PACIFIC SALMON COMMISSION
TRANSBOUNDARY TECHNICAL
COMMITTEE REPORT

SALMON MANAGEMENT AND ENHANCEMENT PLANS FOR THE STIKINE, TAKU AND ALSEK RIVERS, 2000

REPORT TCTR (00)-02

This plan was finalized at the June 1-2, 2000 meeting of the
Transboundary Technical Committee

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ACRONYMS

ADFG	Alaska Department of Fish and Game
DFO	Department of Fish and Oceans, Canada
DIPAC	Douglas Island Pink and Chum, Inc.
NSRAA	Northern Southeast Regional Aquaculture Association
TFN	Tahltan First Nation
TRTFN	Taku River Tlingit First Nation
CAFN	Champagne/Aishihik First Nations

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INTRODUCTION

Management of transboundary river salmon to achieve conservation, allocation and enhancement objectives, as stipulated by the Pacific Salmon Treaty, requires a co-operative approach by Canada and the United States. It is important that both Parties have a clear understanding of the objectives and agree upon procedures to be used in managing the fisheries, including the criteria upon which modifications of fishing patterns will be based. This document is intended to facilitate co-operative salmon management and research on transboundary stocks of the Stikine, Taku, and Alsek Rivers conducted by the Canadian Department of Fisheries and Oceans (DFO), the Tahltan First Nation (TFN), the Iskut First Nation (IFN), the Taku River Tlingit First Nation (TRTFN), Champagne/Aishihik and the Alaska Department of Fish and Game (ADF&G).

The report contains, by river system and species, the 2000 salmon forecasts, spawning escapement goals, a summary of harvest sharing objectives, and an outline of management procedures to be used during the conduct of the 2000 fisheries. With the exception of Stikine sockeye salmon, for which a numerical forecast is required by the Pacific Salmon Treaty and by the Stikine Management Model and Taku River sockeye salmon, forecasts are given qualitatively, with reference to brood year escapement data where available. The report also contains joint plans for fry plants and egg collections in 2000 and proposed transboundary field projects for the year, identifying agency responsibility and contacts for the various functions within the projects.

STIKINE RIVER

Sockeye Salmon

Stock Definitions

Stikine sockeye salmon are, for research, management, and monitoring purposes, subdivided into four stock groups: 1) **wild Tahltan stock** which are those fish originating from naturally spawning sockeye salmon in Tahltan Lake; 2) planted Tahltan stock which are those fish originating from broodstock collected at Tahltan Lake and whose fry are backplanted into Tahltan Lake; 3) **Tuya stock** which are those fish originating from broodstock collected at Tahltan Lake and whose fry are backplanted into Tuya Lake; and 4) **mainstem stock** which are all natural remaining sockeye populations in the Stikine River. For management purposes, the collective wild and planted Tahltan stocks are referred to as **the total Tahltan stock** or, sometimes, just Tahltan stock.

Preseason Forecast

For 2000, the total run forecast for Stikine sockeye salmon is 138,000 fish, which constitutes a below average run but higher than realized in the last two years. For comparison, the recent ten-year average (1990-1999) total Stikine sockeye run size is approximately 200,000 fish. The 2000 forecast includes approximately 44,000 wild Tahltan (32%), 7,000 planted Tahltan (5%), 21,000 Tuya (15%), and 66,000 mainstem sockeye salmon (48%).

The 2000 prediction is based on the following components:

1. A forecast of approximately 51,000 Tahltan wild+enhanced sockeye of which 7,000 are expected from the enhancement project. This is the average of a sibling-based forecast of 69,000 for the total Tahltan stock which includes approximately 7,000 enhanced sockeye, and a smolt forecast of 33,000 Tahltan sockeye of which 7,000 are expected to originate from the enhancement project;
2. a forecast of 21,000 Tuya sockeye salmon, which is a forecast based on lowest age-specific fry-to-adult survival data for Tuya sockeye; and
3. a sibling forecast of 66,000 mainstem stock.

Given an escapement goal of 24,000 sockeye salmon for the total Tahltan stock the predicted allowed harvest is 27,000 with an exploitation rate on this stock of 0.53. This rate applied to the Tuya prediction of 21,000 fish yields a harvest target of 11,000 fish and a surplus of 10,000 fish for the Tuya stock. The projected harvest for mainstem fish to allow for an escapement of 30,000 spawners is 36,000 fish. The predicted total allowable catch (TAC) of all Stikine sockeye salmon is 74,000 fish. The 2000 outlook is characterized as below average for all components of the run.

Age and stock specific catch and escapement estimates are used to reconstruct annual runs for the Stikine sockeye stocks. Marine catch estimates are based on ADF&G scale pattern analysis. Lower inriver catch estimates are based on a variety of stock identification techniques (SPA, egg diameters, parasite frequency, electrophoretic data). The contribution of Tahltan stocks to upper river commercial and aboriginal fisheries had been assumed to be 90% prior to 1997 and has been estimated from egg diameter analysis since 1997. The contributions of planted Tuya and Tahltan fish to various harvests are estimated with analysis of otoliths for thermal marks combined with analysis of scale patterns or egg diameters. Tahltan escapements are enumerated at the Tahltan Lake weir and Mainstem and Tuya escapements are calculated through the subtraction of the reconstructed inriver Tahltan run and the estimated inriver catches of Tuya and Mainstem sockeye stocks from the total inriver run estimates.

Tahltan Lake Sockeye Forecast

Sibling forecast: The sibling forecast technique used for the Tahltan stock is based on the relationship between the return of age-4 fish in one year and the total run in the following year. Using data from both planted and wild Tahltan runs, the relationship between the return of age-1.2 (4 year olds with two years in marine waters, also designated as 4(2)) fish in one year and the total (all ages) run in the following year is described by the following equation:

$$N_{t+1} = 11{,}726 + 9.440217(N_{1.2,t}) \qquad [1.a]$$

where: N_{t+1} = total Tahltan run (all ages) in year(t+1); and
$N_{1.2,t}$ = total Tahltan return of age-1.2 in year(t).

The wild Tahltan component by itself is estimated by:

$$N_{t+1} = 9{,}859 + 9.522778(N_{1.2,t}) \qquad [1.b]$$

where: N_{t+1} = wild Tahltan run (all ages) in year(t+1); and
$N_{1.2,t}$ = wild Tahltan return of age-1.2 in year(t).

The return of all age-1.2 Tahltan sockeye salmon in 1999 was estimated to have been 6,092 fish. Using equation [1a], a run size of approximately 69,000 Tahltan sockeye salmon is expected in 2000. The estimated wild component of this forecast is 62,000 sockeye salmon (from an estimated return of 5,478 wild Tahltan age-1.2 fish in 1999 and equation 1.b). Subtracting the predicted run of wild Tahltan fish from the total Tahltan forecast yields a run projection of 7,000 planted Tahltan fish.

Smolt based forecast: The other forecast method examined for Tahltan sockeye salmon was based on smolt data and average survival rates for individual age classes of both wild and enhanced smolts from smolt years 1994 on. It is generally agreed by oceanographers that recent significant changes in marine productivity have likely affected salmon production since the 1994 year of entry into the marine environment.

Average rates of return for 2000 wild age classes were estimated as follows: 5.7% of the 0.318 million age 1+ smolt counted in 1997 are expected to return as age 5(2) in 2000; 1.1% of the 0.288 million age 1+ smolt counted in 1998 expected to return as age 4(2) in 2000; 13.8% of the 30,000 age 2+ smolt counted in 1997 expected to return as age 6(3) in 2000; and 6.5% of the 39,000 age 2+ smolt counted in 1998 expected to return as age 5(3) in 2000. The wild Tahltan Lake sockeye run is therefore expected to be 26,559 in 2000 based on smolt data.

Average rates of return for 2000 enhanced age classes were estimated as follows: 0.034 of the 0.162 million age 1+ enhanced smolt counted in 1997 are expected to return as age 5(2) in 2000; 0.003 of the 0.210 million age 1+ enhanced smolt counted in 1998 expected to return as age 4(2) in 2000; 0.014 of the 8,300 age 2+ enhanced smolt counted in 1997 expected to return as age 6(3) in 2000; and 0.043 of the 4,100 age 2+ enhanced smolt counted in 1998 expected to return as age 5(3) in 2000. The enhanced Tahltan Lake sockeye run is therefore expected to be 6,506 in 2000 based on smolt data.

Using smolt-to-adult survival data for the 1994 ocean year of entry on gives an expected run of approximately 33,000 total Tahltan sockeye salmon, 26,000 wild and 7,000 planted fish. By including only the survival data from the 1994 year of ocean entry on, we have attempted to incorporate the low recent survivals observed in recent years.

The 2000 preseason Tahltan sockeye forecast that will be used for management purposes at the beginning of the season is 51,000 sockeye salmon derived from the average of the sibling-based and smolt-based forecasts. A run of this magnitude would be below the previous 10-year average of 100,494 fish and below the previous 5-year average of 128,627 sockeye salmon. Last year's run of 43,000 fish was 68% below the preseason forecast of 63,500 fish.

Tuya Forecast

A fry-to-adult survival-based forecast for the 2000 run of Tuya sockeye salmon applied the lowest age-specific sockeye fry-to-adult survivals observed at Tuya Lake to the estimated number of fry outplanted in Tuya Lake in 1995 (BY 1994), 1996 (BY 1995) and 1997 (BY 1996). This gave predicted returns of 1,700 age-4 sockeye salmon, 15,000 age-5 sockeye salmon, and 4,100 age-6 sockeye salmon for a total forecast of approximately 21,000 Tuya sockeye salmon for 2000.

The preseason forecast for last year was 19% above the postseason estimated run size.

Mainstem Sockeye Forecast

The method used to produce the mainstem sockeye forecast for 2000 is based on a sibling forecast technique using regression data from 1983 through 1999.

Linear regression of age-1.2 mainstem sockeye salmon (N1.2) on the following year's total run (catch and escapement, all ages) of mainstem sockeye salmon (N) for the years 1983 to 1999 yielded the following equation:

$$N_{t+1} = 22{,}860 + 7.067717(N_{1.2t}) \qquad [2]$$

Based on equation [2] and a total return estimate of 6,102 age-1.2 mainstem sockeye salmon in 1999, the 2000 sibling forecast for mainstem sockeye salmon is approximately 66,000 fish.

A second method examined, but not used in 2000, was forecasting the mainstem run using the stock-recruitment relationship for the mainstem component from 1979-1993 as described by equation:

$$N = 1.5049 + 0.000020768(S) \qquad [3]$$

where: N = return, and
S = spawners.

The unadjusted forecast for the 2000 run from this method is about 79,000 fish; the correlation coefficient for this relationship is 0.71. However, in 1998 and 1999, the actual run was on average, 44% of the forecast run size. This was likely associated with poor marine survival. Assuming a similar tendency for the method to overestimate as observed over the previous two years, the run is estimated at 35,000 mainstem sockeye salmon in 2000.

The sibling forecast of 66,000 Mainstem sockeye salmon for 2000 represents 86% of the average (1990-1999) mainstem run of 77,013 sockeye salmon.

Due to recent declines in survival for Stikine sockeye, there is a high level of uncertainty in these preseason forecasts. The various preseason forecast techniques suffer from a relatively short time series of data and, therefore, not surprisingly, there have been wide discrepancies between past forecasts and actual runs. For example in 1998, the total run was forecast as 218,500 whereas the estimate of actual run was 121,000; this poor survival could be due to both poor survival in the marine and returning freshwater environment. However, in 1999, the preseason forecast of 126,000 Stikine sockeye salmon was very close to the post-season estimate of approximately 125,000 sockeye. Despite problems with preseason forecasting, these forecasts are useful for management until we have inseason data with which to revise our forecasts.

Spawning Escapement Goals

Escapement goals have been established by the Transboundary Technical Committee (TTC) for two of the Stikine sockeye stocks: the total Tahltan and the mainstem stocks. The Tahltan and mainstem stocks are considered to be independent; surpluses or deficits in escapement realized in one stock are not used to balance deficits or surpluses in the other. In theory, the Tuya stock which is planted and has no natural current access to spawning and rearing grounds, has a spawning escapement goal of zero. In practice, since the Tahltan and Tuya stocks commingle and have the similar migratory timing and distribution, the

harvest rate on Tuya fish should not exceed that which can be sustained by the Tahltan fish so as not to overharvest the latter stock.

Spawning escapement goals have been established as ranges which reflect biological data regarding stock productivity, the ability of existing management systems to deliver established goals, the accuracy and precision of estimates of escapement generated by stock assessment programs, and the degree of risk considered acceptable.

Management subjective categories have been defined for various escapement levels. A postseason estimate of escapement that falls within the Green Management Category shall be considered fully acceptable; one that falls within the Yellow Management Category shall be considered acceptable but not desired; and, one that falls within the Red Management Category shall be considered undesirable. The escapement goal ranges by management category represent our best judgement of desired escapement levels.

Tahltan Stock

In 1993 the TTC established an escapement goal of 24,000 fish for the Tahltan stock, which takes into account an escapement goal of 20,000 naturally spawning fish and the approximately 4,000 fish needed for broodstock to meet the objectives of the current Canada/U.S. Stikine fry planting program. Management escapement goal ranges for the various management categories for the Tahltan stock are:

	TARGET = 24k				
Escapement	0 - 12k	13k - 18k	18k - 30k	30k - 45k	>45k
Mgmt. Category	Red	Yellow	Green	Yellow	Red

Mainstem Stock

Management escapement goal ranges for the various management categories for the mainstem stock are:

	TARGET = 30k				
Escapement	0 - 15k	15k - 20k	20k - 40k	40k - 75k	>75k
Mgmt. Category	Red	Yellow	Green	Yellow	Red

Data Exchange

The following data for the Tahltan sockeye stock will be collected and exchanged for use in evaluating escapement goals:

1. spawning escapements, separated by wild and planted components;
2. smolt production, separated by wild and planted components; and
3. stock specific catches in the various fisheries.

The following relationships for the Tahltan stock will be examined:

1. total run as a function of spawning escapement level;
2. smolt production as a function of the number of natural spawners and planted fry;
3. adult production as a function of the number of smolts; and
4. total run as a function of the return of age-4 sockeye salmon in the previous year.

The following data for the mainstem stock will be collected and exchanged for use in evaluating escapement goals:

1. survey counts of mainstem stock escapements;
2. the mainstem stock component of catches from the various fisheries; and
3. inventory and assessment data regarding the historical pattern of distribution, abundance, and timing of spawning fish.

The following relationships for the mainstem stock will be examined:

1. total escapement as a function of survey counts of escapement;
2. total run as a function of total spawning escapements;
3. total run as a function of the return of age-4 sockeye salmon in the previous year; and
4. relation of total run to patterns of distribution and timing.

The following data for the Tuya sockeye stock will be collected and exchanged for use in evaluating adult returns:

1. escapement estimate, generated from stock ID, CPUE, and inriver run estimates;
2. number of planted fry and age and size composition of smolt emigration; and
3. stock specific catches in the various fisheries.

The following relationships for the Tuya stock will be examined:

1. adult production as a function of the number of fry planted;
2. total run as a function of the return of age-4 sockeye salmon in the previous year.

Methodology for evaluating escapement goals is being developed by the TTC and will be used in reviewing escapement goals.

Harvest Sharing Objectives

The Pacific Salmon Commission negotiated long-term Pacific salmon harvest sharing agreements in June 1999. Stock assessment and harvest arrangements for Stikine sockeye stocks are found in Annex IV, Chapter 1, of the Pacific Salmon Treaty and in three associated joint enhancement Understandings dated February 1988 and February 1989, the third being developed in 1999. Harvest sharing in 2000 for Stikine sockeye salmon is similar to recent years.

Management plans for the 2000 Stikine harvest are for the TAC of Stikine sockeye salmon, both natural and planted, to be shared 50/50 between the Parties in the usual fisheries. However, if the usual fisheries do not manage to catch the entire TAC, terminal catches in Canada taken under "Excess Salmon to Spawning Requirement" (ESSR) licenses will be allowed to avoid over escapement (relative to escapement goal ranges).

Management Procedures

United States

The District 106 drift gillnet fishery occurs in the waters of northern Clarence Strait and Sumner Strait, in regulatory Sections 6-A, 6-B and 6-C, and portions of Section 6-D (Figure 1). The District 108 fishery encompasses the waters surrounding the terminus of the Stikine River (Figure 1). Due to their close proximity, management of these fisheries is interrelated, resulting in some major stocks being subject to harvest by both fisheries. Two distinct management areas exist within each district: the Frederick Sound (Section 8-A) and Wrangell (Section 8-B) portions of District 108, and the Sumner Strait (Subdistricts 106-41/42) and Clarence Strait (Subdistrict 106-30) portions of District 106. Fishing gear used in Districts 106 and 108 is similar, with common sockeye net sizes of between 5 and 5 ½ inches (130-140 mm) stretched mesh, 60 meshes deep and 300 fathoms (549 m) long. The sockeye salmon fishery in both districts will be managed in accordance with recent transboundary Pacific Salmon Treaty (PST) annex provisions.

The fishing season will start at noon on Sunday, June 18 (statistical week 26) for a 48-hour open period in both Districts 106 and 108. District 108 will open at the same time as District 106 rather than open during the second week of June, as occurred during the 1995-1997 period.

