were not available from the PSMFC, nor were final expansions available for the Puget Sound net fishery in 1989 or 1990.

b) *Collect and provide information on the age and sex composition of escapement.* Age specific escapement data is essential to evaluate brood production and escapement goals. Age specific data also improves the quality of the calibration of the CTC Chinook Model.

c) *Tag representative Exploitation Rate indicator stocks at sufficient levels.* The CTC is especially concerned about the adequate representation of spring and summer stocks and the lack of an indicator stock (with escapement data) for the Harrison River stock.

d) *Establish consistent and standardized recovery programs for CWT fish at hatcheries and on spawning grounds.* Accurate estimates of escapement are essential for the Exploitation Rate Analysis. The CTC is concerned that 1) pilot studies have indicated that many tagged fish may not be successfully identified at hatcheries, 2) CWT fish which do not return to the hatchery may not be accounted for on a consistent basis, and 3) standard procedures to estimate escapement are not used by some hatcheries in SEAK. In addition, standardized procedures should be instituted for enumeration of marked and unmarked releases and tag retention rates.

e) *Provide estimates of sublegal encounter rates in troll fisheries and legal and sublegal encounter rates in chinook non-retention fisheries.* The CTC has estimated that non-landed catch mortality is approximately 30-50% of the reported catch (TCCHINOOK (87)-5). However, sampling programs to determine the magnitude and stock composition of the non-landed catch mortality are nearly nonexistent.

5. *A consistent procedure for CTC review of proposed changes in escapement goals should be established.* The escapement goals established by the management agencies provide the basis for the CTC assessment of rebuilding. Modification of an escapement goal can affect the results of the assessment, and hence, the perceived progress toward rebuilding. To assure consistency with the objectives of the PST, a standard procedure for CTC review of changes in escapement goals should be established.

Joint Chinook Technical Committee. Review of Alaskan Procedures to Estimate Add-On and Predicted Effects of June Fisheries. TCCHINOOK (92)-1. January 24, 1992

Executive Summary

The purpose of this report is to aid the Commission in considering a risk adjustment for the 1992 Southeast Alaska (SEAK) hatchery add-on in accord with the 1991 Letter of Transmittal. Given that the magnitude of estimated SEAK hatchery contributions has increased by ten fold and the uncertainty about the estimate is greater, the adverse consequences on other stocks of over estimating SEAK hatchery contributions are greater now than when the add-on procedure was originally adopted. The CTC recommends that the Commission maintain the risk level of error at 1 in 20.

The report consists of two components: (1) a review of the methods used to estimate the variability associated with estimating the add-on in SEAK and (2) an evaluation of the impact of June fisheries targeted at SEAK hatchery stocks on several other stock groups. The review is based on a draft report prepared by the Alaska Department of Fish and Game (ADF&G) and entitled

"Documentation of add-on procedures and estimated impacts of add-on fisheries on chinook salmon stocks in Southeast Alaska" (1991).

The add-on to the SEAK catch is calculated by estimating the total contribution of SEAK hatchery chinook to all fisheries, then subtracting a base-level catch and a risk adjustment. The base-level contribution of 5,000 was set to exceed the level of hatchery production that existed when the ceiling level was established. The risk adjustment, as calculated by ADF&G, is based on the variance of the hatchery contribution estimate. The variance estimate currently used accounts only for the uncertainty associated with tag sampling, the tag decoding process, differences between tagging rates, and, for sport fisheries, estimation of sport catch.

ADF&G uses a variety of statistical procedures to estimate the contributions of SEAK hatchery fish, and the associated variances, to the various SEAK fisheries. Estimation techniques for the non-terminal commercial fisheries, terminal commercial fisheries, and sport fishery are quite different.

- The procedures employed to estimate variance for non-terminal commercial fisheries are considered satisfactory given certain assumptions. Several assumptions, e.g., "knowing the proportion of fish marked without error" need to be validated and evaluated for impacts on estimation error.

- ADF&G assumes that all fish caught in terminal commercial fisheries are of SEAK hatchery origin and, therefore, no variance is used for this portion of the SEAK hatchery contribution. The Chinook Technical Committee (CTC) recommends that this assumption be validated. If the "pure stock" assumption is verified, then catches should be treated as "terminal exclusions" and not be included in the add-on. Otherwise, the contribution and variance should be estimated as for other commercial fisheries.

- Contribution and variance estimates for the sport fishery are less rigorous than those for commercial fisheries. In the past, variances (measured as a coefficient of variation percentage) were assumed and not calculated from the sampled data. ADF&G currently is revising procedures for the sport fish sampling program to improve the contribution estimate; in addition, variances will be calculated from the sampled data. The CTC cannot comment on these now procedures until we receive more detailed operational plans.

- Unsampled fishing strata for the commercial fisheries are ignored in add-on computations (i.e., no contributions are calculated for these areas). Contribution estimates for unsampled fishing strata for the sport fishery have been calculated in the past. The CTC recommends that contribution estimates not be made for the unsampled strata. Apparently the new sport sampling procedure is expected to substantially eliminate unsampled strata in the future.

Given documented reduction in marking rates and the associated increase in uncertainty of mark rate estimates, the rapid increase in recreational catch (which has a larger variability about estimates of hatchery contributions compared to the commercial sampling program), and unaccounted for sources of potential uncertainty, the CTC concluded that the hatchery add-on is estimated with less certainty now than it was when the add-on procedure was established.

In an effort to increase the harvest of SEAK hatchery chinook, three new fisheries have been initiated during June in Alaskan inside waters: "experimental" (troll), "hatchery access" (troll), and "terminal" (troll, gillnet, seine, and sport) fisheries. The proportion of the catch comprised of SEAK hatchery chinook is much higher in the June fisheries than in the summer troll season. If the June fisheries were eliminated, there would be a resulting loss of SEAK hatchery catch by the

troll fleet. However, allocation of chinook to June fisheries results in an increase in the number of chinook non-retention days in the general summer troll season. Examples of the numbers of fish involved are given in this report.

The change in fishing mortality from instituting June fisheries to increase access to SEAK hatchery production differs between stocks considered. Comparing the June to general summer fisheries, the concentrations of SEAK hatchery fish, North/Central B.C., Upper and Lower Georgia Strait, and West Coast Vancouver Island Stocks are higher, while concentrations of other stocks like the Harrison, Upper Fraser, Washington, and Oregon are lower.

Joint Chinook Technical Committee. Report on Preliminary 1991 Catch and Escapement. TCCHINOOK (92)-2. February 8, 1991.

This report presents preliminary information on: (a) chinook catches in fisheries relevant to the U.S./Canada Pacific Salmon Treaty (Table 1) for the period 1988-1991; and (b) summary of the 1987-1991 escapements of chinook escapement indicator stocks (Table 2).

Table 1. Summary of the 1988-1991 Chinook Catches in Fisheries Relevant to the U.S./Canada Pacific Salmon Treaty (numbers in thousands of fish). NOTE: Catches for 1991 are preliminary (estimates as of 3-Feb-92).

	TROLL				NET				SPORT				TOTAL			
AREA	1991	1990	1989	1988	1991	1990	1989	1988	1991	1990	1989	1988	1991	1990	1989	1988
S.E. ALASKA a/	264	288	236	231	33	28	24	21	68	51	31	26	365	367	291	278
BRITISH COLUMBIA b/c/																
North/Cent. Coast	220	181	225	182	48	41	42	44	33	32	36	19	301	254	303	245
W. Vanc. Island d/	196	296	204	409	55	29	40	15	80	61	48	33	331	386	292	457
Georgia Strait/Fraser e/	32	32	29	20	14	15	24	8	116	112	133	119	162	159	186	147
Johnstone Strait	1	2	2	2	13	18	29	6	10	10	10	10	24	30	41	18
Juan de Fuca Strait	0	0	0	0	7	7	22	4					7	7	22	4
sub-total	449	511	460	613	147	110	157	77	239	215	227	181	825	836	844	871
WASHINGTON INSIDE f/																
Strait (mar) g/	35	46	65	49	3	5	10	10	NA	NA	52	39	NA	NA	127	98
San Juans (mar) h/	0	1	1	0	14	9	16	32	NA	NA	9	9	NA	NA	26	41
Others PS (mar+fw) i/	0	0	0	0	130	179	156	133	NA	NA	70	63	NA	NA	226	196
Coastal (mar+fw) i/	0	0	0	0	54	58	85	74	NA	NA	6	7	NA	NA	91	81
sub-total	35	47	66	49	201	251	267	249	NA	NA	137	118	NA	NA	470	416
COLUMBIA RIVER j/k/	---	---	---	---	110	147	275	489	80	95	97	110	190	242	372	599
WA/OR N C FALCON l/	51	65	75	108	0	0	1	3	14	33	21	19	65	98	97	130
OREGON																
Inside Waters m/	0	0	5	4	---	---	---	---	NA	38	45	49	NA	38	50	53
GRAND TOTAL	799	911	842	1005	481	536	724	839	NA	NA	558	503	NA	NA	2124	2347

a/ Southeast Alaska troll chinook catches shown for Oct. 1 - Sep. 30 catch counting year.
b/ British Columbia net catches include only fish over 5 lb. round weight. Native food fishery catches are not included. 1989, 1990, and 1991 exclude catch from terminal gillnet fisheries (3 year total of 16,425) which are excluded from the catch ceiling.
c/ Sport catches are for tidal waters only.
d/ Estimates of WCVI 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/ All WA inside sport numbers adjusted for punch card bias. See "1988 WA State Sport Catch Report" for details.
g/ Strait troll catch includes all catch in areas 5 and 6C and catch in area 4B outside of the PFMC management period (Jan-May and Oct-Dec).
h/ San Juan net catch includes catch in Areas 6, 6A, 7 and 7A; sport catch includes Area 7.
i/ Coastal and Puget Sound sport catches include marine and freshwater catches, but only adults in freshwater.
j/ Columbia River net catches include Oregon, Washington and treaty catches, but not ceremonial.
k/ Columbia River sport catches include adults only, for Washington, Oregon, Idaho and Buoy 10 anglers.
l/ North of Falcon troll catches includes catch in area 4B during the PFMC management period (May-Sept).
m/ Troll = late season troll off Elk River mouth (Cape Blanco); sport = estuary and inland (preliminary for 1990).

Table 2. Summary of the 1987-1991 escapement of Pacific Salmon Commission Chinook Escapement Indicator Stocks. NOTE: Escapements for 1991 are very preliminary (estimates as of 3-Feb-92).

Production Unit	Stock Type	Ave Esc. Base a/	Esc. Goal	1987 Esc.	1988 Esc.	1989 Esc.	1990 Esc.	1991 Esc.	1991 % Base	1991 % Goal
Southeast Alaska										
Situk	Spring	1,299	600	1,884	885	652	700	875	67%	146%
King Salmon	Spring	92	250	193	206	238	168	134	146%	54%
Andrew Creek	Spring	379	750	1,042	752	848	1,062	640	169%	85%
Blossom	Spring	163	1,280	2,158	614	550	411	382	234%	30%
Keta	Spring	325	800	1,229	920	1,848	970	435	134%	54%
Transboundary Rivers Not Addressed in Treaty Annexes										
Unuk (U.S.)	Spring	1,469	2,880	3,157	2,794	1,838	946	1,221	83%	42%
Chickamin (U.S.)	Spring	338	1,440	1,560	1,258	1,494	902	779	231%	54%
Transboundary Rivers Addressed in Treaty Annexes										
Klukshu R (Alsek)	Spring	2,696	4,700	2,615	2,018	2,456	1,915	2,489	92%	53%
Taku Index	Spring	4,582	13,200	5,743	8,626	9,480	12,249	10,153	222%	77%
Little Tahltan (Stikine)	Spring	1,945	5,300	4,783	7,292	4,715	4,392	4,500	230%	85%
B.C. North Coast										
Yakoun River	Summer	788	1,580	2,000	2,000	2,800	2,000	1,900	241%	120%
Nass Area	Spr/Sum	7,944	15,890	11,431	10,000	12,525	12,103	4,017	51%	25%
Skeena Area	Spr/Sum	20,883	41,770	59,120	68,705	57,202	55,976	52,753	253%	126%
B.C. Central Coast										
Area 6 Index	Summer	2,760	5,520	1,566	3,165	998	281	709	26%	13%
Area 8 Index	Spring	2,725	5,450	1,456	1,650	2,535	2,385	2,470	91%	45%
Rivers Inlet	Spr/Sum	2,475	4,950	5,239	4,429	3,265	4,039	6,500	263%	131%
Smith Inlet	Summer	1,055	2,110	1,050	1,050	225	510	500	47%	24%
West Coast Vancouver Island										
Indicator Stocks	Fall	5,832	11,670	3,545	5,725	7,720	6,110	6,440	110%	55%
Fraser River										
Upper River	Spring	12,229	24,460	39,420	34,248	25,310	35,907	21,757	178%	89%
Middle River	Spr/Sum	9,216	21,130	27,330	24,164	15,095	26,060	21,255	231%	101%
Thompson River	Summer	22,059	55,710	36,730	47,103	37,975	41,995	36,307	165%	65%
Harrison River	Fall	120,837	241,700	78,038	35,116	74,685	177,375	86,500	72%	36%
Georgia Strait										
Upper	Sum/Fall	2,546	5,100	5,700	3,300	6,600	2,200	2,850	112%	56%
Lower	Fall	11,139	22,280	2,530	6,914	6,830	7,605	11,645	105%	52%

Table 2 continued.

Production Unit	Stock Type	Ave Esc. Base a/	Esc. Goal	1987 Esc.	1988 Esc.	1989 Esc.	1990 Esc.	1991 Esc.	1991 % Base	1991 % Goal
Puget Sound										
Skagit	Spring	1,217	3,000	2,108	1,988	1,853	1,902	1,495	123%	50%
Skagit	Sum/Fall	13,265	14,900	9,647	11,954	6,776	17,206	NA		
Stillaguamish	Sum/Fall	817	2,000	1,321	717	811	842	NA		
Snohomish	Sum/Fall	5,028	5,250	4,689	4,513	3,138	4,209	NA		
Green	Fall	5,723	5,800	10,338	7,994	11,512	7,035	NA		
Washington Coast										
Hoh	Spr/Sum	1,325	NA b/	1,700	2,600	4,800	3,900	NA		
Queets	Spr/Sum	925	NA b/	600	1,800	2,600	1,800	NA		
Grays Harbor	Spring	425	1,400	900	3,500	2,100	1,600	1,289	303%	92%
Grays Harbor	Fall	8,575	14,600	18,800	28,200	26,100	17,475	NA		
Quillayute	Summer	1,275	1,200	600	1,300	2,200	1,300	NA		
Quillayute	Fall	5,850	NA b/	12,400	15,200	10,000	13,700	NA		
Hoh	Fall	2,875	NA b/	4,000	4,100	5,100	4,200	NA		
Queets	Fall	3,875	NA b/	6,000	7,600	8,900	10,100	NA		
Columbia River										
Upper River	Spring	28,050	84,000	41,400	35,100	27,000	20,100	19,100 c/	68%	23%
Upper River	Summer	23,100	85,000	31,800	30,100	28,700	25,000	18,800	81%	22%
Lewis River	Fall	13,021	NA	12,900	12,100	21,200	17,500	12,000	92%	
Upriver Bright	Fall	28,325	40,000	154,100	114,700	96,500	57,600	46,600	165%	117%
Oregon Coast										
Aggregate Index d/	Fall	91	NA	131	221	151	125	93	101%	

a/ Base period for Alaskan and Transboundary stocks 1975-80; base for all other stocks 1979-82.
b/ Stocks managed on the basis of an escapement floor and fixed harvest rates.
c/ Based on average wild proportion of total adult escapement.
d/ 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 1990 Post Season Summary Report. TCCHUM (92)-1. March, 1992

Introduction

This Joint Chum Salmon Technical Committee report presents the appropriate information for 1991 chum salmon in southern British Columbia and Washington, as required in Chapter 6 of Annex IV of the Pacific Salmon Treaty (PST). In addition, the Pacific Salmon Treaty Letters of Transmittal dated May 16, 1990 paragraph 6, provided for an amendment to Chapter 6 of Annex IV of the 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 1990.

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 1990 are listed in Section 1.6, 1990 Technical Committee Publications.] The committee provided a report detailing estimates of Canadian and U.S. interceptions of Southern British Columbia and Washington chum salmon.

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

   In 1990, the gross escapement of Inside chum totalled 1,711,000. Wild escapement totalled 1,468,000 which was 73% of the Clockwork goal of 2,000,000. The Fraser River wild escapement was 626,000 or 89% of the 700,000 goal. Although stock compositions samples were taken, the technical committee has not addressed the issue of whether increased interceptions were minimized.

   Terminal area fisheries scheduled by Canada to harvest specific stocks with identified surpluses included; mid Vancouver Island (Area 14), Cowichan (Area 18) and Fraser River (Area 29). These fisheries were managed to limit interceptions of U.S. origin or other non-targeted stocks.

3. *In 1990, 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 catch level of chum salmon in U.S. fishing Areas 7 and 7A was determined by the catch of chum salmon in Johnstone Strait. In addition, the traditional proportion of effort and catch between Areas 7 and 7A was to be maintained.*

   The Clockwork Harvest Plan was reviewed after the end of the 1988 fishing season; no subsequent changes were incorporated for 1990. The inseason estimate of Johnstone Strait run size was 3,790,000 providing for a harvest of 30% or 1,137,000 chum. Post season, the run

size was 3,514,000 chum resulting in an overall harvest rate was 36.7% for clockwork assessment purposes.

The total allowable catch for U.S. Areas 7 and 7A was 140,000, however, this was increased by a 41,700 chum underage from the U.S. fishery in 1989. The total catch for this fishery in 1990 was 181,000 chum. The U.S. catch in Areas 7 and 7A was disproportionately harvested in Area 7. The traditional proportion is an even distribution of catch between the two areas.

4. *In 1990, 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 Tribes that fish in the Strait of Juan de Fuca. The catch of 52,200 chum was similar to the 1989 catch level. Genetic stock Identification (GSI) samples were taken to determine whether this catch resulted in higher interceptions of Canadian chum.

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

   Post season, a minor shortfall in 1990 catch of 850 chum was identified in the U.S., Area 7 and 7A fishery (Table 1).

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.*

   Fisheries, covered by this chapter, were sampled; and estimates were provided to the Joint Interception Committee. However, methods for estimating stock composition are under review by the committee.

7. *In 1990, Canada was to manage the Nitinat net chum fishery to minimize the harvest of non-targeted stocks.*

   The boundaries of the Nitinat fishery were the same as in 1988 and 1989. Canada conducted GSI sampling to quantify the incidence of interceptions of passing stocks.

8. *In 1990, 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 and 1986 levels. As a result, Canada did not conduct GSI sampling of this fishery.

9. *As per the Pacific Salmon Treaty Letters of Transmittal dated May 16, 1990, paragraph 6, the Commission recognized the U.S. fishery harvested approximately 41,700 chum salmon less than agreed to for 1989 and that this underage would be taken in years when the Johnstone Strait catch of chum would exceed 225,000.*

The Canadian catch of chum in Johnstone Strait exceeded 225,000, therefore U.S. fisheries harvested the 41,700 shortfall from 1989.

Joint Chum Technical Committee. Accuracy and Precision of Genetic Stock Identification for Estimating the Stock Composition of Mixed-Stock Chum Salmon Fisheries in Northern Puget Sound and Southern Georgia Strait. TCCHUM (92)-2. February 18, 1992.

Summary

1. Simulations were conducted to quantify the accuracy and precision of the WDF 21-locus, 36-stock baseline (1989 version) used to estimate the stock composition of mixed-stock catches of chum salmon from northern Puget Sound. *The baseline provided accurate estimates with acceptable precision of the proportional contribution of U.S. and Canadian chum salmon stock groups to mixed-stock samples with stock compositions representing commercial fisheries in northern Puget Sound and southern Georgia Strait.*

2. For the models and mixture compositions examined in this report, mixture sample sizes of 100 did not provide estimates with acceptable accuracy or precision. There was usually a large increase in precision (decrease in variance of the estimates) when the mixture sample size increased from 100 to 200. There were more modest gains in precision for increases in sample size over 200. *The minimum sample size for a mixture sample should be 200 fish.*

3. *For the simulations in this report, both 7-loci and 21-loci analyses provided accurate estimates of the total U.S. and total Canadian contribution to mixed-stock samples representing commercial fisheries in northern Puget Sound and southern Georgia Strait.* In most cases, 21 loci provided more precise estimates of stock composition than 7 loci.

4. The largest bias of the stock contribution estimates occurred at extremes of stock composition, such as when one or more stock groups contributed 20% or less to the mixture sample. *We recommend that methods of bias correction be examined for mixture samples where one or more stock groups are estimated to contribute 20% or less to the sample.*

5. Three different GSI models were used in the simulations for this report. There were differences in the models' treatment of the baseline electrophoretic data, number of loci analyzed, analytical method used to estimate stock composition, and bootstrapping procedures used to estimate standard errors. *The three GSI models produced similar stock composition estimates when analyzing the same specified stock mixture, especially for the total U.S. and total Canadian contribution.*

Joint Chum Technical Committee. Update of Research Needs for Southern British Columbia and Washington Chum Salmon. A Report to the Standing Committee on Research and Statistics from the Chum Technical Committee. TCCHUM (92)-3. April, 1992.

Update of Research Needs for Southern British Columbia and Washington Chum Salmon

The Standing Committee on Research and Statistics of the PSC has recently requested (November 13, 1991) that each technical committee provide a report on research needs and priorities relative to their respective areas of responsibility, which will be used in developing the overall research priorities of the PSC.