Management actions during the sockeye fishing season will be based on analysis of commercial gillnet CPUE and stock identification data to determine the availability of Stikine fish. These stock abundance indicators, along with fishery performance and stock composition data obtained from Canadian commercial, test, and subsistence fisheries will be incorporated into the Stikine Management Model. As the season progresses, this model will be the primary tool used to estimate the availability of sockeye salmon for harvest by the U.S. fishery in District 108.

Management actions to reduce the harvest of Stikine sockeye salmon are expected in 2000 because of the below average forecast of Tahltan Lake sockeye. If inseason forecasts of run strength indicate that conservation actions are needed, the following measures could implemented: no mid-week openings, no extensions to the early week openings, restrictions in fishing time in District 108 or closure of all or part of District 108. Given past overestimates of Stikine sockeye run strength generated by the SMM a very conservative management approach will be taken in 2000. It is anticipated that no mid-week openings in District 108 or extensions of either Districts 106 or 108 will occur during the first three weeks of the fishery regardless of the SMM TAC. The week 28 (third week) "River" Tahltan forecast may be used for the final projected run size for the season TAC if the "District", "River" and pre-season forecasts are similar in their run size estimates. If the "River" forecasted run size is appreciably different than the "District" forecast the Alaskan mangers will consult with the Canadian managers to determine: 1) if the SMM is again forecasting a larger than reasonable run size, and 2) the most reasonable course of action, if any, that will ensure adequate escapement to Tahltan Lake while allowing commercial harvests. If the sockeye runs to local Alaskan island systems are determined to be weak, area and time restrictions may be necessary in District 106. Should the Tahltan sockeye run appear to be stronger than projected, then fishery extensions and/or mid-week openings will be allowed as necessary to harvest surplus sockeye salmon while meeting the provisions of the PST Transboundary annex. Any additional openings or extensions will be based upon the most recent Stikine sockeye model update and the cumulative estimated U.S. harvest. Open areas and fishing time during mid-week openings may not necessarily be the same as the general weekly openings if adjustments are needed to reduce chinook salmon or other species catches.

Announcements for fishery openings throughout Southeast Alaska are made on Thursday afternoons for gillnet fisheries, which begin the following Sunday. Announcements for any mid-week openings will be

made on the fishing grounds by 10:00 a.m. of the last day of the regular fishery opening in order to adjust the mid-week period to best follow the most current catch data.

The area adjacent to the Stikine River mouth of the sockeye season will be closed through early July to reduce the incidental harvest of Stikine chinook salmon. Due to the late opening of the gillnet season on June 18, the expected reduced fishing times in District 108 and the expected average run of upper Stikine chinook salmon, the area restrictions during initial openings, implemented during the 1995-1997 period, will not be necessary. If fishing effort and the incidental harvest of chinook salmon is high during the first opening then additional area restrictions will again be implemented. To avoid harvesting chinook salmon, the Stikine flats will not open until the first Sunday in July.

Pink salmon should begin entering District 106 in significant numbers by the third or fourth week of July. The early portion of the pink salmon fishery will be managed primarily on CPUE. By mid-August, pink salmon destined for local systems will begin to enter the fishery in greater numbers and at that time, management will be based on observed local escapements. In District 108, chum salmon runs into Frederick Sound are a management consideration beginning the end of June. Chum salmon run strength assessments are based upon CPUE in test and commercial fishery catches.

A personal use fishery in U.S. portions of the Stikine River will be open in 2000, as in recent years. Fishing will be allowed in the main channel of the river between the ADF&G cabin at Kakwan Point upstream to the Canadian border. The fishery is structured to allow the harvest of Tahltan sockeye salmon while limiting the harvest of other sockeye stocks and species. The fishery will be open only from July 1 to July 15, with a limit of 25 sockeye salmon per permit. This fishing period coincides with the peak of the Tahltan sockeye run in the lower river. Gillnet gear restrictions will include a maximum 5 ½ inch stretched mesh size and 15 fathom net length.

A subsistence drift gillnet fishery, targeting sockeye salmon and encompassing the waters of Sumner Strait near Point Baker, will again be allowed in 2000. The fishery is permitted in the waters of Sumner Strait within three nautical miles of the Prince of Wales shoreline north of "Hole-in-the-Wall" at 56o15'42" N. Lat. and west of the longitude of the western entrance to Buster Bay at 133o29; W. Long. The fishery is restricted to Alaska residents only and will be open each week from Thursday through Saturday during the period June 15 through July 31, with a limit of 25 fish (of any salmon species) per family per year. Gillnet gear restrictions include a maximum net length of 50 fathoms. It is anticipated that approximately 500 sockeye salmon will be harvested in this fishery.

Canada

The Canadian lower Stikine River commercial fishery (Figure 1) will be managed on a weekly basis with management actions driven by results of stock, catch, and escapement projections derived from the Stikine Management Model. Weekly inputs to the model will include: effort data and stock specific catch from Alaska Districts 106 and 108; catch, effort and inseason stock composition data from the Canadian lower Stikine commercial and test fishery; and escapement requirements.

The lower river commercial fishery will open June 25 (statistical week 27) for an initial period of 48 hours. This opening is one week later than normal due to the below average sockeye forecast and uncertainty regarding the chinook run. Consideration for Tahltan sockeye stock management objectives should persist from the fishery opening, 12:00 noon June 25, to the end of July. Thereafter, management attention will be focused primarily on mainstem stock objectives. Actual time frames of responses to specific stock compositions will be fine-tuned inseason according to the weekly results of the stock identification program.

The achievement of escapement objectives is the foremost priority in management considerations. Inriver allocation priority will be to fulfill the requirements of the traditional aboriginal fishery. The commercial fisheries, therefore, will be managed to accommodate these fundamental priorities. The area of most intense management will be within the lower Stikine commercial fishery.

Fishing time in the lower Stikine fishery will depend upon stock assessment and international and domestic catch allocation considerations. Fishing periods will be adjusted accordingly. As in recent previous years, the use of two gillnets, of which only one may be a drift gillnet, will be permitted from the start of the fishing period each week. The maximum allowable net length will remain at 135 meters and there will be a maximum mesh size restriction of 150 mm through noon July 16 to conserve chinook salmon. Fishing boundaries will remain unchanged from those established in 1997, i.e., from the international border upstream to boundary markers located near the Stikine-Flood River confluence, and in the Iskut River to a marker located approximately 2 km upstream from the mouth. In 1997 the upstream fishery boundary in the Stikine River was moved approximately 25 km upstream to increase the available fishery area over previous years. Prior to 1997 the boundary was located near the Stikine-Porcupine confluence.

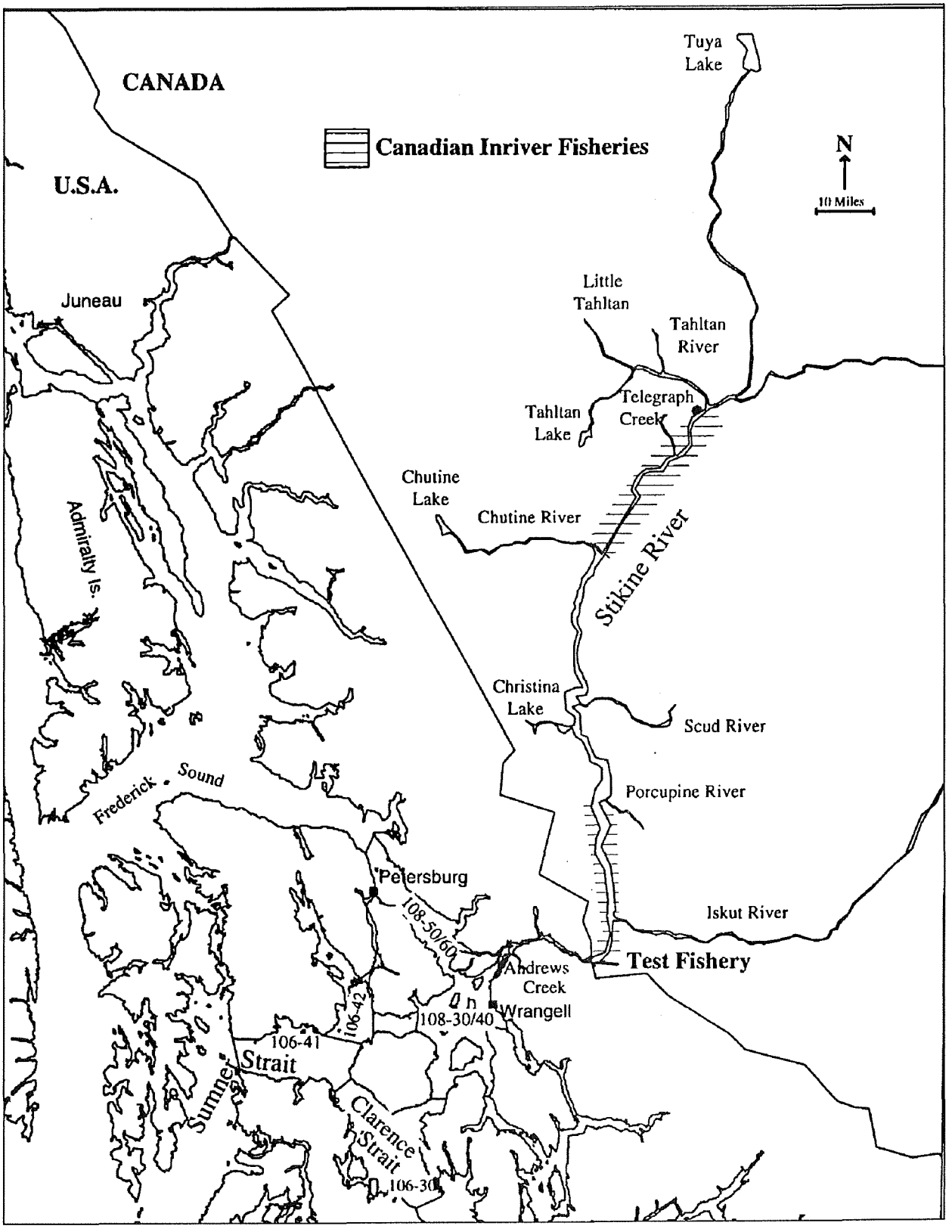

Figure 1. The Stikine River and principal U.S. and Canadian fishing areas.

In the upper Stikine commercial fishery, the fishery will open for the season at noon June 25 for 48 hours. Thereafter, weekly fishing times will generally follow those of the lower river lagged by one week. As in past years, weekly fishing times in the aboriginal fishery will not normally be restricted. Subject to conservation requirements, terminal catches in the lower Tuya River and/or at Tahltan Lake may occur under the ESSR license.

Restrictive management responses that could be used to reduce the sockeye harvest in the lower Stikine commercial fishery, in order of implementation, include: reducing fishing time, the major tool used in the regulation of the fishery; and, reducing the fishing area by relocating boundaries to protect isolated spawning populations. In the aboriginal fishery, reductions in fishing time would be considered only if no other adjustments could be made in the lower and upper river commercial fisheries.

In the event that a more liberal management regime is justified, extensions to fishing time in the commercial fisheries would be granted, dependent on stock specific escapement and catch considerations.

Summary

Attainment of escapement goals for both the Tahltan and mainstem stocks is the primary objective of Stikine sockeye management. Harvest sharing will be based upon the TAC projections derived from the Stikine Management Model. The TAC estimates will likely change from week to week as the model forecasts a new total run size from the cumulative CPUE each week. Variations in the TAC estimate will likely be larger early in the season, when CPUE is high, than later in the season. Management actions will reflect these week-to-week changes in the TAC estimates. Fishery managers from both countries will keep in weekly contact in order to evaluate the output from the Stikine Management Model and the outcome of their respective management actions.

Inseason Data Exchange and Review

Canada and the U.S. will conduct data exchanges by telephone on Wednesday afternoon or Thursday morning of each week during the fishing season. At that time, current catch statistics and stock assessment data will be updated, exchanged, and reviewed. Management plans for the next week for each country will be discussed at this time. It is anticipated that additional communications will be required each week. Weekly decision deadlines will be: a) for Districts 106 and 108, 11:00 a.m., Thursday, Alaska Daylight Time; and, b) for the Canadian Stikine fishery, 10:00 a.m., Friday, Pacific Daylight Time. A final weekly summary of the fisheries will be conducted Friday afternoon through a conference call between management offices of DFO and ADF&G.

DFO field personnel will provide weekly otolith samples from the lower Stikine commercial and test fisheries for pick-up by ADF&G on Wednesday (earlier if possible) each week for processing and analysis in Juneau.

Stock Assessment Program

This section summarizes agreements regarding the data which will be collected by each National Section and, when appropriate, procedures that will be used for analysis.

Catch Statistics

The U.S. shall report catches and effort in the following strata for each statistical week:

1. Subdistricts 106-41&42 (Sumner Strait);
2. Subdistrict 106-30 (Clarence Strait); and
3. District 108; and
4. any test fish catches in District 108.

Canada shall report catch and effort statistics in the following strata for each statistical week:

1. the lower river commercial fishery (all areas);
2. the lower river commercial fishery located near Flood Glacier;
3. the upper river commercial fishery;
4. the aboriginal fishery;
5. the lower Stikine River test fishery conducted near the international border; and
6. ESSR fishery catches will be reported as data become available.

Age Composition of Sockeye in Catches

Scales will be collected and used to age fish. Associated fish length and sex composition data will also be collected. The U.S. shall provide scale samples from Subdistricts 106-41&42, Subdistrict 106-30 and District 108 for each fishing week. Canada shall provide scale samples, matched with length and egg diameter data, collected from the lower river commercial and test fisheries each week. Scale samples may be collected from the upper river commercial and aboriginal fisheries; if not, samples collected at the Tahltan Lake weir will be used to characterize the age composition of catches of sockeye salmon in the upper river. Scale impressions will be available to ADF&G.

Stock Composition of U.S. Catches

During the season, otolith samples are taken from the catches in District 106-41/42, District 106-30, and District 108 and processed inseason to determine the contribution of planted Tahltan and Tuya sockeye salmon. The contributions of wild Tahltan and mainstem sockeye stocks in marine catches will be made by assuming the same ratio of planted Tuya to wild Tahltan and mainstem fish as in the inriver fisheries in the following week; for the current week the same weeks inriver estimates will be used.

After the fishing season, SPA will be used to recalculate actual contributions of Tahltan and mainstem sockeye stocks to the catches made each week in each subsection of District 106 (Clarence Strait and Sumner Strait), and District 108. Scales will be collected inseason and the desired sample size from each of these strata is 600 fish per week. It is recognized that small catches in District 108 may preclude temporal stratification at the desired level. A test fishery may be conducted in District 108 to assess run strength and stock composition if the commercial fishery is not open. If test fisheries occur, samples will be collected for stock assessment.

To evaluate the contribution of planted sockeye salmon to U.S. gillnet catches, 400 otolith samples will be collected per week in District 108, and 300 otolith samples will be collected from each sub-area in District 106 for inseason analyses. Besides indicating the relative strength of the planted Stikine stocks, results from the otolith sampling will also serve as a check on the validity of the stock composition estimates used to apportion catches in District 106 and 108 in the SMM. One hundred of the weekly

otolith samples from District 106-41 will be matched with scale data for postseason assessment of stock composition accuracies.

Stock Composition of the Inriver Canadian Catch

Egg diameter data will be used inseason to estimate the combined Tahltan and Tuya component versus the mainstem contribution to the lower river sockeye catches during the fishing season. Tahltan fish generally have smaller diameter eggs compared to mainstem fish. The Tuya component will be determined from the analysis of otolith samples collected each week. Weekly sampling targets are 150 matched egg diameter, scale, and otolith samples and 50 otolith samples matched with scales from male fish. ADF&G will analyze the thermal marks from a subsample of at least 60 fish each week. Arrangements will be made to ensure timely transfer of samples and notification of results for use in management decisions no later than the week following when the samples are collected. As stated above, weekly pickup times for the otolith samples from the river will be on Wednesday unless otherwise agreed.

This will also be the data used postseasonally in conjunction with results from additional thermal mark analyses to estimate wild Tahltan and mainstem and the planted Tahltan and Tuya contributions. A total of 350 sockeye salmon will be randomly sampled each week for scales, size and sex. It is necessary to match the scale and egg data by fish to develop postseason stock-specific age-composition estimates, and for the development of postseason scale pattern standards.

Stock Composition and Run Timing in the Canadian Test Fishery

The proportions of Tahltan/Tuya and mainstem sockeye salmon in test fishery catches in the lower Stikine River will be estimated inseason in a similar manner to the commercial fishery. All test fishery catches of sockeye salmon will be sampled for scales and otoliths, and all females for egg diameter (all data to be matched). The test fishery otolith samples will be transferred to ADF&G, as per the arrangements made for the commercial samples, for inseason analysis. Additional sampling requirements will include the collection of spaghetti tags applied in the mark-recapture program, heads from any fish exhibiting adipose clips, and observation and recording of spaghetti tagged sockeye salmon.

The postseason, sockeye stock composition estimates will be based on egg diameter data and associated thermal mark analyses. As per the commercial fishery, the planted portion of the catch will be determined postseasonally from otolith sample.