This report is an update of a Chum Technical Committee (CTC) report prepared in February of 1987 (TCCHUM (87)-3), identifying research required to comply with the provisions of Annex IV, chapter 6 (Chum Chapter) of the Pacific Salmon Treaty (PST).

As in the 1987 report, special emphasis has been placed on stock composition research, which continues to be a high priority of the PSC. Considerable work has been completed by the Chum Committee and various agency researchers in the U.S. and Canada on methods of estimating stock composition for chum salmon. Brief highlights of progress on some of these tasks, since the last report on research needs, are provided in this report under each topic. For detailed information on committee activities related to estimating chum stock composition, please refer to the following PSC reports: TCCUM (87)-2; TCCHUM (88)-2; TCCHUM (89)-1; TCCHUM (92)-2 (in preparation). General information on chum research activities of the two countries prior to 1987 is highlighted in TCCHUM (87)-3.

C. JOINT COHO TECHNICAL COMMITTEE

Joint Coho Technical Committee. Northern Panel Area Coho Salmon Status Report. TCCOHO (91)-1. December, 1991.

Coho salmon stocks in the PSC Northern Panel Area contribute to a wide array of fisheries in Canada and Alaska. In the fall of 1988, the Coho Technical Committee was assigned the task of compiling available information on Northern Panel Area coho salmon stocks and fisheries. This report presents the results of a preliminary review of the information in four major areas; (1) fishery catches and trends; (2) fishery management descriptions; (3) stock descriptions and status; and (4) research required to improve coho salmon management in the Northern Panel Area.

Although the total commercial catch of coho salmon by each country in the Northern Panel area has varied widely from year to year, for the most part they have varied together. To the extent that catch is an indicator of abundance, then this similarity in trends may be due to the similar freshwater and/or early marine environmental conditions experienced by coho salmon in the Northern Panel area. Research in southern British Columbia and the Pacific Northwest indicates that temperature and rainfall during freshwater rearing, and coastal upwelling during early ocean life are important factors in determining survival rates to the adult stage.

Since Alaskan statehood, and until approximately 1977, the northern British Columbia commercial catch of coho salmon was slightly higher than the S.E. Alaskan catch. Since 1977, the total S.E. Alaskan commercial catch has been greater. The greater S.E. Alaskan commercial catches may be attributed to several factors. There may have been a higher survival of coho salmon in S.E. Alaska than in northern B.C. There has been a gradual shift by the S.E. Alaska troll fleet to some outside areas thus increasing the number of stocks available for harvest, and the time and area other stocks would be exposed to fishing. Returns from hatchery programs in S.E. Alaska have been greater than those in northern B.C. Finally, there has been more targeting by the S.E. Alaskan troll fleet on coho due to shortened chinook salmon seasons resulting from PST chinook catch ceilings.

Except for the exclusion of purse seines from Icy Straits in SEAK area 4, the pattern of net fishing in Southeast Alaska has remained essentially unchanged since statehood. The troll fishery is responsible for the majority of the increase in the S.E. Alaskan catch. The average troll catch during the 1985 to 1989 period increased by 776,863 (135%) over the average catch during the 1960's. The average purse seine catch during the period 1985 to 1989 increased by only 4,995

(2%) over that of the 1960's while that of the drift and set gillnets' increased by 120,710 (101%) and 39,076 (34%) respectively.

In northern B.C., the total commercial coho catch has not shown an increasing or decreasing trend over time, although the 1960's was a decade of high average catch (1,380,036) relative to the 1950's (1,012,246), 1970's (968,078) and 1980's (925,008). Over this period of time, the troll and seine fleet have increased their proportion of the commercial catch while the gillnet fleet has taken a sharp reduction. Gillnets and seines no longer target on coho salmon in British Columbia and their coho catch is taken entirely as a bi-catch in fisheries directed at sockeye, pink and chum salmon. PST chinook restrictions have also influenced the conduct of troll fisheries for coho in northern B.C. A shorter chinook season coinciding with the coho season, and attempts to minimize periods of chinook non-retention have probably resulted in lower harvest rates on coho despite the increase in fishing effort during July and August.

D. JOINT NORTHERN BOUNDARY TECHNICAL COMMITTEE

Joint Northern Boundary Technical Committee. U.S./Canada Northern Boundary Area 1991 Salmon Fisheries Management Report and 1992 Preliminary Expectations. TCNB (91)-2. November, 1991.

This report reviews: 1) catch, effort, and management actions in the 1991 Northern Boundary Area pink, chum and sockeye salmon fisheries of southern Southeast Alaska Districts 101 to 106 and northern British Columbia Areas 1, 3, 4 and 5; 2) management performance relative to Treaty requirements; 3) historical catches and escapements; and 4) preliminary 1992 expectations and fishing plans.

Returns of pink, sockeye, and coho salmon were generally strong in the Northern Boundary Area in 1991. The catch of 43.4 million pink salmon in southern Southeast Alaska was the third highest since Statehood (1959). A record 9.3 million pink salmon were harvested in Canadian Area 3 and the 2.3 million pink salmon harvested in Area 4 was the largest since 1957. Escapement goals for pink salmon were met or exceeded in most areas. In southern Southeast Alaska catches of sockeye, coho, and chum salmon were about twice the 1960 to 1990 average. In northern British Columbia the catch of sockeye was above the 1973 to 1990 average in all areas, coho catches were about average, and chum catches were below average. Escapement goals were met for sockeye salmon in the Nass and Skeena Rivers. Escapements of summer chum salmon were poor on both sides of the border.

The Pacific Salmon Treaty limits the Alaska District 104 (Noyes Island) purse seine fishery to a four-year total catch (1990 to 1993) of 480,000 sockeye salmon prior to Statistical Week 31. Under terms of the agreement, when the annual catch reaches 160,000 sockeye salmon, no further daily fishing periods are allowed prior to week 31. The 1991 sockeye salmon harvest in District 104 prior to week 31 was 98,583 fish. Combined with last years 169,943, a total of 268,526 sockeye salmon have been caught. This leaves 211,474 to catch over the next two years to stay within the 480,000 pre-Week 31 sockeye limit for 1990 to 1993.

In the Alaska District 101-11 (Tree Point) drift gillnet fishery, the catch of sockeye salmon since 1985 has been limited to an annual average of 130,000 by the Pacific Salmon Treaty. Catch of sockeye salmon in 1991 was 131,487 bringing the 1985 to 1991 average to 129,154.

Under the Pacific Salmon Treaty the outside portions of Canadian Statistical Areas 3 and 5 are to be managed such that an average annual pink harvest of 900,000 fish is achieved. In 1991,

5,724,069 pink salmon were harvested in Management Units 3 (1-4) and 5-11 combined. The current average annual pink harvest from 1985 to 1991 in the Treaty area is 2,046,023.

The Area 1 pink troll fishery is managed to an annual ceiling of 1.95 million pink salmon with a cumulative ceiling of 5.125 million pink salmon for the period 1990 to 1993. In addition, the area adjacent to the Canada-U.S. border in the northern portion of Area 1 (A-B line area) closes to pink retention if the pink catch reaches 300,000 in this area, or by July 22, should this sub-ceiling not be met. The pink catch in the A-B line area reached only 71,620 and closed to pink retention July 22. The catch in this area was estimated to be 71,620 pink salmon. Preliminary sales slips indicate a total Area 1 troll catch of 1.59 million pink salmon.

Moderate returns are forecast for Northern Boundary Area pink salmon in 1992. Alaska Department of Fish and Game's preliminary forecast for pink salmon returning in 1992 is approximately 45 to 50 million which would allow a catch of about 25 million. A harvest of 25 million pink salmon would be about 1.5 times the 1960 to 1991 average but considerably less than the 43 million pink salmon harvested in 1991.

A surplus of 1,000,000 pink salmon is expected to the Masset Inlet area of the Queen Charlotte Islands. A below average sockeye and pink fishery are anticipated in Area 3 in 1991. The Skeena sockeye return is forecast to provide an Area 4 commercial net catch of 1,000,000. The Skeena pink return is forecast to provide an Area 4 catch of 950,000.

E. JOINT TRANSBOUNDARY TECHNICAL COMMITTEE

Joint Transboundary Technical Committee. Transboundary River Sockeye Salmon Enhancement Activities, 1989 Brood Year/July 1989 through October 1990. TCTR (91)-2). May, 1991.

Joint Canada/U.S. enhancement production egg-takes in the Stikine River drainage began in 1989 with the collection of 3,278,000 sockeye salmon (*Onchorynchus nerka*) eggs from Tahltan Lake. A total of 1,110 female and 1,100 male adult sockeye salmon was removed from an escapement of 8,316 sockeye salmon, leaving 6,106 adults to spawn naturally. The eggs were transported to and incubated at the central incubation facility (CIF) at Port Snettisham, Alaska. The otoliths of the resulting embryos were mass-marked by inducing growth bands through thermal variation during egg incubation. A total of 1,041,744 marked sockeye salmon fry were planted in Tahltan Lake in the spring of 1990. In compliance with the 1989 Understanding Concerning Joint Enhancement of Transboundary River Salmon Stocks signed by the U.S. and Canada, the low return of spawners (<15,000 sockeye salmon) to Tahltan Lake in 1989 resulted in backplanting the enhanced fry into only Tahltan Lake rather than into both Tahltan and Tuya Lakes.

Overall survival from egg to backplanted fry was 35%, much lower than expected. Low fertilization rates in the initial egg-takes and incubation problems at the CIF resulted in the loss of a significant number of progeny. The operational deficiencies have been corrected and preventative measures have been implemented to ensure greater egg-to-fry survival with subsequent season's egg-takes. No disease-related problems were encountered in the 1989 joint enhancement program.

Several ancillary projects were undertaken to provide additional information relevant to joint sockeye enhancement. Disease samples taken from the 1989 Tahltan brood stock showed a major reduction in the prevalence of both infectious hematopoietic necrosis virus (IHNV) and bacterial

kidney disease (BKD) compared to 1988. A disease survey of the indigenous fish species of Tuya Lake established the presence of BKD and *Mycobacteria*, but no IHNV was found.

Results from other enhancement related projects conducted in 1989 and 1990 were presented in this report, including: testing potential fry transport problems; mass marking investigations; limnological studies; a fish quality assessment from potential terminal fishing areas in the upper Taku River drainage; and brood stock holding studies at Little Tatsamenie Lake are presented in this report. Fry transport did not present any problems. The quality of fish from terminal areas was of a lower grade than sockeye salmon caught in the Taku River commercial fishery. Holding mortality of Tatsamenie brood stock was a concern, but was judged to be acceptable for an egg-take program.

Joint Transboundary Technical Committee. Salmon Management Plan for the Stikine, Taku, and Alsek Rivers, 1991. TCTR (91)-3. June, 1991.

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. This plan has been developed to assure each Party has a clear understanding of objectives and procedures used in managing relevant fisheries.

This report is organized by river system and salmon species. For each species within each drainage, the pre-season forecast, spawning escapement goals, harvest sharing objectives, and management procedures are presented. For 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 run in 1991 is approximately 94,000 fish, which coincidentally is the same as the pre-season forecast for 1990. This is an average level of 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 1991 season, as determined by the Stikine Management Model, will be based on historical data from 1982 to 1990. The stock assessment program for the river is similar to last year. The 1991 run of chinook salmon to the Stikine River is expected to be average; whereas, a below average coho run is anticipated.

There are no major changes to the management plans for the other species of salmon originating in the Stikine River or for any salmon species originating in the Taku or Alsek river drainages. It is expected that the run size of Taku River sockeye salmon will be average to above average; of chinook and coho salmon, about average; and of chum salmon, below average. A strong pink run to the Taku River is anticipated. Chinook and coho salmon runs to the Alsek River are expected to be average. The early run of Alsek sockeye salmon is expected to be below average; whereas, the late run of sockeye salmon is expected to be average to above average.

Joint Transboundary Technical Committee. Escapement Goals For Chinook Salmon in the Alsek, Taku, and Stikine Rivers. TCTR (91)-4. November 27, 1991.

The Transboundary Technical Committee has developed single escapement goals for the transboundary Alsek, Taku, and Stikine Rivers that have been agreed to by both Parties. For the Alsek River, the escapement goal for the Klukshu River tributary, where the escapement is enumerated annually at a weir, is 4,700 chinook salmon. For the Taku River, the escapement goal for the combined six aerial-survey index systems is 13,200 chinook salmon. For the Stikine River,

the escapement goal for the Little Tahltan tributary, where the escapement is enumerated annually at a weir, is 5,300 chinook salmon.

The chinook escapement goals presented here are based on refinements of the goals or methods developed by the two Parties in 1981. While the new joint escapement goals are not considered better estimates of optimal escapement than those originally used by either of the Parties, they do incorporate improvements, including both data correction and refinements in the old methods. Most important, they provide a single estimate for each river that can be used to assess rebuilding in 1995. Exploratory spawner-recruit analyses are currently being done based upon age-specific data from weir samples and it is hoped that by 1995 a sufficient number of years of data and range of escapements will be available to provide revised estimates that better reflect optimal escapement goals.

Joint Transboundary Technical Committee. Transboundary River Salmon Production, Harvest and Escapement Estimates, 1990. TCTR (92)-1. January, 1992.

Estimates of catches and escapements of Pacific salmon returning to the transboundary Stikine, Taku, and Alsek Rivers for 1990 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 1990 Stikine sockeye run was estimated at 67,200 fish, of which 29,800 fish were harvested in various fisheries and 37,400 escaped to spawn. The estimated U.S. marine commercial and test fishery catches of Stikine sockeye salmon were 9,400 and 400 fish, respectively; the Canadian in-river commercial, Indian food, and test fishery catches were 15,000, 3,000 and 1,900 fish, respectively. The pre-season forecast of 94,000 sockeye salmon overestimated the actual run. In-season, the Stikine Management Model also overestimated the Stikine sockeye run, predicting a total run size of 140,700 fish the week of July 1 and between 95,700 to 125,000 thereafter. This overestimation was due in large part to misclassification problems of the in-season stock composition analysis which, compared to post season estimates, overestimated the catch of Stikine sockeye salmon in the U.S. catches. The model, however, did correctly predict a smaller than average portion of the run being from the Tahltan stock. Estimates of the total allowable catch (TAC) are derived from predictions of the total Stikine River run. Both Canada and the U.S. harvested less than the TAC allowed by the management model but were slightly over the allowable harvest range estimated from the post-season analysis. Due to the low run size of the Tahltan stock (26,200 fish) and, in spite of a low exploitation rate (40%) on this stock (2,200 fish in marine catches and 8,100 fish in inriver catches), the resulting spawning escapement to Tahltan Lake (14,900 fish) was below the 20,000 to 40,000 goal range established by the Transboundary Technical Committee. The escapement of 22,500 non-Tahltan Stikine sockeye salmon fell within the escapement goal range for that stock group.

The chinook catch in Canadian fisheries in the Stikine River was a record 3,200 fish (including the second highest catch of jacks on record; 1,000), approximately 49% more than the 1980 to 1989 average, with approximately 72% harvested in commercial fisheries and 28% harvested in the Indian food fishery. The U.S. marine catch in the District 106 and 108 mixed stock fisheries was 2,700 fish, approximately 80% more than the 1980 to 1989 average catch. Chinook spawning escapements were near average in 1990, with a count of 4,400 large adults through Little Tahltan weir and a total inriver escapement estimate of 17,600 large fish. The total escapement was near the 1985 to 1989 average of 18,200 fish but was below the escapement goal range of 19,800 to 25,000 fish.

The Stikine coho run was relatively strong in 1990. The U.S. marine harvest of Stikine River coho salmon is not known since there is no stock identification program in place; however, total coho gillnet catch in District 106 was more than twice the 1980 to 1989 average. The Canadian coho catch was just over 4,000 fish, near the Treaty entitlement. Coho aerial survey escapement counts were above average.

The Stikine River runs of pink and chum salmon are typically very small. In 1990, Canadian catches of these two species were approximately 500 fish each. This is approximately half the 1980 to 1989 average for pink salmon and near average for chum salmon.

The 1990 total Taku sockeye run was estimated at 224,300 fish and included a catch of 131,500 fish and an escapement of 92,800 fish. The estimated U.S. marine commercial and inriver personal use catches were 108,500 and 1,600 fish, respectively, records in both fisheries. Canadian commercial, Indian food fishery, and test fishery catches were 21,100, 100 and 300 fish, respectively. The Pacific Salmon Treaty defines harvest sharing of Taku River sockeye salmon as 18% of the TAC 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 TAC is also determined as a range. In 1990, Canada took 14% to 15% and the U.S. took 72% to 76% of the TAC. The estimated spawning escapement for Taku sockeye salmon exceeded the upper level of the escapement goal range.

The chinook catch in the Canadian commercial fishery in the Taku River was 1,400 fish, more than three times the 1980 to 1989 average. The catch in the U.S. District 111 mixed stock fishery was 3,500 fish, approximately 67% higher than the 1980 to 1989 average. Above average escapements were observed in most of the Taku chinook tributaries surveyed in 1990. The estimated escapement of chinook salmon to the entire drainage was 21,300 to 24,500, the largest since the methodology was standardized in 1974, but still less than the escapement goal range of 25,600 to 30,000 fish.

The Taku coho run was strong in 1990. The U.S. harvest of coho salmon in the District 111 mixed stock fishery was a record 67,300 fish, 81% greater than the 1980 to 1989 average. The Canadian coho catch was 3,200, close to the Treaty limit of 3,000 fish. The above-border run size was estimated to be 75,000 to 85,000 coho salmon.

The catches of pink and chum salmon in the U.S. District 111 fishery were 153,000 and 145,500 fish, respectively, below the 1980 to 1989 average for pink salmon and above average for chum salmon. The catch of summer run chum salmon, comprised of coastal Alaskan wild and hatchery stocks, was a record, while the fall run of chum salmon, typically comprised of Taku River and Port Snettisham stocks, was weak. Canadian inriver catches included 400 pink and 12 chum salmon, a fraction of the 1980 to 1989 averages for both species.

The sockeye run to the Alsek River was above average as indicated by average U.S. terminal and Canadian catches and above average escapement counts. The U.S. Dry Bay catch was 17,000 sockeye salmon, near the 1980 to 1989 average catch. The Canadian sport fishery catch of 400 fish and Indian food fishery catch of 2,000 sockeye salmon were near the 1980 to 1989 averages. The count of 26,000 sockeye salmon through Klukshu weir was approximately 40% more than the 1980 to 1989 average, although the early run component was weak.

The chinook run to the Alsek River was about average. The U.S. Dry Bay catch of 100 fish was approximately one-fifth of the 1980 to 1989 average catch. The Canadian sport and Indian food fishery catch of 700 fish was approximately 60% greater than the 1980 to 1989 average. The

chinook count through the Klukshu River weir, 1,900 fish, was below the 1984 to 1989 average of 2,300 fish.

The coho run to the Alsek River was poor. The U.S. Dry Bay coho catch of 1,400 fish was one-fourth the 1980 to 1989 average and the Canadian food and sport fishery catch of 100 fish was near average. The Klukshu weir count of 300 fish was less than one-third the 1980 to 1989 average.

The U.S. Dry Bay pink and chum salmon catches of zero and 500 fish, respectively, were near average for pink salmon and 55% of the 1980 to 1989 average for chum salmon. There are no recorded Canadian catches of pink or chum salmon in the Alsek River.

F. JOINT TECHNICAL COMMITTEE ON DATA SHARING

Joint Technical Committee on Data Sharing. 1990 Annual Report of the Data Sharing Committee and Its Work Groups. TCDS (91)-1. July, 1991.

This is the second annual report of the Data Sharing Committee. The Committee was formed in 1985 and reports to the Standing Committee on Research and Statistics. The initial goals and concerns of this committee were to review equipment needs of the Pacific Salmon Commission (PSC), to facilitate data exchange between the two Parties, and to develop standard methods of reporting and analyzing coded-wire-tag data. The Committee continues to facilitate data exchange between the two Parties, is working on a program to standardize and exchange catch and effort data, deals with clarification of problems between Parties and agencies about sampling programs or interpretation of data, and works closely with the coast wide Mark Committee on shared concerns over tagging and tag recovery standards, Once a year, in February, the two Committees meet back-to-back in order to be able to attend each others meetings and share concerns.

The Data Sharing Committee currently has three work groups: Mark-Recovery Statistics Work Group which works on standardizing statistical techniques for using coded-wire-tag data, the Data Standards Work Group which provides continual maintenance of data standards and formats for coded-wire-tag data exchange between the two Parties, and the Catch Data Exchange Work Group which is developing standard formats for catch and effort data for exchange between the two Parties. An earlier work group on Mark-Recovery Databases, completed its task in 1989 of designing the standards and formats for the exchange coded-wire-tag data.

The Data Sharing Committee provides oversight and guidance to its work groups and coordinates activities between them when needed. To facilitate communications between the parent Committee and the work groups, at least one member of the Data Sharing Committee from each Party is placed on each work group.

This report includes a summary of the activities of the Committee and its work groups and includes a copy of the hatchery questionnaire sent to U.S. and Canada salmon hatcheries to determine current standards and procedures, Version 2.0 of the coding for fisheries for Pacific Salmon Commission's coded-wire-tag data. Status of the coded-wire-tag data file exchange is presented in a letter to the Commissioners included in the Appendices of this report.

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. Photocopying charges may be levied for documents which are out of print.