Spawning Escapement Estimates

An adult enumeration weir will be used to estimate the Tahltan sockeye escapement. The age composition will be estimated from scale samples and contributions of planted sockeye salmon will be determined from otolith samples. Approximately 800 fish will be sampled during the season for scales, length, and sex; 400 otolith samples will be taken at the weir and an additional 400 otolith samples from the spawning grounds. The mainstem escapement will be estimated postseasonally using migratory timing information obtained from CPUE and stock ID data from the commercial and/or test fishery, combined with weekly stock compositions estimated from the commercial and/or test fishery catches. The Tuya escapement will be estimated postseasonally in a similar way.

Postseason SPA Standards

Scale pattern standards for Tahltan and mainstem sockeye stocks will be made from scale samples collected inriver. For the Tahltan stock, samples will be taken from both male and female sockeye salmon at the Tahltan Lake weir, and from female sockeye salmon caught in the lower river fisheries having small-diameter eggs and no thermal marks. For the mainstem stock, samples will be taken from female sockeye salmon caught in the lower river fisheries having large-diameter eggs. Standards for classifying marine catches will therefore be developed from scale samples collected from the Tahltan Lake weir and from both the commercial and test fishery catches in Canada.

Since the weekly proportion of Tahltan to mainstem sockeye salmon in the commercial or test fishery is used postseasonally to determine both the proportion of these two stocks in the entire run, and, the mainstem escapement, it is important to get the best estimate possible. It is agreed that egg diameters from both the commercial and test fishery sampled fish will be used to determine stock proportions in the test fishery catches for both inseason and postseason analyses.

Data Evaluation Procedures

Historical Database

Although Canadian commercial fishing began in the Stikine River in 1975, the methodology for estimating sockeye run sizes was not well standardized until 1982. Therefore, estimates of run size after this time are considered to be better than those made prior to 1982. The historical database from 1985 to 1999, used as input to the Stikine Management Model for 2000, is presented in Tables 1 to 4. The 2000 run size estimated by the model at the end of the fishing season will be updated in the fall of 2000 using postseason stock composition data for use in the database in future years.

Stikine Management Model

A model based on the linear relationship between CPUE and run size has been constructed and updated to make weekly inseason predictions of the total run and the TAC during the 2000 season. A description of the original model is given in the Transboundary Technical Committee Report: **TCTR (88)-2, Salmon Management Plan for the Transboundary Rivers, 1988**. Many subtle changes have been made in the model since that documentation was written and a new documentation is in progress. The purpose of the model is to aid managers in making weekly harvest decisions to meet U.S./Canada treaty obligations for harvest sharing and conservation of Stikine sockeye salmon.

The model for 2000 is based on CPUE data from 1985 to 1999 from District 106 and the Canadian commercial fishery in the lower river and from 1986 to 1999 from the lower Stikine test fishery. Linear regression is used to predict run size from cumulative CPUE for each week of the fisheries beginning in week 26 for all three fisheries. As in 1999, the intercept will be forced to be zero in order to correct for a tendency to overestimate the run size in the earlier weeks during years of low abundance. New for the model in 2000 is a refinement to the lower Stikine commercial CPUE which excludes catch and effort data from the Flood Glacier area, i.e. the new area introduced in 1997. In addition, the annual weekly CPUE values were increased by a factor of 1/0.75 for years prior to 1994 to account for the extra gear allowed starting in that year. This makes the historical CPUE data more comparable with the post-1993 era. These modifications helped to correct the model for 1999, which overestimated the run significantly.

The parameters from the linear regressions are presented in Table 5. In the past, three sets of CPUE data have been used to predict the total run. These include:

1. The District 106 cumulative CPUE of Stikine sockeye stocks is used to predict the total run of Stikine sockeye salmon.

2. The cumulative CPUE from the Canadian lower river commercial fishery is used to predict the inriver Stikine sockeye run. Starting with this year's analysis, the CPUE from 1994 on, when additional nets were introduced into the fishery, is reduced to 75% of the actual CPUE. The total run is then determined as the inriver run plus the estimated total season catch of Stikine sockeye salmon in District 108 (the minimum of 1) cumulative catch proportioned out to end of season using average run timing or 2) the TAC minus the assumed 106 catch of 10% of the run) and 106 (assumed to be 10% of the run). District catches will be determined from inseason model estimates of weekly Stikine catches for past weeks and using average migratory timing to determine catch for the remainder of the season.

3. Starting in 1995, the cumulative CPUE from the Canadian test fishery has been used to predict the inriver Stikine sockeye run. The inriver run estimate was expanded as per item 2 above to project total run size.

The 2000 inseason forecasts of abundance and TAC will be based on the following datasets:

1. Forecasts for weeks 26 through week 27 will be based on the preseason forecast;
2. The forecast for week 28 will be based on the SMM with inputs from the week 27 inriver test fishery;
3. The forecasts for weeks 29 through 30 will be based on the SMM with inputs from the inriver commercial fishery in the lower Stikine;
4. The forecasts after week 30, will be based on the week 30 forecast derived from the inriver commercial fishery in the lower Stikine. The SMM will continue to be updated after week 29, however run forecasts will not be used for management unless both Parties agree;
5. In the event that the commercial fishery is closed for a given week after week 28, the CPUE data from the lower Stikine test fishery will be used;
6. Historical timing data will be used in the projections weekly guideline harvests in each country. Because of the earlier than normal dates in each statistical week in 2000, consideration will be given to also using the historical timing data for week "x-1" in week "x" projections. For example, the average start date for week 26 is June 22; in 2000 it is June 18. Timing data for week 26 in 2000 might best be compared with historical timing data from week 25.

The reason for excluding forecast from District 106 data is that weekly regressions of CPUE on run size using the inriver data usually have higher coefficients of correlation compared to those based on the District 106 (Table 5). Predictions from the District 106 data will continue to be made to verify inseason estimates and provide postseason comparisons. For week 28, the inputs for the forecast will be based on the test fishery data which has a higher coefficient of correlation for Tahltan stocks for this week than the commercial CPUE.

Separate projections of run size will be made for the total Stikine sockeye run (wild plus planted), Tahltan stock (wild plus planted), the planted Tuya stock, and the mainstem stock. This information will be used inseason to help management and, postseasonally, to help evaluate the performance of the model.

The part of the model which determines total and weekly TAC levels for the U.S. and Canadian fisheries has been formulated in EXCEL 5.0 for use by managers inseason. This part of the model uses the coefficients from the linear regression model, the established escapement goals, and PST provisions of harvest sharing to determine the total TAC for each country. Estimates of weekly TAC and effort are provided as guidelines for the managers and are derived from the 1985- 1999 average run timing of the stocks and the corresponding average CPUE levels of each fishery.

Inseason Use

For 2000, the model predictions will set the TAC levels; however, managers may use additional information on which to make decisions on the openings of their respective fisheries. They will evaluate the output of the model and look for discrepancies with other information they may have on run strength. The information and evaluation will be used to improve the model for the next year.

Postseason Evaluation

After the fishing season is over, the Transboundary Technical Committee will evaluate how well the model performed in predicting the entire run, where discrepancies occurred, and what might have caused them. The committee will also determine whether escapement goals were met according to the Spawning Escapement Goals section of this report. This information is presented in the annual catch and escapement reports prepared by the committee. For 1999, the preliminary evaluation may be found in: Preliminary Estimates of Transboundary River Salmon Production, Harvest, and Escapement and a Review of Joint Enhancement Activities, 1999, Transboundary Technical Committee, February, 2000 . The summarized output of the Stikine Management Model during the 1999-fishing season is presented in Table 6.

Coho Salmon

Preseason Forecast

A qualitative prediction of the 2000 run of coho salmon is that it will be slightly above average in magnitude. This outlook is based on the test fishery CPUE, or extrapolated Stikine test fishery CPUE, of coho salmon in the two principal brood years, 1996 and 1997. Based on a comparison of test fishery CPUE for coho salmon versus CPUE for sockeye salmon, the latter which is well correlated with the inriver sockeye run size, the coho escapement was judged to be well above average in 1996 but significantly below average in 1997. Aerial surveys of several index coho spawning sites followed suit with the test fish estimates, in that the 1996 and 1997 counts were above and below average, respectively. The escapement in 1996 was estimated to have been above the interim escapement goal range of 30,000 to 50,000 coho salmon, whereas, in 1997, it did not appear the escapement goal range was achieved.

Escapement Goal

The interim escapement goal range for Stikine coho salmon is 30,000 to 50,000 fish.

Harvest Sharing Objectives

The United States' management intent is to ensure that sufficient coho salmon enter the Canadian section of the Stikine River to meet the agreed spawning objective, plus an annual Canadian catch of 4,000 coho salmon in a directed coho salmon fishery [PST, Transboundary Rivers, Annex IV, 3.(a)(2)].

Stock Assessment Program

Each country shall:

1. report catch statistics for the same strata as sockeye salmon are reported;
2. sample its fisheries for appropriate tags, e.g., spaghetti and/or coded-wire tags; and
3. conduct escapement programs as resources permit.

Management Procedures

United States

The coho salmon season will occur during late August and early September. Limited directed fishing in terminal areas is anticipated in District 108. Management of the District 106 fishery will be based predominantly on wild stock CPUE. Substantial contributions from several Alaskan hatcheries and from the remote release site at Neck Lake in upper Clarence Strait are expected to contribute coho salmon in the District 106 and 108 fisheries. Inseason estimates from coded wire tag recovery data will be used to identify the hatchery component of the catch. Only the catch of wild coho will be used for fishery performance evaluation.

If there is a conservation concern, the District 108 fishery will be restricted.

Canada

If there is a conservation concern, the Canadian fishery will be restricted.

Chinook Salmon

Preseason Forecast

The Little Tahltan chinook weir count in 1994, the primary contributing brood year for the 2000 run, was 6,373 large chinook salmon (13% above the 1990-1999 average of 5,637 chinook) but above the biologically-based escapement goal range suggested in recent analysis. The escapement in 1995, which should also contribute significantly to this year's run, was below average, at 3,072 chinook salmon but within the escapement goal range. On average, age-6 chinook salmon account for 72% of the age composition of Little Tahltan chinook stock whereas, age-5 fish comprise 20%. The primary-parent year escapements in 1994 and 1995 suggest that the 2000 chinook run to the Stikine River will be average.

Escapement Goal

Little Tahltan: 2,700 to 5,300; point 3,300;
Stikine total: 14,000 to 28,000; point 17,400.

Prior to 1999, the interim index (Little Tahltan, approx. 19% of total Stikine) escapement goal was 5,300 chinook salmon (excluding jack chinook salmon) through the Little Tahltan River weir. A new goal of 3,500 chinook salmon for the index systems was proposed in a joint paper (Bernard, McPherson, Pahlke, & Etherton. 1999 draft). Optimum production of chinook salmon from the Stikine River) and was tentatively accepted by the TTC at their April 1999 meeting in Juneau.

PSARC (Canadian) review did not recommend accepting the new goal range, but instead recommended developing an escapement floor and a target exploitation rate of 30%, in order to get a wider range of returns per spawner for subsequent analyses. However, at the current time we have no way of managing for exploitation rates, but hope that the CWT program initiated in 2000 can be developed so that we may begin to estimate ocean harvest.

ADF&G (U.S.) review recommended going with the paper's escapement goal range, although some minor errors in the data used were pointed out to the authors.

In response to the above reviews, the TTC accepted an escapement floor of 4,000 chinook salmon for Little Tahltan or 20,000 for the total Stikine system for 1999. These escapement floors were near the midpoint of the ranges recommended by the Bernard et al. paper.

Later in 1999, the Joint Chinook Technical Committee of the PSC re-examined the Stikine escapement goal. Results of the analysis appear in: **Pacific Salmon Commission Joint Chinook Technical Committee Report TCCHINOOK (99)-3. 1999.** *Maximum sustained yield or biologically-based escapement goals for selected chinook salmon stock used by the Pacific Salmon Commission's Chinook Technical Committee for escapement assessment.* The goal recommended in this report is 14,000 to 28,000 total Stikine River (above border) chinook salmon which was adopted by the Transboundary Technical Committee (TTC) in 2000. The point estimate of escapement that produces MSY is approximately 17,400 chinook salmon. Based on mark-recapture data, the overall escapement goal range translates into a Little Tahltan River escapement goal of 2,700 to 5,300 large chinook salmon with a point target of 3,300 fish. Since 1985, when the weir was first installed, the escapement has not fallen below the lower end of this range. The escapement has however, exceeded the upper end of the range in five years (1988, 1992, 1993, 1994, 1997).

Harvest Sharing Objectives

Both parties are to take appropriate management actions to ensure that the escapement goal range for chinook salmon bound for the Canadian portions of the Stikine River is achieved in 2000. Given the past success in achieving the escapement goal range, no changes in management procedures are required. The Parties have agreed not to initiate any new directed fisheries until an appropriate abundance-based management regime is develop and implemented. The target date for this is 2004.

Management Procedures

United States

Initial openings in District 108 will not include the Stikine River flats in order to minimize the interception of adult chinook salmon. Chinook catches will also be a management concern in District 106 throughout the season and, if large numbers of small feeder chinook salmon are caught, night closures may be instituted.

Troll fishery regulations for the 2000 experimental chinook fisheries in Frederick Sound and Chatham Strait, and Stikine and Clarence Straits are similar to those used in 1999. A new experimental fishery has been established in lower Sumner Strait in District 105 north of a line from Ruins Pt. to Pt St. Albans and will be open beginning May 1. The Frederick Sound Experimental fishery will be open on April 17 approximately 2 weeks earlier than in 1999. During the period April 17 to June 29, the experimental fishery in the District 110 portion of Frederick Sound will encompass the waters of District 110 south and east of a line extending from near Turnabout Island to Hobart Bay, and north and west of a line from Boulder Pt. (east entrance to Portage Bay) to Point Highland (north of Farragut Bay). For the remainder of the experimental openings the District 110 area will be expanded southward to the southern boundary of District 110. The District 109 experimental areas along the Kuiu Is. shoreline at Tebenkof Bay and the area around Kingsmill Pt to Pt. Macartney and along the southern Admiralty Is. shoreline east of Pt. Gardner are also in effect in 2000 from May 1 to June 29. A new experimental fishery was established in the waters of Tebenkof Bay in Lower Chatham Strait. A new experimental area was also established in District 107 that expands the Earl West Cove area west to the longitude of Babbler Pt. The District 107 area will be open beginning May 15.

The general summer troll chinook salmon fishery is still being formulated and the details are not available at this time.

Extensive changes in sport fishing regulations will be implemented in 2000. These include reduced seasonal bag limits for charter operators and non-residents, periods of non-retention and area closures.

Canada

Chinook salmon will be harvested in the commercial fisheries incidentally during the early sockeye fishery. Mesh size restrictions (maximum 150 mm) will be in effect through noon July 16 to conserve chinook salmon.

Stock Assessment Program

Each country shall:

1. report catch statistics for the same strata as sockeye salmon are reported;
2. sample its fisheries for coded-wire tags; and
3. conduct escapement programs as resources permit.

A CWT program on wild chinook fry/smolt will be developed and funds sought in order to develop a program to estimate marine harvest on Stikine chinook salmon.

Table 1. Stikine sockeye run sizes, 1985 to 1999.

Year	Inriver Run Size	Inriver Catch	Escapement	Marine Catch	Total Run Size
Total Stikine Sockeye Stocks					
1979	40,353	13,534	26,819	8,299	48,652
1980	62,743	20,919	41,824	23,206	85,949
1981	138,879	27,017	111,862	27,538	166,417
1982	68,761	20,540	48,221	42,746	111,507
1983	71,683	21,120	50,563	5,781	77,465
1984	76,211	5,327	70,884	7,803	84,014
1985	184,747	26,804	157,943	29,747	214,494
1986	69,036	17,846	51,190	6,420	75,456
1987	39,264	11,283	27,981	4,085	43,350
1988	41,915	16,538	25,377	3,181	45,096
1989	75,054	21,639	53,415	15,492	90,546
1990	57,386	19,964	37,422	9,856	67,242
1991	120,152	25,138	95,014	34,199	154,351
1992	154,542	29,242	125,300	77,394	231,936
1993	176,100	52,698	123,402	104,630	280,730
1994	127,527	53,380	74,147	80,509	208,036
1995	142,308	66,777	75,531	76,420	218,728
1996	184,400	90,148	94,252	188,385	372,785
1997	125,657	68,197	57,460	101,258	226,915
1998	90,459	50,486	39,973	30,989	121,448
1999	67,316	47,202	20,114	51,822	119,138
Tahltan sockeye run size					
1979	17,472	7,261	10,211	5,076	22,548
1980	19,137	8,119	11,018	11,239	30,376
1981	65,968	15,178	50,790	16,189	82,157
1982	42,493	14,236	28,257	20,822	63,316
1983	32,684	11,428	21,256	5,071	37,755
1984	37,571	4,794	32,777	3,086	40,657
1985	86,008	18,682	67,326	25,197	111,205
1986	31,015	10,735	20,280	2,757	33,771
1987	11,923	4,965	6,958	2,259	14,182
1988	7,222	4,686	2,536	2,129	9,351
1989	14,110	5,794	8,316	1,561	15,671
1990	23,923	8,996	14,927	2,307	26,230
1991	67,394	17,259	50,135	23,511	90,905
1992	76,681	16,774	59,907	28,218	104,899
1993	84,068	32,458	51,610	40,036	124,104
1994	77,239	37,728	39,511	65,101	142,340
1995	82,290	50,713	31,577	51,665	133,955
1996	95,706	57,545	38,161	147,435	243,141
1997	37,319	25,214	12,105	43,408	80,727
1998	27,941	15,673	12,268	7,086	35,027
1999	34,360	24,041	10,319	25,091	59,451
Tuya sockeye run size					
1995	2,216	1,112	1,104	586	2,802
1996	19,158	8,919	10,239	19,442	38,600
1997	28,738	20,819	7,919	37,520	66,258
1998	31,442	22,911	8,531	15,941	47,383
1999	19,098	15,687	3,411	16,263	35,361
Mainstem sockeye run size					
1979	22,880	6,273	16,608	3,223	26,103
1980	43,606	12,800	30,806	11,967	55,573
1981	72,911	11,839	61,072	11,349	84,260
1982	26,267	6,304	19,964	21,924	48,191
1983	38,999	9,692	29,307	710	39,709
1984	38,640	533	38,107	4,717	43,357
1985	98,739	8,122	90,617	4,550	103,289
1986	38,022	7,111	30,910	3,663	41,685
1987	27,342	6,318	21,023	1,826	29,168
1988	34,693	11,852	22,841	1,052	35,745
1989	60,944	15,845	45,099	13,931	74,875
1990	33,464	10,968	22,495	7,549	41,013
1991	52,758	7,879	44,879	10,687	63,446
1992	77,861	12,468	65,393	49,176	127,037
1993	92,033	20,240	71,792	64,594	156,627
1994	50,288	15,652	34,636	15,408	65,696
1995	57,802	14,953	42,850	24,169	81,971
1996	69,536	23,684	45,852	21,508	91,044
1997	59,600	22,164	37,436	20,330	79,930
1998	31,077	11,902	19,175	7,962	39,039
1999	13,858	7,473	6,384	10,468	24,326

[a] Escapement includes fish later captured for broodstock.