Documents listed here are those which were published during the period covered by this report. For previous publications, please refer to the Pacific Salmon Commission 1989/90 Fifth and 1990/91 Sixth Annual Reports, or contact the Pacific Salmon Commission library.

A. ANNUAL REPORTS

6. Pacific Salmon Commission 1990/91 Sixth Annual Report. November 1991.

This report contains a summary account of the Commission's sixth year of operation and contains amendments to Annex IV of the Pacific Salmon Treaty which applied to the 1991 fishery regime.

B. REPORTS OF JOINT TECHNICAL COMMITTEES

i. Joint Chinook Technical Committee

20. TCCHINOOK (91)-3 - *1990 Annual Report.* November 5, 1991.

21. TCCHINOOK (92)-1 - *Review of Alaskan Procedures to Estimate Add-On and Predicted Effects of June Fisheries.* January 24, 1992.

22. TCCHINOOK (92)-2 - *Chinook Technical Report on Preliminary 1991 Catch and Escapement.* February 13, 1992.

ii. Joint Chum Technical Committee

13. TCCHUM (92)-1 - *Final 1990 Post-Season Summary Report.* March 1992.

14. TCCHUM (92)-2 - *Accuracy and Precision of Genetic Stock Identification for Estimating the Stock Composition of Mixed-Stock Chum Salmon Fisheries in Northern Puget Sound and Southern Georgia Strait.* February 18, 1992.

15. TCCHUM (92)-3 - *Update of Research Needs for Southern British Columbia and Washington Chum Salmon.* April, 1992.

iii. Joint Coho Technical Committee

8. TCCOHO (91)-1 - *Northern Panel Area Coho Salmon Status Report.* December, 1991.

iv. Joint Northern Boundary Technical Committee

12. TCNB (91)-2 - *U.S./Canada Northern Boundary Area 1991 Salmon Fisheries Management Report and 1992 Preliminary Expectations.* November, 1991.

v. Joint Transboundary Technical Committee

16. TCTR (91)-2 - *Transboundary River Sockeye Salmon Enhancement Activities, 1989 Brood Year (July 1989 through October 1990).* May 1991.

17. TCTR (91)-3 - *Salmon Management Plan for the Stikine, Taku, and Alsek Rivers, 1991.* June, 1991.

18. TCTR (91)-4 - *Escapement Goals for Chinook Salmon in the Alsek, Taku, and Stikine Rivers.* November, 1991.

19. TCTR (92)-1 - *Transboundary River Salmon Production, Harvest and Escapement Estimates, 1990.* January, 1992.

vi. Joint Technical Committee on Data Sharing

6. TCDS (91)-1 - *1990 Annual Report of the Data Sharing Committee and Its Work Groups.* July, 1991.

C. REPORTS OF THE FRASER RIVER PANEL

6. *Report of the Fraser River Panel to the Pacific Salmon Commission on the 1991 Fraser River Sockeye Salmon Fishing Season.* PSC Staff. In preparation.

D. TECHNICAL REPORT SERIES OF THE PACIFIC SALMON COMMISSION

2. Levy, D.A., B. Ransom and J. Burczynski. *Hydroacoustic Estimation of Sockeye Salmon Abundance and Distribution in the Strait of Georgia, 1986.* PSC Tech. Rep. No. 2, October, 1991.

3. Cheng, P, D.A. Levy, and P.S. Nealson. *Hydroacoustic Estimation of Fraser River Pink Salmon Abundance and Distribution at Mission, B.C. in 1987.* PSC Tech. Rep. No. 3, October, 1991.

4. Levy, D.A., P.A. Nealson, and P. Cheng. *Fixed-Aspect Hydroacoustic Estimation of Fraser River Sockeye Salmon Abundance and Distribution at Mission, B.C. in 1986.* PSC Tech. Rep. No. 4. October, 1991.

E. PUBLICATIONS BY PACIFIC SALMON COMMISSION SECRETARIAT STAFF

6. Blackbourn, D.J. and M.B. Tasaka. 1989. *Marine Scale Growth in Fraser River Pink Salmon: A Comparison with Sockeye Salmon Marine Growth and Other Biological Parameters.* In P.A. Knudsen (ed.) Proceedings of the 14th Northeast Pacific Pink and Chum Salmon Workshop. Washington State Department of Fisheries, p.p. 58-63.

7. White, B.A. 1989. *Simulation Analysis of GSI Applications to Odd-Year Pink Salmon Fishing.* In P.A. Knudsen (ed.) Proceedings of the 14th Northeast Pacific Pink and Chum Salmon Workshop. Washington State Department of Fisheries, p.p. 37-41.

8. Woodey, J.C. 1989. *Use of GSI Data in Management of Fraser River Pink Salmon.* In P.S. Knudsen (ed.) Proceedings of the 14th Northeast Pacific Pink and Chum Salmon Workshop. Washington State Department of Fisheries, p.p. 42-44.

9. White, B.A. and J.B. Shaklee. 1991. *Need for Replicated Electrophoretic Analyses in Multiagency Genetic Stock Identification (GSI) Programs: Examples from a Pink Salmon (O. gorbuscha) GSI Fisheries Study.* (CJFAS v. 48(8), 1396-1407.

10. White, B.A. and I.C. Guthrie (eds.) 1991. *Proceedings of the 15th Northeast Pacific Pink and Chum Salmon Workshop.* Pacific Salmon Commission, 241 p.p.

11. White, B.A. and J. Gable. 1991. *In-Season Management of Fraser River Pink Salmon Using GSI Techniques.* In B.A. White and I.C. Guthrie (eds.) Proceedings of the 15th Northeast Pacific Pink and Chum Salmon Workshop. Pacific Salmon Commission, p.p. 194-200.

12. Shaklee, J.B., D.C. Klaybor, S. Young and B.A. White. 1991. *Genetic stock structure of odd-year pink salmon, O. gorbuscha (Walbaum), from Washington and British Columbia and potential mixed-stock applications.* Journal of Fish Biology (1991) 39 (Supp. A), 21-34.

13. Walters, C. and J.C. Woodey. 1992. *Genetic Models for cyclic dominance in sockeye salmon (O. nerka).* CJFAS v. 49(2), 281-292.

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 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 Behaviour of Adult Sockeye Salmon in Response to a Hydroelectric Diversion of Homestream 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.

5. Gilhousen P. 1990. *Prespawning Mortalities of Sockeye Salmon in the Fraser River System and Possible Causal Factors.* IPSFC Bull. XXVI. Vancouver, B.C.

6. Roos, J.F. 1991. *Restoring Fraser River Salmon: A History of the International Pacific Salmon Fisheries Commission 1937-1985.* 438 pp. PSC. Vancouver, B.C.

7. Gilhousen, P. 1992. *Estimation of Fraser River Sockeye Escapements from Commercial Harvest Data, 1892-1944.* IPSFC Bull. XXVII. Vancouver, B.C.

Publication of John F. Roos' History of the International Pacific Salmon Fisheries Commission, and P. Gilhousen's Estimation of Fraser River Sockeye Escapements now end all publication series of the International Pacific Salmon Fisheries Commission. Copies of all in-print Progress Reports and Bulletins of the International Pacific Salmon Fisheries Commission are available free of charge through the Library of the Pacific Salmon Commission. Copies of the History of the International Pacific Salmon Fisheries Commission may also be ordered through the Library of the Pacific Salmon Commission.

G. DOCUMENTS SUBMITTED BY THE PARTIES

In compliance with provisions of the Treaty, the Parties provide annual post-season fishery reports and updates on their respective salmonid enhancement programs to the Commission. Documents received during 1991 were:

1. *Preliminary 1991 Post-Season Report for United States Salmon Fisheries of Relevance to the Pacific Salmon Treaty.* United States Section, Pacific Salmon Commission. December, 1991.

2. *1991 Post-Season Report for Canadian Treaty Limit Fisheries.* Canada Department of Fisheries and Oceans. December 12, 1991.

3. *Preliminary Annual Report on the Salmonid Enhancement Activities of the United States in the Areas of the Pacific Salmon Treaty.* United States Section, Pacific Salmon Commission. December 2, 1991.

4. *Operations and Plans for the Salmonid Enhancement Program in British Columbia and the Yukon Territory.* Canada Department of Fisheries and Oceans. December, 1991.

Report of the Auditors for 1990/91

PART VII
AUDITORS' REPORT AND FINANCIAL STATEMENTS FOR THE PERIOD APRIL 1, 1991 TO MARCH 31, 1992

AUDITORS' REPORT TO THE COMMISSIONERS

We have audited the balance sheet of Pacific Salmon Commission as at March 31, 1992 and the statements of revenue and expenditures, fund balances and changes in financial position for the year then ended. These financial statements are the responsibility of the Commission's Management. Our responsibility is to express an opinion on these financial statements based on our audit.

We conducted our audit in accordance with generally accepted auditing standards. Those standards require that we plan and perform an audit to obtain reasonable assurance whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by the Commission, as well as evaluating the overall financial statement presentation.

In our opinion, these financial statements present fairly, in all material respects, the financial position of the Commission as at March 31, 1992 and the results of its operations and the changes in its financial position for the year then ended in accordance with the Financial Regulations of the Commission applied on a basis consistent with that of the preceding year.

Peat Marwick Thorne

Chartered Accountants

New Westminster, Canada
May 11, 1992

PACIFIC SALMON COMMISSION

Balance Sheet

March 31, 1992, with comparative figures for 1991

	1992	1991
Assets		
General fund:		
Current assets:		
Cash term term deposits	$ 460,638	$ 376,632
Accounts receivable	19,454	42,648
Interest receivable	6,457	7,164
Prepaid expenses	22,227	31,913
	508,776	458,357
Note receivable (note 2)	96,415	130,507
	$ 605,191	$ 588,864
Working capital fund:		
Cash and term deposit	$ 94,756	$ 94,438
Fixed asset fund:		
Fixed assets (note 3)	$ 226,588	$ 273,972
International Pacific Salmon Fisheries Commission Fund:		
Term deposits	$ 74,454	$ 145,354

On behalf of the Commission:

Chair, Standing Committee on Finance and Administration

Vice-Chair, Standing Committee on Finance and Administration

	1992	1991
Liabilities and Fund Balances		
General fund:		
Current liabilities:		
Accounts payable and accrued liabilities	$ 118,996	$ 159,157
Fund balance (note 4):		
Reserves	486,195	429,707
	$ 605,191	$ 588,864
Working capital fund:		
Fund balance	$ 94,756	$ 94,438
Fixed asset fund:		
Fund balance	$ 226,588	$ 273,972
International Pacific Salmon Fisheries Commission Fund:		
Fund balance	$ 74,454	$ 145,354

See accompanying notes to financial statements.

PACIFIC SALMON COMMISSION

General Fund

Statement of Revenue and Expenditures

Year ended March 31, 1992, with comparative figures for 1991

	1992	1991
Revenue:		
Contributions from contracting parties	$ 1,650,000	$ 1,450,000
Interest	81,728	109,948
Test fishing	969,624	978,562
	2,701,352	2,538,510
Expenditures:		
Salaries and employee benefits	1,342,997	1,278,230
Travel and transportation	57,004	62,163
Rents and communication	89,538	83,558
Printing and reproductions	16,801	18,107
Contract services	227,565	215,772
Materials and supplies	47,406	29,446
Test fishing	807,000	828,915
Loss (gain) on disposal of fixed assets	3,109	23,456
	2,591,420	2,539,647
Excess (deficiency) of revenue over expenditures	109,932	(1,137)
	$ 2,701,352	$ 2,538,510

See accompanying notes to financial statements.

PACIFIC SALMON COMMISSION

Working Capital Fund

Statement of Revenue and Expenditures

Year ended March 31, 1992, with comparative figures for 1991

	1992	1991
Revenue:		
Interest	$ 6,330	$ 10,805
Expenditures:		
Meeting expenses	6,012	12,850
Excess (deficiency) of revenue over expenditures	$ 318	$ (2,045)

See accompanying notes to financial statements.

PACIFIC SALMON COMMISSION

International Pacific Salmon Fisheries Commission Fund

Statement of Revenue and Expenditures

Year ended March 31, 1992, with comparative figures for 1991

	1992	1991
Revenue:		
Interest earned on term deposit	$ 7,879	$ 18,004
Book sales	17,456	–
	25,335	18,004
Expenditure:		
Publications	96,235	28,623
Excess of expenditures over revenue	$ (70,900)	$ (10,619)

See accompanying notes to financial statements.

PACIFIC SALMON COMMISSION

Statement of Fund Balances

Year ended March 31, 1992, with comparative figures for 1991

	1992	1991
General fund:		
Fund balance, beginning of year	$ 429,707	$ 472,122
Transfer (to) from funds:		
Fixed asset fund	(53,444)	(41,278)
Excess (deficiency) of revenue over expenditures	109,932	(1,137)
Fund balance, end of year	$ 486,195	$ 429,707
Working capital fund:		
Fund balance, beginning of year	$ 94,438	$ 96,483
Excess (deficiency) of revenue over expenditures	318	(2,045)
Fund balance, end of year	$ 94,756	$ 94,438
Fixed asset fund:		
Fund balance, beginning of year	$ 273,972	$ 391,785
Transfer from General Fund	53,444	41,278
Depreciation	(100,828)	(159,091)
Fund balance, end of year	$ 226,588	$ 273,972
International Pacific Salmon Fisheries Commission Fund:		
Fund balance, beginning of year	$ 145,354	$ 155,973
Excess of expenditures over revenue	(70,900)	(10,619)
Fund balance, end of year	$ 74,454	$ 145,354

See accompanying notes to financial statements.

PACIFIC SALMON COMMISSION

Statement of Changes in Financial Position

Year ended March 31, 1992, with comparative figures for 1991

	1992	1991
General fund:		
Operating activities:		
Excess (deficiency) of revenue over expenditures	$ 109,932	$ (1,137)
Add (deduct):		
Net changes in non-cash working capital balances relating to operations	(6,574)	67,097
Cash used by operations	103,358	65,960
Financing activity:		
Transfer to fixed asset fund	(53,444)	(41,278)
Investing activities:		
Decrease (increase) in note receivable	34,092	(130,507)
Cash used in investing activities	34,092	(130,507)
Decrease in cash during the year	84,006	(105,825)
Cash and term deposits, beginning of year	376,632	482,457
Cash and term deposits, end of year	$ 460,638	$ 376,632
Working capital fund:		
Financing activity:		
Excess (deficiency) of revenue over expenditures	$ 318	$ (2,045)
Cash used in financing activities	318	(2,045)
Cash and term deposits, beginning of year	94,438	96,483
Cash and term deposits, end of year	$ 94,756	$ 94,438
Fixed asset fund:		
Operating activity:		
Item not affecting working capital:		
Loss (gain) on sale of fixed asset	$ 3,109	$ 23,456
Cash used for operations	3,109	23,456
Investing activities:		
Additions to fixed assets	(73,335)	(67,334)
Proceeds on sale of fixed assets	16,782	2,600
Cash used for investing activities	(56,553)	(64,734)
Financing activity:		
Transfer from general fund	53,444	41,278
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

Year ended March 31, 1992, with comparative figures for 1991

	1992	1991
International Pacific Salmon Fisheries Commission Fund:		
Operating activities:		
Excess of expenditures over revenue	$ (70,900)	$ (10,619)
Decrease in cash during the year	70,900	10,619
Cash and term deposits, beginning of year	145,354	155,973
Cash and term deposits, end of year	$ 74,454	$ 145,354

See accompanying notes to financial statements.

PACIFIC SALMON COMMISSION

Notes to Financial Statements

Year ended March 31, 1992, with comparative figures for 1991

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 administrative purposes.

1. 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 of rates sufficient to amortize the costs over the estimated useful lives of the assets. The rates of depreciation used on a annual basis are:

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

1. **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.

2. **Note receivable:**

   During fiscal 1991 a purchaser of part of the Commission's test fishing was placed into receivership. The Commission has taken legal action to secure its position by way of a mortgage claim on assets of one of the guarantors.

3. **Fixed assets:**

			1992	1991
	Cost	Accumulated depreciation and amortization	Net book value	Net book value
Automobiles	$ 70,419	$ 66,977	$ 3,442	$ 9,105
Boats	77,586	72,265	5,321	19,726
Computer equipment	339,176	285,388	53,788	34,207
Equipment	292,766	261,979	30,787	59,729
Films	1,800	1,800	–	–
Furniture and fixtures	230,757	112,410	118,347	137,539
Computer software	65,151	60,014	5,137	1,946
Leasehold improvements	19,532	9,766	9,766	11,720
	$ 1,097,187	$ 870,599	$ 226,588	$ 273,972

4. Reserves:

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

		1992	1991
(a)	Continuing operations	$ 367,553	$ 267,288
(b)	Reserve for note receivable	96,415	130,506
(c)	Reserve for prepaid expenses	22,227	31,913
		$ 486,195	$ 429,707

5. 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.

Appendices

Appendix A

Revised Annex IV to the Pacific Salmon Treaty and other attachments to the May 17, 1991 letter of transmittal

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.

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.

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 1991, the all-gear catch in Southeast Alaska shall not exceed the base ceiling of 263,000 chinook salmon plus 10,000; in 1992, the all-gear catch in Southeast Alaska shall not exceed 263,000 chinook salmon; these catches exclude the Alaska hatchery add-on as described in the letter of transmittal; in 1991 and 1992 Alaska shall open its general summer troll fishery on July 1; the June

fishery shall not exceed 40,000 chinook salmon (excluding the Alaska hatchery add-on) taken in a manner similar to 1989 and 1990; and areas of high chinook abundance shall be closed during chinook non-retention periods to reduce incidental mortalities;

(ii) in 1991, the all-gear catch in Northern and Central B.C. shall not exceed the base ceiling of 263,000 chinook salmon plus 10,000; in 1992, the all-gear catch in Northern and Central B.C. shall not exceed 263,000 chinook salmon; these catches exclude a portion of the catch in extreme terminal areas as described in the letter of transmittal;

(iii) in 1991 and 1992, the annual troll catch off the west coast of Vancouver Island shall not exceed 360,000 chinook salmon;

(iv) in 1991 and 1992, 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 achieve the target of rebuilding Lower Georgia Strait and Fraser River chinook stocks by 1998;

(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 1991 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 1991, and the likelihood of achievement of these goals by 1995; and,

(c) cooperatively developed management options to be identified by December 1991 and initiated in 1992 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:

	Sockeye	Pink
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:

	Sockeye	Pink
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 data-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.

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 endeavour 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 1991 and 1992, the west coast of Vancouver Island (Canadian Management Areas 21, 23, 24, 25, 26, 27, 121, 123, 124, 125, 126, 127, and 130-1) annual troll harvest shall not exceed 1.8 million Coho;

(b) for 1991 and 1992, 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 1991 and 1992, 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 1991 and 1992, 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 1993 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 1993 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.

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 1991 and 1992, 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 each of 1991 and 1992,

(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 1991 and 1992, 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 1991 and 1992 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 1991 and 1992, 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.

Exclusion of Selected Terminal Area Chinook Catches from the Northern and Central British Columbia Chinook Catch Ceiling

1) With respect to the terminal exclusions for 1989 and 1990 in North/Central British Columbia (NCBC), after review of the methodologies by the Chinook Technical Committee (CTC) in accordance with the May 16, 1990 letter of transmittal:

   a) Skeena

   The Parties agree to exclude from the catch ceiling in NCBC: 4,500 chinook salmon in 1989 and 4,400 chinook salmon in 1990 (base catch of 2,400). Canada will provide the additional biological data from this area for the CTC to review.

   b) Bella Coola

   The Parties agree to exclude from the catch ceiling in NCBC: 300 chinook salmon in 1989 and 1,100 chinook salmon in 1990 (base catch 2,800).

   c) Kitimat

   The Parties agree that for 1989 and 1990, no portion of the catches in this area will be excluded from the catch ceiling.

2) With respect to 1991 and 1992, the following terminal exclusions shall be allowed if the conditions identified in paragraph 3 are satisfied:

   a) Skeena

   Catches of chinook (>5 lbs) by net fisheries in the River/Gap/Slough exclusion area (described in TCCHINOOK (91)-2) in excess of the base catch level of 2,900 will be excluded from the NCBC catch.

   b) Bella Coola

   Catches of chinook (>5 lbs) in the exclusion area (described in TCCHINOOK (91)-2) in excess of the base catch level of 2,950 will be excluded from the NCBC catch.

   c) Kitimat

   Catches of chinook (>12.5 lbs) in the exclusion area (described in TCCHINOOK (91)-2) in June and July in excess of the base catch level of 2,400 will be excluded from the NCBC catch.

3) Conditions to be satisfied for acceptance of 1991 and 1992 terminal exclusions are:

   a) Canada collects catch, coded-wire-tag, and biological sampling data from the exclusion area and provides preliminary catch and CWT data to the Commission in the January following the fishery and the remainder of the data by June of the year following the fishery:

b) the terminal exclusions satisfy the following general conditions:

i) spawning escapements of stocks targeted in the exclusion area are meeting or exceeding the interim escapement goal;

ii) the harvest in the exclusion area is comprised of mature chinook returning to local stocks while minimizing the harvest of immature and non-local stocks; and

iii) management capabilities accurately account for and sample harvest occurring exclusively in the exclusion area.

4) Non-Acceptance of Terminal Exclusions

Terminal exclusions in the area described in paragraphs 2(a) - 2(c) are to be evaluated by the CTC on the basis of time and gear strata proposed by Canada. In the event that catch from a terminal exclusion time/gear stratum is not accepted by the Commission for either year, the total catch in that stratum shall count against the NCBC ceiling for that year.