Table 2. CPUE for all sockeye salmon and the proportion of Tahltan, Tuya, and Mainstem stocks in the catch from the Canadian lower river commercial fishery, 1985-1999. For periods when the fishery was closed, values were filled in with averaging and interpolation techniques (these values italicized and underlined in the table).

Week	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Inriver Commercial Fishery CPUE on all sockeye salmon:															
25	*5.1*	*2.7*	*1.8*	*2.5*	*3.2*	*3.0*	*3.4*	*4.9*	*5.1*	*3.5*	*3.4*	*5.0*	3.3	5.3	*3.5*
26	90.1	3.7	*21.9*	*29.9*	34.0	17.3	19.8	*58.5*	*61.2*	*42.4*	79.9	119.2	57.8	89.8	0.5
27	*156.1*	25.1	15.9	29.0	64.2	66.1	160.4	148.1	217.7	45.2	123.2	312.2	150.1	148.3	55.1
28	*133.5*	106.4	14.1	47.3	30.8	104.8	161.3	206.7	247.1	164.6	126.0	224.4	130.0	182.7	150.6
29	346.7	77.4	77.2	92.3	140.6	147.0	152.5	192.0	180.5	147.6	120.1	142.2	90.7	154.7	219.2
30	197.2	112.9	90.3	95.8	187.8	108.5	71.7	221.4	157.7	145.5	106.5	142.6	131.5	148.0	187.9
31	139.6	109.2	36.8	82.5	98.5	82.9	111.7	117.8	95.5	111.0	86.0	74.9	128.7	86.3	72.7
32	98.2	74.1	102.2	119.0	81.0	72.5	42.1	122.1	111.6	81.8	51.3	54.1	90.5	68.0	61.5
33	78.1	45.4	43.1	44.3	37.9	21.5	20.9	57.6	41.5	42.4	26.3	29.4	21.7	28.9	4.6
34	24.2	34.6	22.0	30.8	21.8	16.5	1.3	16.7	52.4	32.5	19.1	7.7	25.9	23.1	27.7
35	13.7	12.5	7.2	14.7	8.2	17.5	5.6	6.0	15.3	10.3	11.7	2.3	12.6	6.1	0.0
Tahltan as a proportion of the sockeye catch															
25													0.833	0.182	
26	0.890	0.730			0.650	0.730	0.800				0.970	0.808	0.632	0.337	0.720
27		0.770	0.740	0.770	0.490	0.800	0.830	0.870	0.793	0.944	0.921	0.731	0.544	0.382	0.552
28	0.900	0.830	0.880	0.690	0.380	0.690	0.860	0.780	0.831	0.881	0.814	0.555	0.346	0.386	0.566
29	0.790	0.730	0.660	0.421	0.210	0.350	0.750	0.550	0.677	0.793	0.665	0.429	0.321	0.452	0.604
30	0.420	0.520	0.240	0.270	0.030	0.250	0.370	0.240	0.464	0.631	0.440	0.256	0.183	0.304	0.563
31	0.290	0.190	0.110	0.100	0.020	0.060	0.120	0.260	0.342	0.426	0.261	0.201	0.180	0.158	0.392
32	0.200	0.090	0.050	0.040	0.020	0.030	0.080	0.090	0.149	0.253	0.157	0.125	0.163	0.073	0.194
33	0.200	0.020	0.040	0.070	0.020	0.030	0.000	0.020	0.073	0.126	0.134	0.102	0.121	0.077	0.088
34	0.000	0.010	0.070	0.090	0.020	0.030	0.000	0.000	0.166	0.063	0.130	0.037	0.030	0.043	0.019
35	0.000	0.010	0.080	0.000	0.000	0.000	0.000	0.000	0.000	0.024	0.000	0.000	0.050	0.008	0.038
Tuya as a proportion of the sockeye catch															
25													0.000	0.818	
26											0.000	0.122	0.279	0.635	0.200
27											0.030	0.028	0.339	0.566	0.405
28											0.044	0.164	0.489	0.504	0.407
29											0.012	0.102	0.237	0.298	0.345
30											0.010	0.063	0.136	0.228	0.245
31											0.000	0.013	0.133	0.165	0.150
32											0.000	0.026	0.120	0.084	0.049
33											0.000	0.000	0.089	0.000	0.038
34											0.000	0.037	0.022	0.000	0.019
35											0.000	0.000	0.037	0.016	0.000
Mainstem as a proportion of the sockeye catch															
25													0.167	0.000	
26	0.110	0.270			0.350	0.270	0.200				0.030	0.071	0.089	0.028	0.080
27		0.230	0.260	0.230	0.510	0.200	0.170	0.130	0.207	0.056	0.049	0.141	0.116	0.051	0.043
28	0.100	0.170	0.120	0.310	0.620	0.310	0.140	0.220	0.169	0.119	0.142	0.281	0.165	0.109	0.026
29	0.210	0.270	0.340	0.580	0.790	0.650	0.250	0.450	0.323	0.207	0.323	0.469	0.442	0.250	0.051
30	0.580	0.480	0.760	0.730	0.970	0.750	0.630	0.760	0.536	0.369	0.550	0.681	0.681	0.468	0.192
31	0.710	0.810	0.890	0.900	0.980	0.940	0.880	0.740	0.658	0.574	0.739	0.786	0.688	0.677	0.458
32	0.800	0.910	0.950	0.950	0.980	0.970	0.920	0.910	0.851	0.747	0.843	0.850	0.717	0.843	0.757
33	0.800	0.980	0.960	0.930	0.980	0.970	1.000	0.980	0.927	0.874	0.866	0.898	0.790	0.923	0.875
34	1.000	0.990	0.930	0.910	0.980	0.970	1.000	1.000	0.834	0.937	0.870	0.926	0.947	0.957	0.962
35	1.000	0.990	0.920	1.000	1.000	1.000	1.000	1.000	1.000	0.976	1.000	1.000	0.913	0.976	0.962

Table 3. CPUE for all sockeye salmon and the proportion of Tahltan, Tuya, and Mainstem stocks in the catch from the U.S. District 106/41-42 commercial fishery, 1985-1999. For periods when the fishery was closed, values were filled in with averaging and interpolation techniques (these values italicized and underlined in the table).

Week	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
District 106-41/42 Commercial Fishery: CPUE all sockeye stocks															
25	91.0	14.1	*42.5*	*33.9*	46.8	29.2	51.4	*40.3*	*41.7*	*47.0*	53.9	30.5	40.0	*24.9*	*20.6*
26	*110.9*	16.9	29.1	22.9	51.9	33.6	116.5	56.6	27.4	61.2	72.9	200.8	99.2	41.1	52.6
27	162.9	62.9	52.2	58.7	66.1	78.2	52.9	110.2	95.6	96.8	61.1	77.6	96.1	47.7	38.3
28	176.2	*67.9*	103.9	66.8	147.1	84.5	99.6	108.8	96.9	131.2	112.7	62.6	64.7	79.5	46.3
29	114.5	*68.4*	83.9	103.6	109.4	116.1	73.5	111.4	109.7	165.1	79.5	124.7	60.0	59.4	59.8
30	110.0	100.5	155.9	87.6	89.4	176.9	95.5	103.6	94.2	104.8	125.3	107.4	70.3	62.9	61.3
31	293.6	105.7	106.6	59.3	93.4	78.4	74.1	70.2	99.3	95.3	95.3	98.1	53.9	59.2	41.6
32	69.0	82.1	115.4	92.2	36.2	45.1	40.0	59.6	87.6	47.3	98.3	77.3	25.0	40.2	29.2
33	100.5	60.1	88.3	67.6	33.5	30.6	65.4	41.0	55.1	65.3	58.5	57.1	30.0	22.4	14.6
34	37.8	28.8	*25.0*	20.5	7.7	12.6	16.7	21.3	40.4	36.6	25.8	18.1	34.3	10.9	9.9
35	12.0	8.9	3.4	11.0	2.9	4.2	4.4	15.8	15.0	9.8	6.9	8.4	30.3	7.9	3.2
Tahltan as a proportion of the catch															
25	0.103	0.000			0.032	0.018	0.231				0.390	0.436	0.122		
26		0.020	0.013	0.085	0.085	0.026	0.396	0.438	0.460	0.466	0.424	0.672	0.115	0.026	0.334
27	0.347	0.090	0.013	0.071	0.027	0.025	0.256	0.180	0.410	0.501	0.391	0.459	0.215	0.129	0.145
28	0.240		0.051	0.050	0.000	0.012	0.099	0.140	0.313	0.380	0.130	0.243	0.075	0.004	0.085
29	0.129		0.008	0.011	0.000	0.008	0.012	0.030	0.162	0.179	0.018	0.169	0.016	0.007	0.075
30	0.000	0.000	0.008	0.006	0.000	0.001	0.100	0.010	0.078	0.113	0.003	0.070	0.017	0.007	0.043
31	0.000	0.037	0.000	0.000	0.000	0.000	0.000	0.016	0.045	0.019	0.005	0.000	0.002	0.003	0.004
32	0.000	0.000	0.000	0.000	0.000	0.000	0.016	0.012	0.013	0.060	0.003	0.021	0.000	0.009	0.000
33	0.000	0.009	0.000	0.000	0.000	0.000	0.052	0.000	0.057	0.049	0.013	0.000	0.000	0.001	0.000
34	0.000	0.000		0.000	0.000	0.000	0.000	0.000	0.069	0.083	0.000	0.000	0.000	0.001	0.000
35	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.034	0.077	0.000	0.000	0.008	0.001	0.000
Tuya as a proportion of catch															
25											0.000	0.046	0.181		
26											0.000	0.093	0.215	0.507	0.203
27											0.000	0.125	0.183	0.293	0.206
28											0.000	0.061	0.175	0.076	0.140
29											0.010	0.010	0.007	0.061	0.131
30											0.000	0.010	0.010	0.035	0.029
31											0.000	0.000	0.000	0.014	0.004
32											0.000	0.000	0.000	0.001	0.001
33											0.000	0.000	0.000	0.000	0.006
34											0.000	0.000	0.000	0.022	0.009
35											0.000	0.000	0.000	0.022	0.009
Mainstem as a proportion of the catch															
25	0.000	0.000			0.060	0.055	0.094				0.040	0.000	0.003		
26		0.000	0.000	0.000	0.100	0.022	0.018	0.060	0.036	0.018	0.053	0.019	0.000	0.000	0.000
27	0.013	0.032	0.000	0.000	0.160	0.020	0.028	0.153	0.036	0.015	0.000	0.039	0.018	0.002	0.009
28	0.005		0.003	0.000	0.045	0.022	0.012	0.064	0.091	0.017	0.016	0.000	0.053	0.000	0.036
29	0.008		0.000	0.000	0.005	0.005	0.085	0.030	0.280	0.048	0.014	0.000	0.006	0.000	0.041
30	0.029	0.005	0.015	0.000	0.004	0.008	0.031	0.044	0.083	0.056	0.072	0.000	0.007	0.002	0.182
31	0.000	0.001	0.000	0.000	0.015	0.039	0.054	0.113	0.301	0.047	0.020	0.000	0.013	0.000	0.286
32	0.000	0.000	0.000	0.009	0.011	0.049	0.010	0.090	0.173	0.000	0.089	0.000	0.009	0.000	0.185
33	0.015	0.000	0.000	0.000	0.012	0.004	0.000	0.258	0.183	0.000	0.034	0.043	0.003	0.000	0.152
34	0.042	0.000		0.000	0.012	0.016	0.000	0.155	0.102	0.005	0.134	0.005	0.016	0.000	0.129
35	0.042	0.000	0.000	0.000	0.012	0.016	0.000	0.155	0.102	0.005	0.134	0.005	0.000	0.000	0.129

Table 4. CPUE for all sockeye salmon and the proportion of Tahltan, Tuya, and Mainstem stocks in the catch from the Canadian lower river test fishery, 1986-1999. For periods when the fishery was closed, values were filled in with averaging and interpolation techniques (these values italicized and underlined in the table).

Week	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Inriver Test Fishery CPUE on all sockeye salmon:														
25	*0.45*	*0.22*	*0.32*	0.42	0.03	0.04	*0.49*	*0.61*	*0.31*	0.67	0.35	0.66	0.58	0.37
26	*0.95*	0.13	0.10	0.48	0.38	0.50	0.91	1.25	0.18	1.90	1.93	1.40	1.23	0.77
27	0.48	0.08	0.60	0.70	1.28	2.92	1.32	2.00	1.47	3.16	3.85	3.00	1.40	1.62
28	2.24	0.93	0.58	0.37	2.18	2.08	2.75	2.50	2.40	1.47	1.93	1.73	1.07	1.71
29	2.06	1.18	1.15	1.57	1.70	1.56	2.30	2.75	1.80	1.33	2.53	1.80	0.80	1.73
30	2.17	1.67	0.92	1.76	1.77	1.48	2.37	3.15	*1.42*	1.00	1.53	1.80	1.00	1.69
31	3.17	1.15	2.55	1.16	0.90	1.25	1.75	1.85	*1.17*	0.96	1.13	1.00	0.50	1.40
32	1.89	0.76	2.20	0.63	0.70	0.58	1.45	2.20	*0.82*	0.60	0.73	1.20	0.20	0.98
33	1.00	0.52	1.15	0.23	*0.51*	0.50	1.10	1.46	*0.52*	0.35	0.40	0.47	0.37	0.61
34	0.52	0.10	0.18	0.10	0.18	0.48	0.50	0.63	1.64	0.55	0.20	0.53	0.13	0.42
35	*0.22*	0.02	0.12	0.03	0.00	0.23	0.07	0.15	1.30	0.00	0.12	0.15	0.00	0.18
Tahltan as a proportion of catch														
25				0.756	0.583	0.763				0.900	0.710	0.696	0.517	0.000
26		0.882	0.875	0.632	0.906	0.958	0.927	0.888	0.876	0.910	0.745	0.886	0.595	0.444
27	0.704	0.714	0.759	0.519	0.821	0.885	0.931	0.793	0.908	0.905	0.760	0.511	0.214	0.585
28	0.507	0.761	0.406	0.237	0.623	0.775	0.846	0.687	0.903	0.891	0.787	0.346	0.656	0.587
29	0.339	0.463	0.324	0.165	0.406	0.584	0.571	0.660	0.826	0.400	0.136	0.185	0.625	0.573
30	0.126	0.192	0.132	0.036	0.143	0.384	0.256	0.457		0.438	0.231	0.333	0.050	0.482
31	0.055	0.063	0.055	0.000	0.104	0.236	0.221	0.282		0.291	0.155	0.200	0.000	0.346
32	0.061	0.038	0.068	0.011	0.129	0.073	0.184	0.103		0.218	0.000	0.458	0.000	0.207
33	0.040	0.010	0.111	0.000		0.050	0.078	0.118		0.135	0.000	0.143	0.000	0.113
34	0.024	0.061	0.000	0.000	0.037	0.016	0.278	0.010	0.037	0.000	0.100	0.125	0.000	0.041
35		0.111	0.000	0.000	0.000	0.000	0.056	0.048	0.042	0.000	0.000	0.000	0.000	0.000
Tuya as a proportion of catch														
25										0.000	0.079	0.217	0.345	0.000
26										0.009	0.155	0.086	0.378	0.543
27										0.015	0.145	0.444	0.643	0.371
28										0.055	0.057	0.462	0.188	0.323
29										0.000	0.026	0.074	0.125	0.232
30										0.000	0.000	0.037	0.100	0.181
31										0.000	0.000	0.050	0.000	0.062
32										0.000	0.000	0.000	0.000	0.018
33										0.000	0.000	0.000	0.000	0.000
34										0.000	0.000	0.000	0.000	0.000
35										0.000	0.000	0.000	0.000	0.000
Mainstem as proportion of catch														
25				0.244	0.417	0.237				0.100	0.261	0.087	0.138	0.000
26		0.118	0.125	0.368	0.094	0.042	0.073	0.112	0.124	0.080	0.095	0.029	0.027	0.012
27	0.296	0.286	0.241	0.481	0.179	0.115	0.069	0.207	0.092	0.080	0.095	0.044	0.143	0.044
28	0.493	0.239	0.594	0.763	0.377	0.225	0.154	0.313	0.097	0.055	0.156	0.192	0.156	0.090
29	0.661	0.537	0.676	0.835	0.594	0.416	0.429	0.340	0.174	0.600	0.838	0.741	0.250	0.195
30	0.874	0.808	0.868	0.964	0.857	0.616	0.744	0.543		0.563	0.769	0.630	0.850	0.337
31	0.945	0.937	0.945	1.000	0.896	0.764	0.779	0.718		0.709	0.845	0.750	1.000	0.592
32	0.939	0.962	0.932	0.989	0.871	0.927	0.816	0.897		0.782	1.000	0.542	1.000	0.775
33	0.960	0.990	0.889	1.000		0.950	0.922	0.882		0.865	1.000	0.857	1.000	0.887
34	0.976	0.939	1.000	1.000	0.963	0.984	0.722	0.990	0.963	1.000	0.900	0.875	1.000	0.959
35		0.889	0.000	1.000	1.000	1.000	0.944	0.952	0.958	1.000	1.000	1.000	1.000	1.000

Table 5. The 2000 Stikine Management Model parameters, including average run fraction by week, average weekly CPUE, and regression parameters for run size regressed on cumulative CPUE.