5) Terminal Exclusion Reserves in Base Catch Ceilings

For accounting purposes, NCBC fisheries other than those identified in paragraphs 2(a) - (c) shall be considered to operate under the NCBC ceiling level minus the base catch levels specified for those terminal exclusion areas.

Attachment 3

February 8, 1991

FRASER RIVER PANEL JOINT REPORT TO THE PACIFIC SALMON COMMISSION

THE ESTABLISHMENT OF FRASER SOCKEYE AND PINK SALMON ESCAPEMENT GOALS FOR 1991 AND 1992 FOR THE PURPOSE OF COMPUTING THE TOTAL ALLOWABLE CATCH

1. The Parties agree the following will define Fraser River sockeye and pink salmon net escapement goals for the purpose of calculating Canadian and U.S. in-season and post-season Total Allowable Catch shares. This agreement would amend subparagraphs (a) of the June 8, 1987 Fraser Panel Agreement.

   (a) for the period 1991 and 1992, the in-season net escapement goal or post-season, the actual net escapement of adult sockeye and pink salmon will be used to compute Total Allowable Catch shares.

February 8, 1991

FRASER RIVER PANEL JOINT REPORT TO THE PACIFIC SALMON COMMISSION

FRASER PANEL AGREEMENT ON SOCKEYE ESCAPEMENT ADD-ON COMPUTATION

1. The Parties agree that, in order to implement the arrangements contained in Commission document PSC-ES (87)-14, the following arrangements shall apply:

A. For the purpose of calculating the Canadian production benefit in 1990 from escapement add-ons contributed during the period 1986 the Parties agree:

(i) The preliminary post-season estimate of the total run size of the early- and mid-summer management groups are 1,533,000 and 7,902,000, respectively.

(ii) Based on this preliminary estimate, the escapement add-on production benefit shall be 199,000 early-summer and 838,000 mid-summer fish.

(iii) Canada's escapement add-on production benefit referred to in paragraph 1.A (ii) shall be adjusted in proportion to any post-season adjustments in the run size set out in paragraph 1.A (i).

(iv) The Parties agree that Canada's escapement add-on production benefit as determined in 1.A (i) - (iii) above shall not be included in the calculations of the Total Allowable Catch from which the U.S. allocations are determined.

B. For the purpose of calculating the Canadian production benefit in 1991 from escapement add-ons contributed during the period 1987 the Parties agree:

(i) The preliminary forecast of the total run size of the early- and mid-summer and late run management groups are 902,000, 2,900,000 and 10,148,000, respectively.

(ii) Based on this preliminary forecast, the escapement add-on production benefit shall be 87,000 early-summer, 128,000 mid-summer fish and 1,674,000 late run fish.

(iii) Canada's escapement add-on production benefit referred to in paragraph 1.B (ii) shall be adjusted in proportion to any in-season and post-season adjustments in the run size set out in paragraph 1.B (i).

(iv) The Parties agree that Canada's escapement add-on production benefit as determined in 1.B (i) - (iii) above shall not be included in the calculations of the Total Allowable Catch from which the U.S. allocations are determined.

C. For the purpose of calculating the Canadian production benefit in 1992 from escapement add-ons contributed during the period 1988 the Parties agree:

(i) The preliminary forecast of the total run size of the Early Stuart, early- and mid-summer and late run management groups are 459,000, 1,041,000, 1,637,000 and 1,066,000, respectively.

(ii) Based on this preliminary forecast, the escapement add-on production benefit shall be 41,000 Early Stuart, 63,000 early-summer, 14,000 mid-summer fish and 18,000 late run fish.

(iii) Canada's escapement add-on production benefit referred to in paragraph 1.C (ii) shall be adjusted in proportion to any in-season and post-season adjustments in the run size set out in paragraph 1.C (i).

(iv) The Parties agree that Canada's escapement add-on production benefit as determined in 1.C (i) - (iii) above shall not be included in the calculations of the Total Allowable catch from which the U.S. allocations are determined.

2. At appropriate times throughout 1991 and 1992, Canada will provide gross and net spawning escapement requirements by race and management group. Specifically, Canada will provide, on a pre-season basis, escapement requirements, and will provide notification of any in-season adjustments to specific escapement goals.

3. The Parties agree that notwithstanding paragraph 1B and 1C, the Parties recognize that the harvest of increased Fraser sockeye production could have impacts requiring adjustments in harvest patterns in both countries, to be consistent with Article III, Paragraph 3. Canada agrees to take into account such potential impacts in planning and executing its production increases, and to consult with the U.S. on ways to minimize such impacts and to plan adjustments in harvest management, as necessary.

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 that 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) February 1991 - 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. JOGC to exchange all chapters in completed form by the end of May 1991.

   (d) Mid-June 1991 - Bilateral discussion by the JOGC to identify incompatible short and long-term management objectives and production plans and develop problem statements for all chapters. At the conclusion of this meeting JOGC will meet with Panel Chairs to explore opportunities for cooperative problem solving.

   (e) October 1991 - Commission review of chapters and problem statements and provision of direction to JOGC and/or Panels on continued development of this process. The Commission should provide these to the Panels for their bilateral review and discussion.

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 indicate a process to deal with these questions, consistent with paragraph A of the Memorandum of Understanding of the Pacific Salmon Treaty (1985).

Appendix B

Agreed 1991-1992 Work Assignments, Including Schedule Amendments Approved October 30, 1991

Revised Due Date	Group	Task
November 1991	Northern Boundary Tech. Comm.	Interim progress report-northern boundary area sockeye, pink & chum status review
December 1991	Parties	Develop 7/7A 1990 interception estimates; criteria for enhancement re compensation 7/7A
December 1991	Parties	Exchange views on factors affecting perceptions of benefits in relation to Production & interceptions-Canada will present its view early in the Nov. 1991 meeting-later in that meeting the U.S. will follow
December 1991	Northern Panel	Begin a planning process Panel re: opportunities/options for improved management, conservation & enhancements in the N. Boundary Area prepatory for the Dec. 1991 PSC meetings
December 1991	Chinook Working Group	Chinook workshop follow-up; progress report & work Group plan to complete tasks leading to long range management approach
December 1991	United States	Alaska hatchery add-ons: comp. procedures re risk adj. factor; impacts on rebuilding, etc.
December 13, 1991	JOGC	Exchange draft chapters for the remainder of Fraser River, Strait of Juan de Fuca, Southern Puget Sound, Washington Coast, Upper & Lower Columbia River, West Coast of Vancouver Island, Georgia Strait & Johnstone Straits, & transboundary rivers
Spring 1992	Technical Committees	1990 interception estimates & JIC methodologies
Undated - following PSARC review	Canada	Report on the effectiveness PSARC review of 1988, 1989, & 1990 management measures to reduce harvest rates on depressed chinook stocks & provide data on harvests, harvest rates, chinook stock composition & management measures for Georgia Strait & Area 20 fisheries

Revised Due Date	Group	Task
Undated	Parties	Develop time frame & methodology to assess average annual contribution of new U.S. production to Can. coho fisheries vs. interceptions in 7/7A
January 1992	Canada	Provide tech data on term-area exclusion fisheries in 1991
Early January 1992	JOGC	Meet with panel chairs & vice-chairs to explore opportunities for cooperative problem solving
February 1992	N. Coho Workshop: Northern Panel members & other observers	Explore management approaches for the northern panel area that improve the Parties ability to meet management objectives
January 20-24, 1992	Commission	Review JOGC developed chapters & problem statements. Provide JOGC & panels direction re: continuation of the process
January 1992	Bi-lateral Panels	Through January 1992 Panels are to conduct deliberations on JOGC problem statements and opportunities for cooperative problem solving - seeking consensus on specific measures to be undertaken
February 3-7, 1992	Commission	Commission receives report on Panel discussions and discusses how to use this information (re: JOGC)
late February early March 1992	S. Coho Workshop: 10 from each Party	Explore coho management approaches for Southern Panel area that improve the Parties ability to meet management goals

Appendix C

Approved Budget FY 1992/93

1.	Income		
	A. Contribution from Canada		$ 836,500
	B. Contribution from U.S.		836,500
		Sub-total	$1,673,000
	C. Carry-over from 1991/92		301,018
	D. Interest		20,000
	E. Total Income		1,994,018
2.	Expenditures		
	A. 1. Permanent Salaries & Benefits		$1,271,371
	2. Temporary Salaries & Benefits		158,794
	3. Total Salaries & Benefits		1,430,165
	B. Travel		96,138
	C. Rents, Communications, Utilities		141,413
	D. Printing and Publication		20,000
	E. Contractual Services		180,291
	F. Supplies and Materials		46,635
	G. Equipment		79,376
	H. Total Expenditures		$1,994,018
3.	Balance (Deficit)		$ 0
4.	Test-Fishing Program		
	A. Forecast Revenues		$ 378,494
	B. Forecast Expenditures		315,791
	C. Forecast Balance		$ 62,703
5.	Total Balance (Deficit)		$ 62,703

Appendix D

Pacific Salmon Commission
Approved Meeting Schedule 1992/93, 1993/94 and 1994/95

1. 1992/93

   (a) October 20-22, 1992
   Fall Executive Session of the Commission
   Westmark Baranof Hotel
   Juneau, Alaska

   (b) November 30-December 4, 1992
   Post-Season Meeting of the Commission
   Hotel Vancouver
   Vancouver, B.C.

   (c) January 20-29, 1993
   Meeting of the Panels and the Commission
   Four Seasons Hotel
   Vancouver, B.C.

   (d) February 8-17, 1993
   Eighth Annual Meeting of the Commission
   Hyatt Regency Hotel
   Bellevue, Washington

2. 1993/94

   (a) Fall Executive Session
   October 19-21, 1993
   Olympia, Washington

   (b) Post-Season Meeting
   November 29-December 3, 1993
   Four Seasons Hotel
   Vancouver, B.C.

   (c) Panel/Commission Meeting
   January 24-28, 1994
   Portland Hilton Hotel
   Portland, Oregon

(d) Ninth Annual Meeting
February 7-11, 1994
Four Seasons Hotel
Vancouver, B.C.

3. 1994/95

(a) Fall Executive Session
October 18-20, 1994
Vancouver or Kamloops

(b) Post-Season Meeting
November 28-December 2, 1994
Four Seasons Hotel
Vancouver, B.C.

(c) Panel/Commission Meeting
January 23-27, 1994
Four Seasons Hotel
Vancouver, B.C.

(d) Tenth Annual Meeting
February 6-10, 1995
Portland Hilton
Portland, Oregon

Appendix E

Pacific Salmon Commission
Secretariat Staff as of March 31, 1992

EXECUTIVE OFFICE

Ian Todd
Executive Secretary

Janice Abramson
Secretary

Vicki Ryall
Secretary, Meeting Planner

Teri Tarita
Librarian/Records Administrator

FINANCE & ADMINISTRATION

Kenneth N. Medlock
Finance and Administration

Bonnie Dalziel
Accountant

FISHERY MANAGEMENT

James C. Woodey
Chief Biologist

Jim Gable
Head, Racial Identification Group

Jim Cave
Head, Stock Monitoring Group

Mike Lapointe
Project Biologist, Sockeye

Valerie Craig
Project Biologist, Test-Fishing

Bruce White
Project Biologist, Pinks

Peter Cheng
Project Biologist, Acoustics

Keith Forrest
Project Biologist, Racial Database

Ian Guthrie
Head, Biometrics/Computer Services

Carol Lidstone
Scale Analyst

Kathy Mulholland
Computer Programmer/Analyst/Operator

Jullie Parkin
Assistant Scale Analyst

Doug Stelter
Statistician

Holly Derham
Assistant Scale Analyst

Appendix F

Membership Lists for Standing Committees, Panels, Joint Technical Committees and other Appointments as of March 31, 1992

U.S.A.	CANADA

1. STANDING COMMITTEE ON FINANCE AND ADMINISTRATION

Mr. Guy R. McMinds (Chair)
Mr. Charles K. Walters
Mr. James Heffernan
Mr. W. Ron Allen

Mr. Patrick S. Chamut (Vice-Chair)
Ms. Heather James
Mr. C.C. (Bud) Graham

Staff: I. Todd (ex. officio)

Editorial Board

Dr. N.J. Sands

Mr. C.C. (Bud) Graham

Staff: I. Todd

2. STANDING COMMITTEE ON RESEARCH AND STATISTICS

Mr. Guy R. McMinds
Dr. Norma Jean Sands
Mr. Ben Van Alen
Dr. Don Bevan
Dr. James C. Olsen
Dr. Gary S. Morishima
Mr. Gary R. Graves
Mr. Michael Grayum
Mr. James B. Scott

Ms. Stefani Paine (Chair)
Dr. Brian Riddell
Mr. David Peacock
Mr. R. Harrison
Mr. R. Kadowaki
Mr. Don Anderson
Mr. Wayne Saito
Mr. Marc Hamer

Research and Statistics Working Group

Dr. Norma Jean Sands
Mr. Larry Rutter
Dr. Phil Mundy
Mr. Thomas D. Cooney
Mr. Rich Lincoln (alternate to Cooney)
Mr. Charles K. Walters
Mr. Jerry R. Van Meter

Mr. A. W. (Sandy) Argue
Ms. Susan Steele

Staff: I. Todd (ex. officio)
Ian Guthrie (ex. officio)

Ad Hoc Joint Interceptions Committee

Dr. Gary S. Morishima (Co-Chair)
Dr. Richard Moore
Dr. Norma Jean Sands

Mr. A.W. (Sandy) Argue (Co-Chair)
Mr. Ken Wilson
Ms. Barb Snyder
Ms. Stefani Paine

Ad Hoc Joint Objectives and Goals Committee

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Mr. Larry Rutter
Mr. Kevin C. Duffy

Mr. Alan F. Lill (Co-Chair)
Mr. Colin N. MacKinnon
Mr. C. C. (Bud) Graham
Ms. Stefani Paine

3. FRASER RIVER PANEL

Mr. A. Dennis Austin (Vice-Chair)
Ms. L. Loomis
Mr. Robert P. Zuanich
Mr. R.A. Schmitten

Mr. F.J. Fraser (Chair)
Mr. Ernie Crey
Mr. Mike Forrest
Mr. Jim Hill
Ms. Ruth Kendall
Mr. Larry Wick

Fraser River Panel Alternates

Mr. W. Ron Allen
Dr. Morris Barker
Mr. William L. Robinson
Mr. Robert Suggs

Mr. Vince Fiamengo
Mr. Mike Griswold
Ms. Kaarina McGivney
Mr. Mike Medenwaldt
Mr. Russell Nugent

4. SOUTHERN PANEL

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Mr. Burnell Bohn
Mr. Robert W. Whitener, Jr.
Mr. J. Gary Smith
Mr. Robert Haindel
Ms. N. Kathryn Brigham

Mr. Paul Sprout (Chair)
Mr. Tom Davis
Mr. Ron Fowler
Mr. William Green
Mr. John Legate

Southern Panel Alternates

Dr. Morris Barker
Dr. Donald O. McIsaac
Mr. Mark Cedergreen
Mr. Terry R. Williams
Mr. Jerry R. Van Meter
Mr. David B. Sones

Mr. Roy Alexander
Mr. Bob Duncan
Mr. Warren Peterson
Ms. Jane Reid
Ms. Susan Steele
Ms. Geraldine (Danni) Tribe

5. NORTHERN PANEL

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Mr. Daniel V. Hickman
Mr. Arnold Enge
Mr. Steven Pennoyer
Mr. John Winther
Mr. John P. Peckham
Mr. Norm Lemmen (Vice-Chair)
Mr. Mark Forand
Ms. Nancy James
Mr. William Kristmanson
Mr. Alan Ronneseth
Ms. Mandy Wade

Northern Panel Alternates

Mr. Scott Marshall
Mr. Jev Shelton
Mr. Don W. Collinsworth
Ms. Dale A. Kelley
Mr. William Foster
Mr. James E. Bacon
Mr. Elmer Derrick
Mr. Rick Haugan
Mr. Ray Kendel
Ms. Joan Lemmers
Mr. Gary Miltenberger
Mr. Robb Wilson

6. JOINT CHINOOK TECHNICAL COMMITTEE

Mr. James B. Scott (Co-Chair)
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Mr. Gary R. Freitag
Mr. Dexter Pitman (alternate to Hassemer)
Dr. Kenneth A. Henry
Mr. Steve E. Ignell
Dr. Richard Moore
Dr. Gary Winans
Dr. Norma Jean Sands
Mr. Ronald H. Williams
Dr. Gary S. Morishima
Mr. Timothy W. Roth
Dr. Sandra Moore
Mr. Peter J. Hassemer
Mr. Dave Gaudet
Mr. Jim M. Berkson
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Mr. Paul Suchanek
Ms. Marianne Johnson
Dr. B. Riddell (Co-Chair)
Ms. Barb Snyder
Mr. Louis Lapi
Mr. Ken Pitre
Mr. N. Schubert
Mr. Paul Ryall
Mr. Wilf Luedke

Joint Chinook Working Group

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Mr. Dave Gaudet
Mr. Daniel V. Hickman
Ms. Dale A. Kelley
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Mr. A.W. (Sandy) Argue (Co-Chair)
Dr. B. Riddell
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Mr. William Green
Mr. Alan Ronneseth

Joint Chinook Working Group - Alternates

Mr. Robert W. Whitener, Jr.
Mr. Robert Haindel
Mr. James B. Scott
Dr. Sandra Moore
Mr. Kevin C. Duffy
Mr. James E. Bacon
Mr. William Foster
Dr. Norma Jean Sands

7. JOINT COHO TECHNICAL COMMITTEE

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Mr. James B. Scott
Mr. Robert A. Hayman
Dr. Kenneth A. Henry
Mr. Ronald H. Williams
Dr. Richard Moore
Mr. Robert Wunderlich
Mr. George Milner
Mr. Steve Elliot

Mr. R. Kadowaki (Co-Chair)
Mr. K. Pitre
Mr. N. Schubert
Mr. Tom Pendray
Mr. Louis Lapi
Mr. Ken Wilson
Mr. Paul Ryall

Northern Coho

Dr. Aven M. Anderson
Dr. H. Richard Carlson
Mr. Leon D. Shaul
Mr. Dave Gaudet
Mr. Steve Elliot

8. JOINT CHUM TECHNICAL COMMITTEE

Mr. Gary R. Graves (Co-Chair)
Dr. Kenneth A. Henry
Mr. Nick Lampsakis
Mr. Ralph Boomer
Mr. Tim Tynan
Mr. Randy Hatch
Dr. Gary Winans

Mr. Don Anderson (Co-Chair)
Mr. Al Gould
Dr. Terry Beacham
Ms. Marilyn Joyce
Mr. Wilf Luedke
Mr. Leroy Hop Wo

9. JOINT NORTHERN BOUNDARY TECHNICAL COMMITTEE

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Dr. Jack H. Helle
Mr. Phillip S. Doherty
Mr. Glen T. Oliver
Dr. Jim Blick
Dr. Jerome J. Pella
Mr. Fred Gaffney
Mr. David Peacock (Co-Chair)
Mr. L. Jantz
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10. JOINT TRANSBOUNDARY TECHNICAL COMMITTEE

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Mr. John H. Eiler
Mr. William R. Bergmann
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Mr. S. Johnston
Dr. C. Wood
Mr. P. Milligan
Mr. P. Etherton

Enhancement Sub-Committee

Dr. Ken Leon (Co-Chair)
Dr. Jeff Koenings
Dr. Robert Burkett
Mr. John Burke
Mr. Pete Hagen
Mr. Bruce Morley (Co-Chair)
Mr. P. Milligan
Mr. Cam J. West

11. JOINT TECHNICAL COMMITTEE ON DATA SHARING

Dr. John E. Clark (Co-Chair)
Dr. Kenneth A. Henry
Dr. Ken Johnson
Dr. Gary S. Morishima
Mr. M. Matylewich
Mr. Joseph Pavel
Dr. Don Bevan
Mr. Marc Hamer (Co-Chair)
Mr. James H. Bjerring
Ms. Margaret Birch
Ms. Maureen Holmes

Staff: K. Mulholland (ex. officio)

Working Group on Mark-Recovery Statistics

Dr. Ray Hilborn (Co-Chair)
Dr. J. E. Clark
Dr. Kenneth A. Henry
Dr. John Skalski
Mr. Rich Comstock
Mr. Robert Conrad
Dr. Peter W. Lawson
Dr. J. Schnute (Co-Chair)
Ms. Carol Cross
Dr. Tim Mulligan
Mr. Rob Kronlund

Working Group on Data Standards

Dr. Ken Johnson
Mr. Ron Olson
Mr. Charles Corrarino
Mr. Dick O'Connor
Ms. Barbara Haar
Mr. Louis Lapi
Mr. Marc Hamer

Catch Data Exchange Working Group

Mr. Joseph Pavel (Co-Chair)
Mr. Scott Johnson
Mr. Will Daspit
Ms. Susan Markey
Mr. Gerald Lukas
Mr. James H. Bjerring (Co-Chair)
Ms. Lia Bijsterveld
Mr. Vic Palermo
Ms. Maureen Holmes

12. FRASER RIVER PANEL TECHNICAL COMMITTEE

Mr. Michael Grayum (Co-Chair)
Mr. Bill Tweit
Mr. Bob Vreeland
Mr. Wayne Saito (Co-Chair)
Mr. Al Gould
Mr. A. MacDonald

13. NATIONAL CORRESPONDENTS

Mr. Charles K. Walters
Mr. C. C. (Bud) Graham
Ms. Heather James
Mr. Obert Sweitzer