	All Stikine Sockeye Stocks						Tahltan Sockeye Stock					
Week	Run Fraction	Intercept	Slope	R Squared	Slope for Zero incpt	Average CPUE	Run Fraction	Intercept	Slope	R Squared	Slope for Zero incpt	Average CPUE
Lower River Commercial Fishery, 1985-1999												
27	0.143	51399	510	0.678	812	104.1	0.242	16332	406	0.722	530	77.9
28	0.170	33412	306	0.714	409	123.3	0.269	4453	259	0.852	277	86.3
29	0.190	8363	252	0.769	270	130.2	0.253	492	188	0.832	189	76.1
30	0.176	-7536	216	0.735	204	118.9	0.138	-1632	166	0.804	162	41.7
31	0.120	-22535	207	0.758	176	85.3	0.058	-1811	156	0.804	152	18.3
32	0.103	-37475	205	0.745	157	72.5	0.026	-1904	152	0.802	148	8.6
33	0.045	-41493	200	0.752	149	34.9	0.008	-1661	150	0.799	147	3.3
34	0.030	-44575	198	0.743	145	21.2	0.004	-1692	150	0.798	146	1.4
35	0.012	-46868	198	0.744	143	8.8	0.000	-1734	150	0.798	146	0.1
36	0.006	-46420	197	0.749	142	4.8	0.000	-1735	150	0.798	146	0.0
District 106-41/42 Commercial Fishery, 1985-1999												
27	0.292	110135	1896	0.590	3323	28.7	0.344	43803	1631	0.751	2256	23.3
28	0.250	76360	1654	0.805	2416	24.6	0.278	25578	1352	0.903	1620	18.9
29	0.176	64710	1412	0.855	1942	17.4	0.201	23091	1152	0.882	1259	13.6
30	0.106	64938	1228	0.864	1688	10.4	0.096	24846	913	0.864	1110	6.5
31	0.059	63234	1166	0.861	1591	5.8	0.043	24539	877	0.862	1063	2.9
32	0.045	61328	1130	0.872	1527	4.4	0.012	23945	875	0.862	1057	0.8
33	0.028	60393	1107	0.879	1488	2.7	0.007	24037	867	0.862	1048	0.5
34	0.025	60348	1079	0.881	1449	2.5	0.011	23925	859	0.860	1038	0.7
35	0.013	60523	1063	0.880	1429	1.3	0.006	24093	852	0.857	1030	0.4
36	0.005	60461	1058	0.880	1422	0.5	0.001	24114	850	0.856	1029	0.1
Lower River Test Fishery, 1986-1999												
27	0.159	50174	31810	0.556	52630	1.7	0.312	14444	26445	0.676	33859	1.3
28	0.160	15291	26100	0.685	29867	1.7	0.293	-1886	20268	0.861	19624	1.2
29	0.162	-7781	21793	0.736	20453	1.7	0.188	-6868	16953	0.858	15264	0.8
30	0.158	-20946	18322	0.696	15531	1.7	0.105	-5763	14667	0.841	13420	0.4
31	0.133	-23180	15436	0.548	12824	1.4	0.048	-4988	13718	0.833	12698	0.2
32	0.100	-6442	11878	0.425	11236	1.1	0.033	-5390	13352	0.819	12280	0.1
33	0.061	2338	10219	0.376	10436	0.7	0.013	-5239	13137	0.810	12109	0.1
34	0.041	211	9991	0.398	10010	0.4	0.006	-5146	13035	0.809	12031	0.0
35	0.017	1589	9688	0.397	9826	0.2	0.001	-5103	13007	0.809	12013	0.0
36	0.007	1563	9618	0.402	9753	0.1	0.000	-5102	13001	0.810	12008	0.0

Table 6. Evaluation of the Stikine Management Model for the 1999 sockeye fishery as run by both the U.S. and Canada. Weekly forecasts of run size are given along with the predicted total allowable catch (TAC) for Stikine sockeye salmon.

Stat. Week	Start Date	Forecast Run Size	TAC			Cumulative Catches[a]	
			Total	U.S.	Canada	U.S.	Canada
Model runs generated by Canada							
25	13-Jun	126,000	61,125	30,563	30,563		
26	20-Jun	126,000	61,126	30,563	30,563	6,397	10
27	27-Jun	126,000	61,125	30,563	30,563	21,386	1,126
28	4-Jul	75,890	14,457	7,229	7,229	26,581	6,336
29	11-Jul	130,958	64,089	32,045	32,045	34,621	17,066
30	18-Jul	198,738	124,668	62,334	62,334	39,578	29,739
31	25-Jul	227,182	148,887	74,444	74,444	45,311	34,015
32	1-Aug	222,347	146,436	73,218	73,218	46,372	36,045
33	8-Aug	215,014	139,282	69,641	69,641	46,372	36,710
34	15-Aug	206,438	130,997	65,499	65,499	46,605	38,451
Model runs generated by the U.S.							
25	13-Jun	126,000	61,125	30,563	30,563		
26	20-Jun	126,000	61,125	30,563	30,563	4,600	28
27	27-Jun	126,000	61,125	30,563	30,563	19,990	1,126
28	4-Jul	75,890	14,457	7,228	7,228	26,582	6,268
29	11-Jul	130,958	64,089	32,045	32,045	34,000	15,268
30	18-Jul	181,195	108,288	54,144	54,144	39,694	25,014
31	25-Jul	224,623	146,702	73,351	73,351	46,687	30,662
32	1-Aug	223,886	146,615	73,307	73,307	46,423	32,854
33	8-Aug	215,050	139,316	69,658	69,658	46,605	32,936
34	15-Aug	205,885	130,422	65,211	65,211		
Preliminary end-of-season estimate							
		119,138					

[a] Does not include ESSR or test fishery catches.

TAKU RIVER

Preseason Forecasts

Sockeye

The TTC has not developed a joint preseason forecasting method for Taku sockeye salmon. Both ADF&G and DFO agree that joint work needs to be done in the future to develop a single committee forecast.

ADF&G has not developed a numeric preseason forecast for Taku River sockeye salmon but is expecting an above average run. This expectation is based on excellent Taku sockeye parent-year escapements (1994 to 1996 average of 103,000 fish) and large returns of 4-year-old fish in 1999, when age-1.2 fish represented the highest proportion of the District 11 gillnet catch and inriver escapement on record (since 1984).

The DFO preseason forecast for the 2000 Taku sockeye salmon total run is approximately 273,000 fish; this constitutes an above average run size. For comparison, the recent 10-year average (1990-1999) estimated run size is 236,500 sockeye salmon. The 2000 forecast is the average of a sibling-based forecast of 311,600 sockeye salmon, and a forecast of 234,7400 sockeye salmon based on stock-recruitment data. If the run comes in as expected, the 2000 TAC will be approximately 198,000 sockeye salmon.

The sibling forecast is based on the historical relationship between the number of age-5 sockeye salmon in year (t) and the number of age-4 sockeye salmon in year (t-1). The relationship for the 1989-1999 period is described as follows:

$$N_{5(t)} = 63{,}545 + 1.76(N_{4(t-1)}) \qquad [4]$$

where: $N_{5(t)}$ = return of age-5 in year(t); and
$N_{4(t-1)}$ = return of age-4 in year(t-1).

The coefficient of determination for this relationship for data from 1989-1999 is r2=0.66 and it is significant at a level of α=0.05. The preliminary estimate of the return of age-4 in 1999 is approximately 82,200 fish (record high), which, when substituted into equation [4] above, gives a predicted age-5 return of approximately 208,600 fish in 1999. On average, approximately 67.0% of the run is composed of age-5 sockeye salmon. Assuming the 2000 age-5 proportion of the run will be average, the predicted 208,600 age-5 return translates into a total run forecast of approximately 311,600 sockeye salmon in 2000.

The 2000 stock-recruitment forecast is based on the historical relationship between the number of spawners (composite of all Taku stocks) and the subsequent returns described by the following equation:

$$\ln(R/S) = 1.998 - 0.0000113(S) \qquad [5]$$

where: R = total adult return; and
S = number of spawners.

Equation [5] above is based on the estimated return of spawners from the 1984 to 1994 brood years and the subsequent age-specific returns from these escapements. The correlation coefficient for this relationship is r2=0.36 and it is significant at a level of [illegible]=0.05. The estimated numbers of spawners from the principal brood years were 102,600 in 1994, 113,700 in 1995, and 92,600 in 1996; calculated returns per spawner for these years based on equation [5] are 2.4, 2.0, and 2.6, respectively. Assuming that the

age composition of the 2000 run will be average (66.9% 5-year olds, 25.2% 4-year olds, 5.6% 6-year olds, and 2.2% 3-year olds), the total run size for 2000, predicted using stock-recruitment data, is 234,700 sockeye salmon.

Marine conditions influencing salmon which returned in 1995 and 1996 appeared to be have been quite favorable. However conditions for the 1997, 1998 and the age-5 component of the 1999 returns appear to have been unfavorable. A trend in return per spawner has been noted showing a consistent decline for brood years 1988 to 1993 (3.9, 2.9, 2.3, 2.3, 1.8, 1.6, respectively). However, a high return per spawner was noted for the age-4 component of the 1995 year-class, which may indicate that environmental conditions have improved.

Tatsamenie sockeye salmon: Escapement of sockeye salmon to Tatsamenie Lake has occasionally limited the magnitude of the joint U.S./Canada egg take program. Based on standard assumptions of fecundity (4,000 eggs per female), equal sex ratios and the Canadian requirement that no more than 30% of the escapement can be utilized for enhancement purposes, an escapement of approximately 5,000 to 8,300 sockeye salmon will be needed to reach the egg take target of 3-5 million sockeye salmon in 2000. Tatsamenie Lake escapements have averaged 7,000 fish during the last 5 years, ranging from a high of 10,400 to a low of 2,100 fish. An above average run of Tatsamenie sockeye is expected in 2000 based on parent-year escapements of 8,000 in 1995 and 10,400 in 1996 and estimated Tatsamenie Lake smolt outmigration of 2,444,000 in 1998 (some of which should return as age-1.2 (42) and age-1.3 (53) in 2000).

Coho Salmon

Coho runs to the Taku River from 1991 through 1994 appeared to have benefited from high marine survivals and other factors. This trend does not appear to be continuing; there has been a trend towards declining run strength since 1994 as the result of some years of poor freshwater survival and some years of poor marine survival.

The estimated spawning escapements in the two primary brood years contributing to the 2000 run were 44,600 fish in 1996 and 32,300 fish in 1997. These escapements were within or above the interim escapement goal range for Canadian-origin Taku coho salmon of 27,500 to 35,000 fish but were well below the 1987 to 1998 average escapement of 69,700 fish. Very good catches of juvenile coho salmon in ADF&G's Taku River coded-wire-tagging program during the spring of 1999 are believed to reflect increased smolt production from the drainage and could indicate improved adult runs this year assuming favorable marine survivals. The general outlook is for an average run in 2000.

Chinook Salmon

The run of Taku River chinook salmon in 1999 was the lowest in over a decade primarily as a result of extremely poor production from the 1993 brood year. The principal brood years contributing to the 2000 chinook run are 1994, 1995 and 1996. Returns-to-date from the 1994 and 1995 brood years have been slightly below average but much improved from the 1993 brood year. The preliminary forecast for large chinook salmon (>=660 mm mid-eye to tail-fork) in 2000 is based on sibling returns and is 32,000 fish (range 20,000 to 45,000). This constitutes a below average run.

Pink Salmon

An above average run of pink salmon is expected in 2000. Pink salmon returning in 2000 are the progeny of the 1998 escapement, which is believed to have been above average based on the Canyon Island fish

wheel catch of 23,300 pink salmon. The 1984-1998 average even-year Canyon Island fish wheel catch of pink salmon is 15,800 fish.

Chum Salmon

Low fall chum catches and CPUE in the District 111 fishery and Canyon Island fish wheels catches in 1995 and 1996 suggest that the spawning escapement that will produce the 2000 run was poor. Consequently, a below average to poor fall chum run is expected in 2000.

Escapement Goals

The new Annex IV, Chapter 1 agreement required the Parties to review an appropriate escapement goal for Taku chinook salmon by May 1999 and thereafter establish a new goal as soon as practicable. Detailed analyses of harvest and spawning abundance by age class and smolt production were used to generate a recommendation for a 30,000 to 55,000 adult fish (3-5 ocean) escapement goal range. This analysis and recommendation has been reviewed and approved by the Chinook Technical Committee (TCCHINOOK (99)-3), internal review committees of ADF&G and DFO and by the TTC.

Escapement goals for other Taku River salmon species are based on limited analyses of historic catch and escapement data. These escapement goals are considered as 'interim goals' and are subject to change as additional stock recruitment data and detailed analyses are performed. The new Annex IV, Chapter 1 agreement also calls for developing a revised escapement goal for coho salmon no later than May 1, 2004. Current escapement goals accepted by the Transboundary Technical Committee for salmon spawning in Canadian portions of the Taku River are as follows:

Species	Yr establ. or status	Interim Escapement Goal Ranges	
		From	To
Sockeye	1985	71,000	80,000
Coho	Review by May 1, 2004	27,500	35,000
Chinook	1999	30,000	55,000
Pink	1985	150,000	250,000
Chum	1985	50,000	80,000

Harvest Sharing Objectives

Long-term harvest sharing agreements between Canada and the United States for Taku River salmon are in place as a result of negotiations of Annex IV, Chapter 1 of the Pacific Salmon Treaty. The arrangements that are expected to apply for the 1999 to 2008 period as follows:

(1) Sockeye salmon:

(i) Except as noted below, Canada shall harvest no more than 18% of the TAC of the wild sockeye salmon originating in the Canadian portion of the Taku River each year;

(ii) If the projected inriver escapement is greater than 100,000 sockeye salmon, Canada may, in addition harvest 20% of the projected inriver escapement above 100,000 sockeye salmon;

(iii) The Parties agree to manage the runs of Taku River sockeye salmon to ensure that each country obtains catches in their existing fisheries equivalent to each country's share of wild sockeye salmon and a 50% share of fish originating from Taku fry plants;

(iv) The Parties agree to continue the existing joint Taku enhancement program designed to produce annually 100,000 returning sockeye salmon.

(2) Coho salmon:

(i) The Parties agree to develop and implement an abundance-based approach to managing coho salmon on the Taku River no later than May 1, 2004. The Parties commit to developing a revised MSY escapement goal to be implemented no later than May 1, 2004.

(ii) Until a new abundance-based approach is developed, the management intent of the United States is to ensure a minimum above-border inriver run of 38,000 coho salmon, and the following arrangements will apply:

a. no numerical limit on the Taku coho catch will apply in Canada during the directed sockeye salmon fishery (through statistical week 33);

b. if inseason projections of above-border run size are less than 50,000 coho salmon, a directed Canadian harvest of up to 3,000 coho salmon is allowed for assessment purposes as part of the joint Canada/U.S. Taku River mark-recapture program;

c. if inseason projections of above-border run size exceed 50,000 coho salmon, a directed Canadian harvest of 5,000 coho salmon is allowed;

d. if inseason projections of above-border run size exceed 60,000 coho salmon, a directed Canadian harvest of 7,500 coho salmon is allowed;

e. if inseason projections of above-border run size exceed 75,000 coho salmon, a directed Canadian harvest of 10,000 coho salmon is allowed.

(3) Chinook salmon:

(i) Both Parties shall take appropriate management action to ensure that the necessary escapement goals for chinook salmon bound for Canadian portions of the Taku River are achieved.

(ii) The Parties agree that new fisheries on Taku River chinook salmon will not be developed without the consent of both Parties. Management of new directed fisheries will be abundance-based through an approach to be developed by the Committee no later than May 1, 2004. The Parties agree to implement assessment programs in support of the development of an abundance-based management regime.

It is assumed that both Parties will continue to take appropriate management actions to ensure that the escapement goals for chinook and other species of salmon bound for Canadian portions of the Taku River are achieved in 2000.

Management Procedures

The management co-ordination between U.S. and Canadian fishery managers will involve weekly conferences between designated members or alternates. ADF&G and DFO managers do not believe major fishery restrictions will be necessary in 2000 to ensure Tatsamenie escapements are sufficient to meet brood stock requirements. The agencies have agreed, however, to coordinate management of their respective fisheries to increase the likelihood that Tatsamenie escapements are adequate to achieve brood stock needs.

United States

Section 11-B (Figure 2) will open for a 72-hour fishing period beginning at noon on the third Sunday in June (June 18, statistical week 26). The fishery will be managed through mid August primarily on the basis of sockeye abundance. Run strength will be evaluated using fishery catch and CPUE data and weekly inriver run size estimates from the Taku River mark-recapture program operated jointly by ADF&G and DFO. Contributions of enhanced sockeye salmon will be estimated inseason by analysis of salmon otoliths sampled from the commercial harvests. For purposes of inseason run size estimation, average weekly historical stock composition data will be used to estimate the contribution of wild Taku River and Port Snettisham sockeye contributions to the catch. The above data will be used to generate weekly estimates and total season projections of total Taku sockeye run size, U.S. Taku TAC and U.S. harvest. The age and stock compositions of the harvest of wild sockeye stocks will be revised after the fishing season by analysis of scale pattern and brain parasite incidence data from samples from the commercial catch and escapements.

To increase numbers of Tatsamenie sockeye returning to the lake, fishing time will be limited to a maximum of 3 days in Taku Inlet in the U.S. drift gillnet fishery during statistical weeks 31-33 (July 23-August 12). This management action will be accompanied by Canadian inriver management actions described in the Canadian portion of the "Management Procedures" section of this report. Extensions of fishing time above prescribed levels in each country's fisheries will only be allowed after consultation and agreement between fishery managers of the two countries.

Nighttime fishing closures may be imposed to limit incidental catches of immature chinook salmon. Harvests in the Juneau recreational fishery and initial gill net openings will be evaluated to determine the need for night closures during the 2000 season.

Returns from domestic hatchery programs are expected to contribute significantly to the District 11 fishery in 2000. Extended fishing time is expected in Stephens Passage during July to harvest hatchery runs of summer chum salmon to Limestone Inlet and during August to harvest runs of Snettisham Hatchery sockeye salmon. Substantial runs of summer chum and coho salmon are also expected to Douglas Island Pink and Chum, Inc. hatcheries in Gastineau Channel. Portions of these runs will be available for incidental harvest in the directed wild sockeye and coho fisheries in Taku Inlet.

Pink salmon will be harvested in Section 11-B incidental to the sockeye and summer chum fisheries. Fishing time for pink salmon in Section 11-C will depend on the strength of runs to lower Stephens

Passage, Seymour Canal, and the northern portions of District 10. Parent-year pink escapements in Stephens Passage and Seymour Canal were good and some surplus to escapement needs may occur.

In 1989 the Alaska Board of Fisheries reopened the purse seine fishery in a small area in northern Chatham Strait (a portion of subdistrict 112-16) during the month of July in order to harvest pink stocks migrating northward to Taku River, Lynn Canal and upper Stephens Passage. The area encompasses waters along the western shore of Admiralty Island north of Point Marsden (Figure 3). If a harvestable surplus of pink salmon returning to this area occurs in 2000, a July seine fishery may occur in the Hawk Inlet shore area. During August, fishery openings along the Hawk Inlet shore may extend northward to the latitude of Hanus Reef when north-migrating pink stock strength warrants. If north-migrating runs are poor and south-migrating stocks are strong, seining may be limited to south of Point Marsden.

Beginning in mid-August management of the District 11 gillnet fishery will be based on the run strengths of coho and fall chum salmon. Inseason management will be based on evaluation of fishery catch, effort and CPUE relative to historical levels, recovery of coded-wire-tags from fishery sampling, and inriver run size estimates from the Taku River mark-recapture program. As specified in the new Annex IV, Chapter 1 agreement, the U.S. will manage its fishery to achieve a minimum above-border run of 38,000 Taku coho salmon.

Extensive changes in sport fishing regulations will be implemented in 2000. These include reduced seasonal bag limits for charter operators and non-residents, periods of non-retention and area closures. The chinook sport fishing season will be open in marine waters near Juneau throughout the year. Sport fishing inside Taku Inlet, however, is closed north of a line from Cooper Point to Dorothy Creek from April 16 through June 14 to protect returning Taku chinook salmon.

A personal use fishery in U.S. portions of the Taku River was established by the Alaska Board of Fisheries in 1989 and will operate during the month of July in 2000. The legal gear type is set nets, not to exceed 15 fathoms in length. The seasonal bag limit is five sockeye salmon per person or ten sockeye salmon per household. Fishing is not allowed within 100 yards of the U.S./Canada research fish wheels.

Canada

The Canadian fishery will open 12:00 noon Sunday, June 18 for an initial 48-hour period to target early sockeye runs. A maximum mesh size restriction of 150 mm (approximately 5.9 inches) will be in effect through 12:00 noon July 16 to conserve chinook salmon during the early season sockeye fishery.

Canadian sockeye management decisions for the Taku River fishery (Figure 2) will be based on weekly projections of total run size, TAC and escapement for wild stocks. The weekly projections (wild stocks) will be made using the following calculations:

$$TAC_{(w)} = [(E_{w(t)} + C_{w(t)} + A_{w(t-1)}) / \rho_{w(t)}] - E_w \qquad [5]$$

Where:
- $TAC_{(w)}$ = the projected total allowable catch of wild *w* sockeye for the season;
- $E_{w(t)}$ = the cumulative wild escapement to week *t* based on mark-recapture data;
- $C_{w(t)}$ = the cumulative Canadian wild catch to week *t*;
- $A_{w(t-1)}$ = the estimated cumulative U.S. catch of wild Taku sockeye salmon to the preceding week t-1 (preceding week used to allow for migration time). Catches in Districts 111 and 112 will be considered for inclusion in this estimate;
- $\rho_{w(t)}$ = the estimated proportion of run through to week t determined from the average inriver run timing based on historical CPUE data from the Canadian fishery. (Run

timing estimates will be adjusted inseason according to inseason CPUE data relative to historical data in both U.S. and Canadian fisheries); and

E_w = the system-wide escapement goal for wild stocks. (A value of 75,000 will be used reflecting the midpoint in the interim range of 71,000 to 80,000).

Weekly TAC and U.S. catch projections for sockeye salmon will be used to guide the management of the commercial fishery. Run timing will be used to project the total escapement and U.S. harvest; the Canadian catch will be adjusted with the objective of meeting escapement and agreed Canada/US harvest sharing objectives.

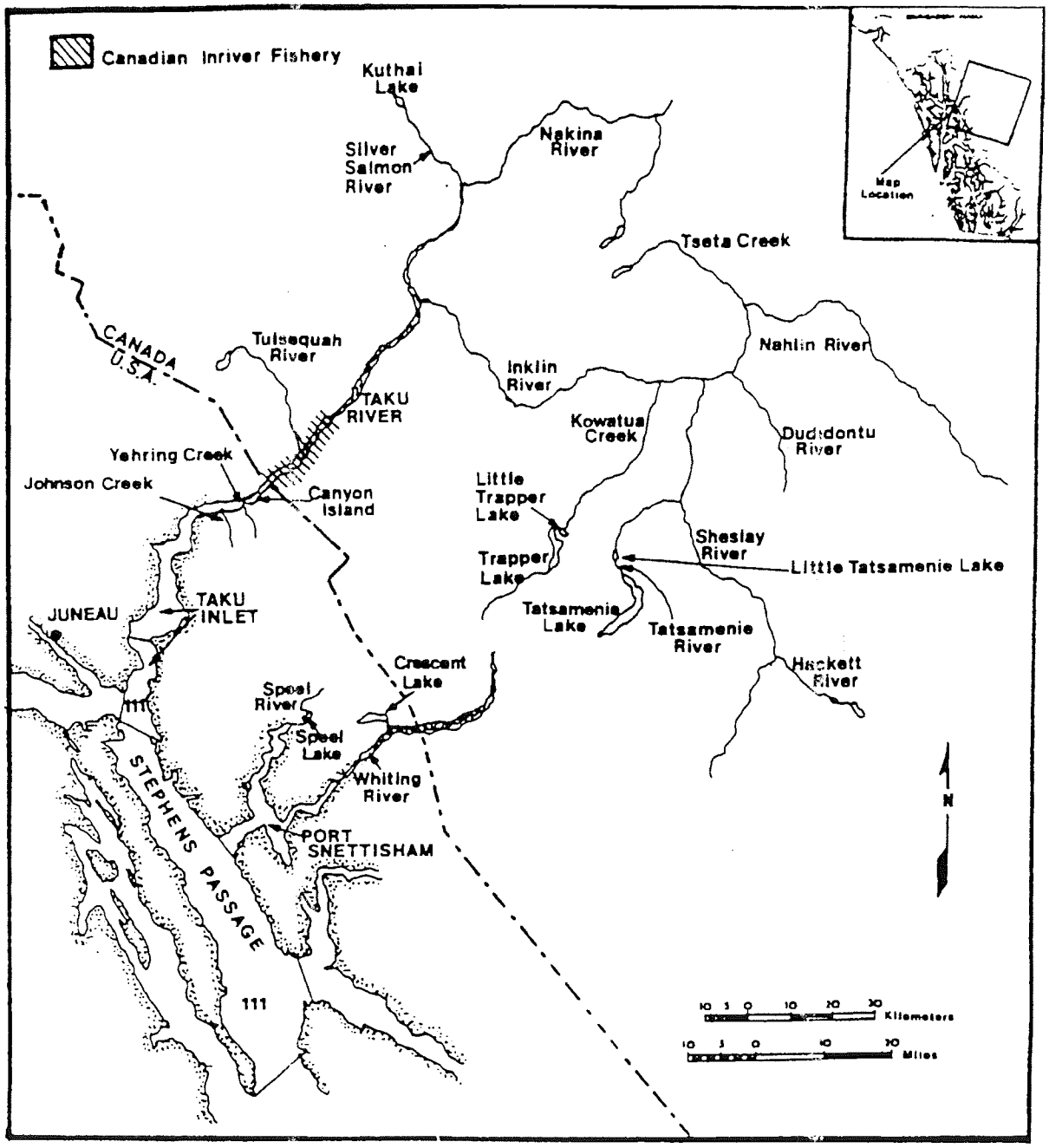

Figure 2. The Taku River and principal U.S. and Canadian fishing areas.

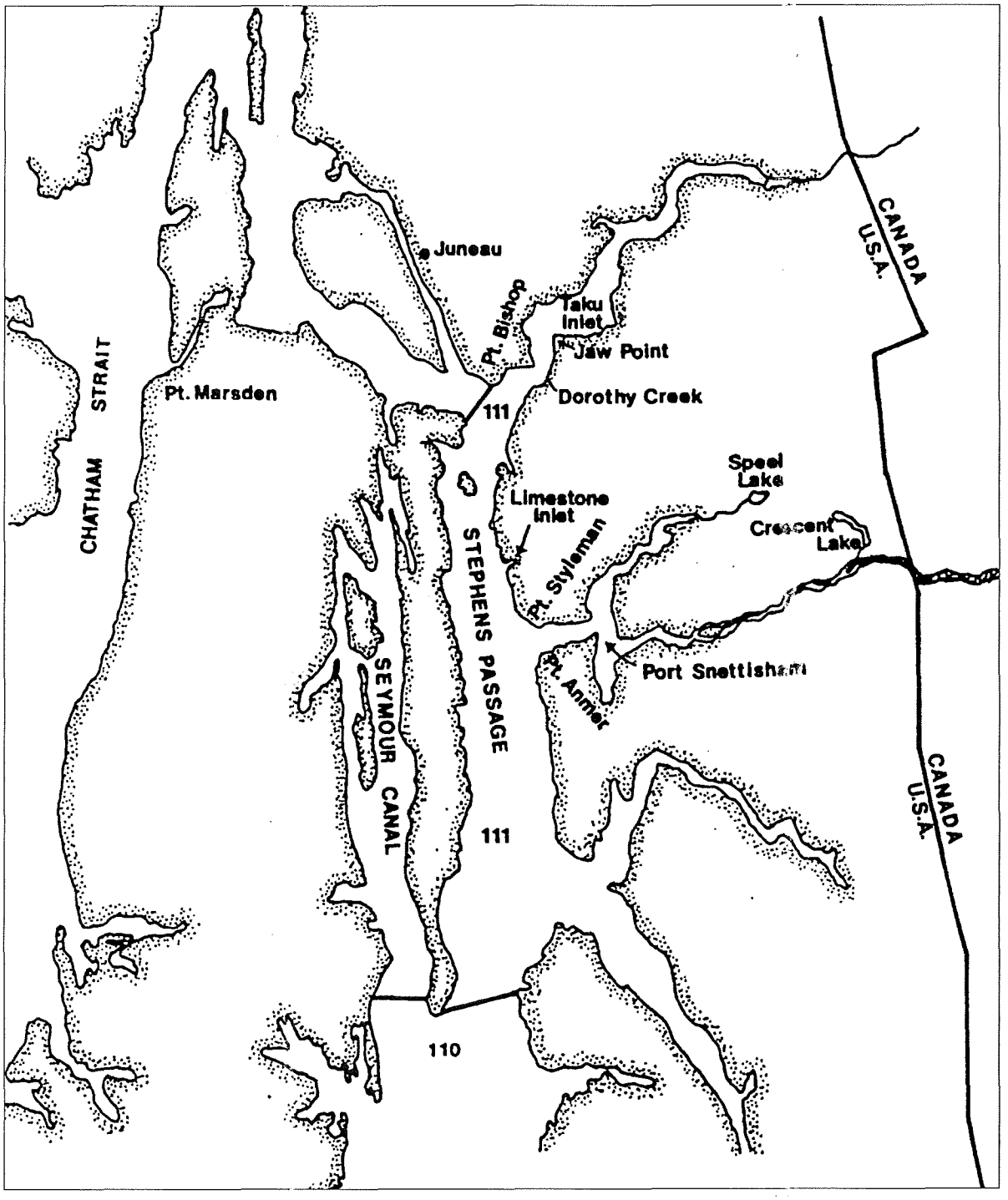

Figure 3. U.S. fishing areas adjacent to the Taku River.

During statistical weeks 31-33 (July 23-August 12), it is anticipated fishing time will be limited to a maximum of 3 days to conserve Tatsamenie sockeye salmon. This management action will be accompanied by U.S. management actions described in the U.S. portion of the "Management Procedures" section of this report. Extensions of fishing time above prescribed levels in each country's fisheries will only be allowed after consultation and agreement between fishery managers of the two countries.

Modification to the fishing area implemented in 1998 to include a 50 meter closed section just upstream of the Canada/US border will be continued in 2000. The upper boundary near Yellow Bluff will remain unchanged from previous years.

To address chum salmon conservation concerns, the retention of chum salmon will be prohibited. Fishers will also be encouraged to live-release any steelhead caught as per previous years.

The Canadian fishery will be monitored daily by DFO personnel who will collect catch and tag recapture data. Catch information will be relayed to the DFO office in Whitehorse, collated, and exchanged with a designated ADF&G contact person during weekly, more often if needed, telephone contacts.

ALSEK RIVER

Fisheries

Salmon stocks returning to the Alsek River drainage (Figure 4) are jointly managed by the Canadian Department of Fisheries and Oceans (DFO) and the Alaska Department of Fish and Game (ADFG) through the joint Transboundary Technical Committee (TTC) of the Pacific Salmon Commission.

The principal U.S. fishery that targets Alsek stocks is a commercial set gillnet fishery which operates in Dry Bay. A small subsistence fishery also operates in Dry Bay. U.S. fishers harvest the full mixture of Alsek stocks. The principal Canadian fisheries occur in the upper Tatshenshini drainage. A traditional aboriginal fishery takes place in the Klukshu River and Village, Goat and Blanchard creeks. At present, between 100-150 members of the Champagne Aishihik First Nations harvest salmon via fish traps and gaffs, primarily in the Klukshu River, and to a lesser extent at Village, Blanchard and Goat Creeks. Sport fisheries take place primarily in the Klukshu/Dalton Post area and on Takhanne and Blanchard rivers. The Canadian fisheries harvest upper Tatshenshini River salmon stocks.

Most Alsek chinook salmon appear to spawn in Canada, but some spawners have been observed in U.S. tributaries. Most sockeye and coho salmon probably also spawn in Canada, but substantial spawning has been documented in U.S. tributaries as well.

Preseason Forecasts

The overall sockeye run to the Klukshu River in 2000 is expected to be below average in strength. Principal contributing brood years to this years' run will be 1995 (Klukshu escapement of 19,817 sockeye salmon) and 1996 (Klukshu escapement of 7,891 sockeye salmon); the 1989-98 average Klukshu escapement is approximately 16,400 fish. Based on historical stock-recruitment analysis, the range of Klukshu escapements that appear most likely to produce maximum sustained yields is 7,500 to 15,000 sockeye salmon (Clark and Etherton in prep.).

The 2000 overall Alsek sockeye run is expected to be approximately 40,000 sockeye. This estimate is based on: a predicted run of 22,300 Klukshu sockeye derived from historical Klukshu stock-recruitment data; an assumed Klukshu contribution to the total run of 35%; and an adjustment factor of approximately 0.64 to account for the tendency of the method to over predict the Klukshu weir counts since 1995. A run size of this magnitude is below the recent 10-year average run size estimate of approximately 64,000 sockeye (based on the Klukshu weir count expanded by 1/0.35 to account for other inriver escapement and an assumed U.S. harvest rate of 0.20) .

The Klukshu early sockeye run escapements in 1995 and 1996 were 2,289 and 1,502, respectively. Both years were below average but the predominant brood year (1995) was close to the optimum level of 2,500 sockeye spawners as determined through separate stock-recruitment analyses by DFO of the early run. Normally this would support an expectation for an above average run. However, returns in 1998 and 1999 were far below expectations that were developed in a similar manner. Therefore the early run is expected to be at best, average.

The Klukshu chinook escapements in 1995 and 1996, 5,400 and 3,400 chinook salmon, respectively, were above average with the 1995 escapement being the highest on record. However, the escapements were above the optimum escapement range of 1,100 to 2,300 chinook salmon as determined from current stock-recruitment analysis. As a result, the preliminary outlook is for a below average run.

The coho escapements observed at the Klukshu River in 1996 (3,500 coho salmon) and 1997 (300 coho salmon but incomplete count) suggests the run in 2000 will be average to above average. The recent 10-year average escapement is 2,600 coho salmon.

Management Approach for the 2000 Season

Sockeye Salmon

The principal escapement monitoring tool for chinook stocks on the Alsek River is the Klukshu weir, operated by DFO and the Champagne-Aishihik First Nation. A joint report that recommends a biologically-based escapement goal for the Klukshu stock is in preparation and is expected to be peer reviewed in 2000. The preliminary analyses were used to develop targets for the 2000 season.

Canadian and U.S. managers have set a spawning escapement goal range of 7,500 to 15,000 sockeye salmon for 2000 (Clark in prep).

United States

U.S. fisheries will operate similar to regimes in 1995-1999, with the first opening the first week in June for one day. The remainder of this fishery will be operated on sockeye run strength. The fishery will be managed on run strength judged by comparison of CPUE to historical averages A cautious approach will be taken recognizing that fishery CPUE is poorly correlated with run size. As noted above the U.S. fisheries target the full mixture of Alsek sockeye stocks, which include stocks in the U.S. such as Tanis and Basin creeks, as well as Canadian upriver stocks such as Klukshu River and Village Creek. The proportion of the Alsek sockeye run represented by the Klukshu stock is not known on an annual basis. A sockeye tagging study in 1993 indicated that approximately 37% of the "upriver escapement" (McBride and Bernard 1984) was bound for the Klukshu; however, the tagging study did not cover the entire sockeye run. That estimate was, however, expanded to represent the entire run by assuming normal timing and proportions for the early run.

The initial opening for the Alsek River fishery (Dry Bay, Figure 4) occurs on or after the first Monday in June by regulation; prior to 1963 the fishery opened in May. In 2000 weekly openings will initially be set at 24 hours. The duration of the weekly fishing periods will be based on fisheries performance and Klukshu weir data. The first opening will occur on June 5, 2000. Gill nets will be restricted to a maximum mesh size of 6 inches (152 mm) through July 1 to minimize chinook harvests.

The Alsek sockeye run in the lower river is nearly over by early to mid-August. Management emphasis will then be switched to coho salmon. Fishing time during the coho fishery will be based on a comparison of current year fishery performance with historical performance.

The Alsek River surf fishing area will be open during the same time period as the inriver fishery. The surf fishery areas include the shoreline, 3/4 of a mile (1.2 km) in each direction from the river mouth to the outermost bar where the surf breaks.

Canadian Fisheries

Canadian fisheries for sockeye salmon will proceed similar to regimes in recent years. Next to conservation, the priority in management will be to provide for the basic needs harvest of the Champagne-Aishihik First Nation. The basic needs level for sockeye is 3,000 fish, as documented in the CAFN final land claims agreement. An option being considered in 2000 is allowing some First Nations' harvest to occur at the weir which would provide biological samples and tag recovery information. In the sport fishery, non-retention of sockeye will be in effect through mid August to conserve early runs and address domestic allocation priorities. In the event that the run size into the Klukshu is above the minimum targets, Canadian managers will liberalize harvest opportunities.

Chinook Salmon

The principal escapement monitoring tool for chinook stocks on the Alsek River is also the Klukshu weir. A joint report for an escapement goal for the Klukshu stock has been reviewed and accepted by both Canada and ADF&G, which recommends an escapement goal range of 1,100 to 2,300 chinook spawners in the Klukshu drainage (McPherson, Etherton and Clark 1998). Canadian and U.S. managers have agreed to a minimum escapement goal of 1,100 spawners in the Klukshu drainage in 2000.

United States

U.S. fisheries will operate similar to regimes in 1995-1999, with the fishery opening the first week in June for one day. The remainder of this fishery will be operated on sockeye run strength (see below). The U.S. fishery will likely have little effect on the Klukshu weir count. The U.S. fishery is operated after the peak of the chinook salmon have passed through Dry Bay; the peak timing appears to be in late May based on past fishery data (McPherson, Etherton and Clark, 1998). Chinook tagging studies in 1997 and 1998 indicated that approximately 18-23% of the chinook salmon passing through Dry Bay were bound for the Klukshu drainage. U.S. Alsek chinook harvests have been less than 1,000 chinook salmon each year since 1981, and the 2000 harvests most likely will not be greater than this figure.

Canadian Fisheries

Canadian fisheries for chinook salmon will proceed similar to regimes in recent years. As with sockeye management, the priority in management will be to achieve escapement goals and provide for the basic needs harvest of the Champagne-Aishihik First Nation. According to the CAFN land claims agreement, the basic needs level for chinook salmon is 200 fish. In the event that the run size into the Klukshu River is above the minimum targets, Canadian managers may liberalize harvest opportunities. If run forecasts are below minimum weir targets, fishery restrictions will be considered beginning in the sport fishery.

Coho Salmon

Coho salmon in U.S. and Canadian fisheries will be managed by monitoring fishery performance data and comparing it to historical fishery performance data. In the U.S. fisheries, the 2000 CPUE will be compared to historical CPUE for a given opening; time and area openings will be adjusted, similar to the plan for sockeye salmon.

Stock Assessment Program

The escapement of chinook, sockeye, and coho salmon through the Klukshu weir and sockeye salmon through the Village Creek electronic counter serves as an inseason indicator of stock strength and adjustments to the fishery may be made on the basis of these counts. Aerial surveys are used to augment escapement information on sockeye and chinook stocks in the Alsek drainage and are reported in the TTC postseason annual report. A sockeye and chinook adult tagging project is being conducted to determine the distribution of these stocks within the drainage with the aim of determining the proportion of the spawning that occurs in the Klukshu drainage. A summary of the field projects on the Alsek River is presented in Appendix Table A3.

Management Planning

An improved inseason forecasting method for sockeye salmon particularly in the lower Alsek River is needed. To this end, DFO, with assistance from ADF&G, will be conducting a sockeye mark-recapture project in 2000 to assess the feasibility of obtaining inriver run size estimates in the lower Alsek River as well as preliminary stock specific run timing information. If successful, this technique could be useful in developing an abundance-based management regime as required by the Treaty.

Another mark-recapture project will take place during 2000 to estimate total escapement of chinook salmon in the Alsek drainage and estimate the fraction represented by the Klukshu stock. This project was initiated in 1998 by ADF&G with assistance from DFO in tag recovery and will used to improve inseason management of chinook salmon. Fish will be tagged in the lower Alsek River in Alaska and recoveries will be made in tributaries primarily in the Tatshenshini watershed. The Klukshu weir will also be used for tag recovery. During the chinook-tagging project, early-run sockeye salmon will also be tagged (through June 30). This should estimate the abundance of the early-run sockeye component and timing between Dry Bay and Klukshu weir.

A joint report has been completed which provides the rationale for the biologically-based escapement goal range for Klukshu River sockeye salmon as described in the "Preseason Forecasts" section above. Peer review should be completed by the fall of 2000. This report also includes recommendations for an improved stock assessment program for sockeye salmon in the Alsek River, to be shared between DFO, ADF&G and the Champagne Aishihik First Nations.

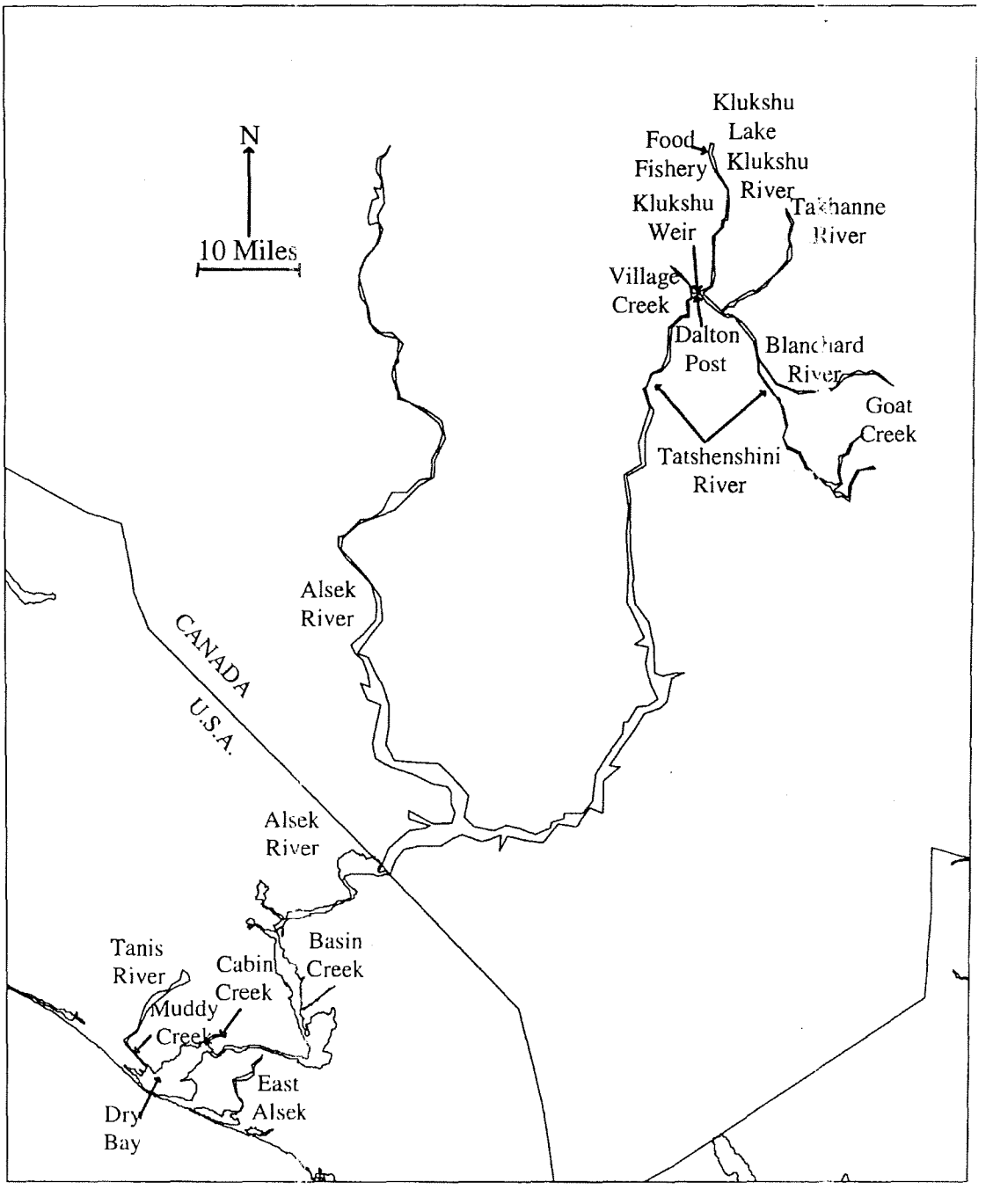

Figure 6. The Alsek River and principal U.S. and Canadian fishing areas.

TRANSBOUNDARY ENHANCEMENT PLANS

Overview

Joint sockeye enhancement projects are conducted on the Stikine and Taku rivers. Broodstock are taken at Tahltan Lake on the Stikine and from Tatsamenie Lake on the Taku; the eggs are incubated and thermally marked at the Snettisham Central Incubation Facility; and the fry are back planted into Tahltan and Tuya lakes on the Stikine and into Tatsamenie Lake on the Taku. In addition, plankton samples are taken from the various lake systems and analyzed. A summary of the enhancement field and incubation projects is presented in Appendix Table A4.

Fry Plants

Fry plants are scheduled to occur in May and June. The following numbers of sockeye fry produced from the transboundary sockeye enhancement program are expected to be outplanted in 2000:

Stikine drainage: Tahltan Lake 2.2 million
Tuya Lake 0.9 million
Taku drainage: Tatsamenie Lake 0.4 million

Egg-Take Goals

Target sockeye egg-takes for the fall of 2000 are as follows:

Tahltan Lake : 6.0 million.

Tatsamenie Lake: 3.0 to 5.0 million.

- The recommended eggtake goal is 3 million (or a maximum of 30% of the escapement) if the smolt ratio of enhanced:total is less than 20% during the 2000 outmigration;
- The recommended eggtake goal is 5 million if the enhanced smolt contribution is 20% or greater.

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APPENDIX: 2000 TRANSBOUNDARY FIELD PROJECTS

Proposed projects regarding the Stikine, Taku, and Alsek salmon stocks are summarized in Appendix Tables A1 to A3. Enhancement projects are given in Table A4. For each project listed, information regarding the dates of operation, primary objectives, and agency roles are described. Contacts are listed at the bottom of each table.

Table A1. Proposed Stikine River field projects, 2000.

Project/Dates	Function	Agency	Involvement
Stikine Chinook Mark-Recapture			
5/5 - 7/10	• Tag up to 800 Stikine River chinook salmon captured from the Kakwan point drift net site.	ADF&G/ DFO	All aspects except tag recovery
	• Recover tags from the Canadian fisheries and from the Little Tahltan weir and from Verrett Creek. Tags may also be recovered from other spawning sites.	DFO/TFN	All aspects
Tahltan Lake Smolt Estimation			
5/7 - 6/30	• Enumerate Tahltan Lake sockeye smolts.	DFO/TFN	All aspects
	• Sample up to 800 smolts for age, size, and otoliths.		
Upper Stikine Sampling			
6/12 - 8/25	• Sample up to 800 sockeye for age, sex, size, otoliths proportionally from the Aboriginal and commercial fishery at Telegraph Creek.	TFN	Collect data
	• Sample up to 500 chinook for age, sex, size, and tags.	DFO	Data analysis
Stikine sockeye mark-recapture			
6/19 – 1/9	• Tag up to 1,100 Stikine River sockeye salmon captured from the Rock Island set net site.	DFO/ ADF&G	All aspects except tag recovery
	• Recover tags from the Canadian fisheries and from the Tahltan weir and at Tuya. Tags may also be recovered from other spawning sites.	DFO/TFN	All aspects
Little Tahltan Chinook Enumeration			
6/15 - 8/18	• Enumerate Little Tahltan chinook salmon from a weir located at the mouth of the river.	DFO/TFN	All aspects
	• Sample up to 1100 fish for age, sex, size, and tags.		
	• Enumerate and record tags observed during the enumeration of the fish.		

Table A1. (page 2 of 4)

Project/Dates	Function	Agency	Involvement
Stikine Coho Mark-Recapture			
9/2-10/20	• Tag up to 900 Stikine River coho salmon captured from the Rock Island set net site.	DFO/ ADF&G	All aspects except tag recovery
	• Recover tags from the Canadian fisheries. Tags may also be recovered from other spawning sites.	DFO/TFN	All aspects
Test Fishery in Lower Stikine			
5/8 - 10/22	• Conduct a test fishery as required (to fill in when no commercial fishing) to assess run size and run timing of chinook, sockeye and coho salmon. Collect age-sex-size information and recover CWTs from all salmon. Collect tagged salmon.	DFO/TFN	All aspects
	• Sample all salmon from test fishery for scales and all female sockeye for egg diameters (used for stock ID).		
	• Otolith sampling requirements are 150/week for weekly samples (matched with scales) and with egg diameters for females. Transfer otolith samples to ADF&G for inseason processing.	ADF&G	Inseason processing of otoliths
Commercial Inriver Fishery Stock ID Sampling			
6/25-9/4	• Commercial catch sampling for sockeye to include 350/week for age-sex-size, including up to 150 matched egg-diameter/otolith samples and otoliths from 50 males (if possible).	DFO	All aspects
	• Transfer up to 200 otolith samples per week to ADF&G for inseason processing.	ADF&G	Inseason processing of otoliths
District 106 &108 Stock ID Sampling			
6/21 - 9/20	• Sample 20% of chinook, coho, chum and sockeye catches per district for CWTs; sample sockeye and coho for scales (for aging), sex, and size (scale sampling goals are 600 sockeye per D108, D106-41, D106-30 per week and 600 coho from D106 during the season).	ADF&G	All aspects
	• Collect 400 otoliths/week in District 108, 300 in Subdistrict 106-41 (100 matched with scale samples), 300 in Subdistrict 106-30.		
District 108 Test Fishery			
13/6- 7/3	• Gillnet selectivity study using varied mesh sizes, sample up to 100 sockeye/week for thermal marks, size and age	ADF&G	All aspects

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Project/Dates	Function	Agency	Involvement
Andrew Creek Salmon Enumeration			
7/25 - 9/10	• Survey Andrew Creek , enumerate chinook salmon and recover tags.	ADF&G	All aspects
Tahltan Lake Salmon Enumeration			
7/5 - 9/10	• Enumerate Tahltan Lake sockeye entering the lake at weir.	DFO/TFN	All aspects
	• Sample up to 800 fish for age, sex and size.		
	• Sample up to 400 sockeye for both otoliths and egg diameters (400 will be sampled from the brood stock take)		
Tuya ESSR Fishery & Sampling			
7/12 - 8/27	• Continue feasibility study for terminal sockeye fishery at Tuya River.	TFN	Fishery feasibility/ collect data
	• Sample up to 100 sockeye for otoliths, scales, and size.		
	• Sample up to 400 female sockeye for egg diameters.	DFO	Data analysis
Chinook and Coho CWT			
4/5 – 6/16	• Targets are 20k chinook smolts and 40k coho smolts.	ADFG/ DFO	All aspects
	• Sample fish for age and size.		
Chinook and Sockeye DNA Stock ID Baseline			
8/1 – 9/30	• Target is 150 samples/stock	DFO	All aspects
	• Up to four separate stocks to be sampled/spp.		
Chinook Creel Census			
6/26 – 8/4	• Survey anglers in the Tahltan River	DFO/TFN	
	• Sample for tags, age, size, sex.	All aspects	
Chinook at Shakes Creek			
7/26 - 8/20	• Collect age and size data from spawned out chinook	TFN	All aspects
	• Enumerate spawning escapement of chinook		
Chinook Aerial Surveys			
8/10 - 8/15	• Enumerate chinook salmon spawning in Little Tahltan, Beattie, and Andrew tributaries.	ADF&G	All aspects

Table A1. (page 4 of 4)

Project/Dates	Function	Agency	Involvement
Coho and Sockeye Aerial Surveys			
9/4 - 10/31	1. Enumerate Stikine River coho and sockeye salmon spawning in select index areas within the Canadian portion of the Stikine River.	TFN/DFO	All aspects
10/05 - 10/31	2. Enumerate coho salmon spawning in the US section of the Stikine River	ADF&G	All aspects

Contacts:		
Sandy Johnston or Pete Etherton	(DFO)	All DFO projects.
Cherri Frocklage or Richard Inkster	(TFN)	Inriver sampling projects.
Keith Pahlke	(ADF&G)	Chinook tagging and surveys; Andrew Creek Weir.
Kathleen Jensen	(ADF&G)	106&108 samples, stock assessment, and sockeye tagging.
Brian Lynch	(ADF&G)	Coho aerial surveys.

Canadian staff that may be crossing the Canadian/US border:

Peter Etherton, Cherri Frocklage, Alex Joseph, Matthew Waugh, Nigel Young, Andy Carlick, Wayne Dennis, Derrick Louis, Frances Naylen, others

US staff that may be crossing the Canadian/US border:

Tom Rockne, Kathleen Jensen, Brian Lynch, Keith Pahlke, others

Table A2. Proposed Taku River field projects, 2000.

Project/Dates	Function	Agency	Involvement
Canyon Island Marking Program			
mid April	1. Set up fish wheel/camp, including 2 boats & motors, camp supplies, food/tagging equipment.	ADF&G/ DFO	All aspects
4/26 - 9/30	2. Fishwheel operation • Mark all fish (chinook) captured in wheel through mid-June with spaghetti tags. • Sample for age-sex-length information, 260 sockeye/week throughout sockeye run, 600 coho salmon for the entire season, and about 1 in 4 chinook salmon. • Recover all adipose-clipped chinook and coho caught in wheel.	ADF&G TRTFN DFO	3 staff 1 staff 1-2 staff
Smolt Tagging			
4/7-6/27	• Tagging (CWT) up to 40,000 chinook and 20,000 coho smolt.	ADF&G DFO	All aspects 1-2 staff
Canadian Aboriginal Fishery Sampling and Chinook Fishwheel Operation			
5/1 - 9/30	• Collect and record AFS catch information. • Record tag number for any Canyon Island chinook that are recaptured; release all tagged chinook salmon. • The fishwheel component will take place 05 May to 10 June	TRTFN	All aspects
Nahlin Sampling			
6/1- 8/20	• Adult chinook and opportunistic sampling of sockeye salmon at Nahlin; sample for age-sex-length (600 chinook and 600 sockeye), recover and record all spaghetti tags. Recover heads of all adipose-clipped chinook salmon.	TRTFN	All aspects
Canadian Fishery Sampling			
6/15- 10/16	• Collect and record commercial catch information Catch information shall be sent to DFO Whitehorse; whose staff will provide/relay catch information to management staff, ADF&G (Juneau). • Sample sockeye and coho salmon for age-sex-length; 200 samples per week for sockeye; 520 per season for coho; 300 scale samples per season for chinook. • Recover CWTs from coho and chinook (i.e., those heads returned by fishers or taken in adipose fish samples).	DFO	All aspects

Table A2. (page 2 of 4)

Project/Dates	Function	Agency	Involvement
	• Examination of sockeye and coho salmon for secondary mark, minimum 400 per week each species. • Collect 60 sockeye otolith samples per week for determination of contribution of planted fish; send otolith samples to ADF&G for processing. • Collect and record all spaghetti tags caught in inriver fisheries, pay fishers for tag recoveries and maintain receipt book.		
Chinook Creel Census			
6/26 – 8/4	• Survey anglers in the Nakina River • Sample for tags, age, size, sex.	DFO/ TRTFN	All aspects
District 111 Fishery Sampling			
6/21 - 9/30	• Sample a minimum of 20% of chinook and coho catches for CWT; all species except pinks for age-sex-length (goals are 600 per week for sockeye and 600 per season for chinook, chum, and coho). • Collect 600 matched brain-parasite/scale/otolith samples per week from sockeye with sub-district specific goals	ADF&G	All aspects
Kuthai Sockeye Sampling			
7/10- 9/01	• Maintain adult sockeye salmon weir at Kuthai Lake; enumerate and sample for age-sex-length (600 samples) and recover spaghetti tags.	TRTFN	All aspects
Little Trapper Sampling			
7/16- 9/12	• Maintain adult sockeye salmon weir at Little Trapper Lake; enumerate and sample for age-sex-length (750 samples) and recover spaghetti tags. • Examine chinook salmon for tags & secondary marks.	DFO	All aspects
Aerial chinook surveys			
7/25- 8/25	• Aerial surveys of spawning chinook salmon in index tributaries of Nakina, Nahlin, Dudidontu, Tatsatua, Kowatua, and Tseta rivers	ADF&G	All aspects
Nakina Chinook Escapement Estimation			
7/28 - 8/28	• Maintain chinook carcass weir enumerate chinook. • Sample every fourth (minimum 600) chinook for age-sex-length and all other chinook for sex-length.	TRTFN	All aspects

Table A2. (page 3 of 4)

Project/Dates	Function	Agency	Involvement
	• Recover and record all spaghetti tags, examination of fish for secondary mark, examination of all chinook salmon for adipose clips and recover all heads from adipose clipped fish for coded wire tags.		
Sockeye Sampling			
7/28 - 8/28	• Sample Nakina and Silver Salmon origin sockeye for age-sex-length.	TRTFN	All Aspects
Tatsamenie Sampling			
5/15 – 6/24	• Conduct sockeye smolt mark-recapture study to estimate abundance of wild and enhanced smolt;	DFO	All aspects
	• Sample for age, size and stock (wild vs enh'd).		
8/5- 9/30	1. Maintain adult sockeye salmon weir	DFO	All aspects
	• Enumerate sockeye, sample for age-sex-length (750 samples) and recover spaghetti tags.		
	• Collect otoliths from sockeye broodstock taken at weir.		
	• Examine chinook salmon for tags & secondary marks.		
8/23- 9/7	2. Chinook salmon carcass weir at Lower Tatsamenie	ADF&G	All aspects
	• Sample for age-sex-size and		
	• examine for tags and secondary marks on all chinook salmon recovered		
Sockeye Escapement Sampling			
9/5- 9/25	• Sample sockeye escapement in mainstem areas for age-sex-length (400 samples per area) and recovery of spaghetti tags.	ADF&G	All aspects
Chum Aerial Survey			
10/15	• Aerial survey for chum on mainstem, King Salmon Flats	TRTFN	All aspects

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Contacts:		
Scott McPherson	(ADF&G)	Lower river smolt tagging, adult chinook/coho tagging.
Scott McPherson	(ADF&G)	Adult chinook and coho tagging.
		Scott – do we take Ben off the list?
Ben Van Alen	(ADF&G)	Canyon Island adult sockeye tagging.
Kathleen Jensen	(ADF&G)	All ADF&G Com Fish Research Programs.
Keith Pahlke	(ADF&G)	Chinook surveys.
Ian Boyce	(DFO)	All DFO Taku programs
Sandy Johnston	(DFO)	All DFO Taku programs.
Nina Tevely or Richard Erhardt	(TRTFN)	All TRTFN programs.

Canadian staff that may be crossing the Canadian/US border:

Ian Boyce, Marty Strachan, Sean Stark, Mike Martin, Scott Heron, James Grier, others

US staff that may be crossing the Canadian/US border:

Clyde Andrews, Mark Olsen, Kent Crabtree, Ben Van Allen, Kathleen Jensen, Ed Jones, Keith Pahlke, Rich Yanusz. others

Table A3. Proposed Alsek River field projects, 2000.

Project/Dates	Function	Agency	Involvement
Sockeye Mark-Recapture			
6/12-8/25	• Spaghetti tag all fish captured; target is 1,100;	DFO/ADFG	All aspects
	• Recover tags at Klukshu weir and other headwater tributaries	DFO/CAFN	
Chinook Tagging Project			
5/8-9/30	• Tag chinook and sockeye salmon to determine distribution.	ADF&G	All aspects
	• Tag recovery at various locations (see below)	DFO	Tag recovery
Klukshu River Sampling			
6/03 - 10/15	• Enumerate chinook, sockeye and coho salmon at adult weir.	DFO/CAFN	All aspects
	• Estimate sport and aboriginal fishery catches.		
	• Collect age-sex-length information from salmon caught by First Nations (live sampling discontinued) (750 scale samples per species) except chinook, see below.		
	• Sample 300 chinook in sport harvest for scales, sex, length (MEF), CWTs and spaghetti tags.		
	• Sample 1100 chinook at weir for sex, length (MEF), CWTs and spaghetti tags.		
	• Look for chinook and sockeye tagged fish.		
Village Creek sockeye enumeration			
6/10- 10/18	• Enumerate sockeye salmon using an electric counter at Village Creek.	DFO	All aspects
Chinook and Sockeye DNA Stock ID Baseline			
8/1 – 9/30	• Target is 150 samples/stock	DFO	All aspects
	• Up to four separate stocks to be sampled/spp		
Lower Alsek Sampling			
6/14- 9/15	• Sample commercial catches of all salmon at lower Alsek and East River.	ADF&G	All aspects
	• Collect age-sex-length (MEF) data (sockeye-600, chinook-600, coho-500); recover tags from chinook and sockeye.		

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Project/Dates	Function	Agency	Involvement
Escapement Surveys			
8/01- 8/15	1. Aerial surveys of spawning sockeye salmon in index areas of Cabin, Tanis Muddy and Basin creeks (in Canada)	ADF&G	All aspects
8/10	2. Aerial surveys of spawning chinook salmon in index areas of Blanchard, Takhanne, Klukshu rivers and Goat Creek (in Canada)	ADF&G	All aspects
10/01- 10/15	3. Aerial surveys of spawning coho salmon in index areas of Cabin, Tanis, Muddy and Basin creeks (in Canada)	ADF&G	All aspects

Contact:

Peter Etherton	(DFO)	All DFO projects
Sandy Johnston	(DFO)	All DFO projects
Keith Pahlke	(ADF&G)	Chinook aerial surveys, and tagging
Kathleen Jensen	(ADF&G)	Lower Alsek and East Rivers commercial catch sampling
Alan Burkholder	(ADF&G)	Adult chinook tagging, sockeye and coho aerial surveys
Linaya Workman	(CAFN)	CAFN projects

Canadian staff that may be crossing the Canadian/US border:

Mark McFarland, Matthew Waugh, Frances Naylen, Liz Fillatre, Peter Etherton, Robert Jackson, Ron Chambers, others

US staff that may be crossing the Canadian/US border:

Al Burkholder, Robert Johnson Keith Pahlke, others

Table A4. Proposed enhancement projects for transboundary Stikine and Taku rivers, 2000.

Project	Function	Agency	Involvement
Tahltan/Tuya Enhancement Project			
5/8 - 6/30	1. Enumeration and sampling of smolts from Tahltan and Tuya lakes (sample only) (Stikine River, in Canada) and collection of otolith samples to determine planted contribution.	DFO	All aspects
15/55 - 6/20	2. Backplant sockeye fry from Snettisham Hatchery into Tahltan and Tuya lakes and collect plankton data from Tuya Lakes.	DIPAC & ADF&G	All aspects
6/1 - 9/15	3. Plankton samples from Tahltan Lake.	DFO	All Aspects
6/1 - 9/30	4. Hydroacoustic/limnological surveys of Tahltan and Tuya lakes to evaluate success of fry outplant.	DFO	All aspects
9/1 - 9/30	5. Collect 6.0 million sockeye eggs from Tahltan Lake and transport to Snettisham Hatchery in Alaska.	DFO	Egg-take and transport
9/6 - 10/8	6. Sample 200 male and 200 female adult sockeye from Tahltan Lake broodstock for otolith samples.	DFO	All aspects
Tatsamenie Lake Enhancement Project			
5/10 - 6/4	1. Sample smolt outmigration from Tatsamenie (Taku River, in Canada) and conduct mark-recapture program on smolt from Tatsamenie Lake.	DFO	All aspects
5/22 – 7/15	2. Conduct feeding experiments with subsample of planted fry.	DFO	All aspects
5/15 - 5/30	3. Backplant sockeye fry from Lake Snettisham Hatchery into Tatsamenie Lake.	DIPAC & ADF&G	All aspects
6/1 - 9/30	4. Collect plankton samples from Tatsamenie and King Salmon Lakes; conduct hydroacoustic and limnological surveys in Tatsamenie and King Salmon Lakes to evaluate the success or potential success of fry outplants.	DFO	All aspects
8/15 - 10/15	5. Collect up to 5.0 million sockeye eggs from Tatsamenie Lake and transport to Snettisham Hatchery in Alaska.	DFO	Egg-take and transport
Fall-winter	6. Test passive flow incubator in Tatsamenie Lake	DFO	All aspects
Aug - Sep	7. Conduct barrier assessments of Trapper Lake outlet and Nakina Lake access.	DFO	All aspects

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Project	Function	Agency	Involvement
9/6 - 10/8	8. Sample 400 adult sockeye from Tatsamenie Lake egg-take for otolith samples.	DFO	All aspects
Salmon Egg Incubation			
9/97 - 6/98	• Incubation and thermal marking of juvenile sockeye (eggs & alevins) collected from Tahltan (Stikine River) and Tatsamenie (Taku River) lakes at the Snettisham Incubation Facility in Alaska.	DIPAC/ ADF&G	All aspects

Contacts:

Pete Hagen or Kris Munk	(ADF&G)	Otolith marking
Ron Josephson	(ADF&G)	Snettisham Hatchery
Kathleen Jensen	(ADF&G)	Inseason & postseason estimates of planted fish in marine catches.
Eric Prestegard	(DIPAC)	Snettisham Hatchery/DIPAC programs
Steve Reifenstuhl	(NSRAA)	Snettisham Hatchery
Sandy Johnston, Pat Milligan, or Doug Lofthouse	(DFO)	All DFO projects
Peter Etherton	(DFO)	Stikine River drainage programs
Ian Boyce	(DFO)	Taku River drainage programs
Kim Hyatt	(DFO)	Hydroacoustic and evaluation program
Cheri Frocklage	(TFN)	All TFN programs

Canadian staff that may be crossing the Canadian/US border:
flight crew and egg-take crew

US staff that may be crossing the Canadian/US border:
Eric Prestegard, Kevin Stack, flight crew from Alaska Coastal airline