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Salmon Management and Enhancement Plans for the Stikine, Taku and Alsek Rivers, 1992.

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EXECUTIVE SUMMARY

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

This report is organized by river system and salmon species. For each species within each drainage, the pre-season forecast, spawning escapement goals, harvest sharing objectives, and management procedures are presented. For salmon stocks of the Stikine River, details of the stock assessment program are also presented.

The pre-season forecast for the Stikine River sockeye salmon run in 1992 is approximately 127,000 fish. This is an above average run from which a total allowable catch of 67,000 fish could be shared by the two Parties. The escapement goal of 60,000 sockeye salmon has not been changed. The in-season predictions of run size during the 1992 season, as determined by the Stikine Management Model, are based on historical data from 1982 to 1991. The stock assessment program for the river is similar to last year. The 1992 runs of chinook and coho salmon to the Stikine River are expected to be about average. There are no major changes to the management plans for the other species of salmon originating in the Stikine River.

It is expected that the run sizes of Taku River sockeye, pink, and chum salmon will be below average; the coho run is expected to be below average to average; and the chinook run is expected to be average to above average. Management of Taku River salmon stocks will be similar to that of previous years.

Alsek River chinook and coho salmon runs are expected to be above average in 1992. The overall sockeye run is expected to be below average consisting of an above average early run and a larger, but below average late run. No major changes to the management plan for Alsek salmon are anticipated.

Sockeye salmon enhancement will continue in 1992 in the Stikine and Taku drainages. The following fry out-plants from the 1991 egg-takes are scheduled to occur in June: 1.4 million to Tahltan Lake; 2.6 million to Tuya Lake; 1.3 million to Tatsamenie Lake; and 1.9 million to Trapper Lake. To date, egg-to-fry mortality rates have been low with the exception of Little Trapper Lake stock which encountered an outbreak of IHNV resulting in the mortality of approximately 600,000 fry. Egg-take targets for the fall of 1992 are as follows: 5.4 million at Tahltan Lake; 1.75 million at Little Tatsamenie Lake; and 2.75 million at Little Trapper Lake.

Most of the stock assessment and research programs conducted in 1991 will be continued in 1992. Notable exceptions include the cancellation of aerial surveys for coho salmon on the Taku River, and the termination of the Little Tatsamenie coho CWT project. New programs include matched parasite and scale sampling in the District 111 sockeye fishery to improve stock identification accuracy, and a major radio-tagging program for studying Taku River coho salmon.

INTRODUCTION

Management of transboundary river salmon to achieve conservation, allocation and enhancement objectives, as stipulated by the Pacific Salmon Treaty, requires a cooperative 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 cooperative management by presenting the 1992 forecasts, summarizing the management and enhancement goals, and outlining the procedures to be used by the Canadian Department of Fisheries and Oceans (DFO) and the Alaska Department of Fish and Game (ADF&G) during the conduct of the 1992 fisheries on the Stikine, Taku and Alsek river salmon stocks. With the exception of Stikine sockeye salmon, for which a numerical forecast is required by the Treaty, forecasts are given qualitatively, with reference to brood year escapement data where available.

STIKINE RIVER

Sockeye Salmon

Pre-season Forecast

For 1992, the total run forecast for Stikine River sockeye salmon is 127,338 fish of which 44% are predicted to be of Tahltan Lake origin. The 1992 prediction is derived by averaging a sibling and smolt forecast for Tahltan Lake sockeye salmon, (80,962 sockeye - sibling forecast; 30,862 sockeye - smolt forecast), and adding this to the forecast of 71,426 non-Tahltan sockeye salmon which is the average of a sibling forecast (96,782 sockeye) and a spawner-recruit forecast (46,069 sockeye). The pre-season forecast of total allowable catch (TAC) is 67,338 sockeye salmon.

Tahltan Lake Sockeye Forecast: There is a linear correlation between the returns of age-1.2 (4_2) fish in one year and the total run the following year for some sockeye stocks. Most of the linear relationship is due to the strong correlation among sibling returns for a given brood year. The "sibling forecast" for Stikine sockeye salmon stocks predicts the total run in a given year from the age-1.2 (4_2) return in the previous year, whereas, a true sibling forecast usually predicts age-specific returns of siblings from a common brood year.

The 1992 sibling forecast for Tahltan Lake sockeye salmon was based on data from 1983 through 1991. Runs were reconstructed using age-specific data from catches in U.S. Districts 106 and 108 commercial and test fisheries, the Canadian lower river commercial and test fisheries and upper river commercial and Indian food fisheries, and from the escapement. For years in which U.S. test fishery catches were not sampled, catches were assumed to have the same weekly age and stock compositions as the appropriate commercial catches. It was assumed that 90% of the Canadian commercial and Indian food fishery catches of sockeye salmon in the upper Stikine River were composed of fish originating from Tahltan Lake; it was also assumed that the age composition of the portion of the catch assumed to be of Tahltan Lake origin was the same as the Tahltan Lake escapement.

Linear regression of age-1.2 (4_2) Tahltan Lake sockeye salmon ($T_{1.2}$) on the following year's total run (catch and escapement, all ages) of Tahltan Lake sockeye salmon (T) for the years 1983 to 1990 yielded the following equation:

$$T = 16{,}823 + 7.489 \times (T_{1.2})$$

The coefficient of correlation (r) of this relationship is 0.86. The slope is statistically greater than zero ($t=4.084$, $df=6$, $p=0.0032$, one-tailed test). Based on the above equation and a total return estimate of 8,565 age-1.2 (4_2) sockeye in 1991, the 1992 sibling forecast for Tahltan sockeye salmon is 80,962 fish.

The Tahltan Lake sockeye smolt forecast is based on the average age-specific survivals of sockeye smolt emigrating from Tahltan Lake to subsequent age-specific adult returns. Since 1984, when smolt enumeration began, the average survival of age 1+ smolt to adults is 0.6% to age 1.2 (4_2) and 4.2% to age 1.3 (5_2). The average survival of age 2+ smolt is 2.4% to age 2.2 (5_3) and 5.8% to age 2.3 (6_3). Applying these survival rates to the 1989 and 1990 smolt counts by age class, which are the years from which the 1992 adult run will originate, gives a smolt-based forecast for 1992 of 30,862 Tahltan sockeye salmon.

The average of the sibling- and smolt-based forecasts is 55,912 Tahltan Lake sockeye salmon, an above average run. The 1982-1991 ten-year average run size is 44,715 fish.

Non-Tahltan Lake Sockeye Forecast: The methods used to forecast the non-Tahltan Lake sockeye salmon forecast for 1992 include a sibling forecast technique and spawner-recruit regression analysis. The point estimate given for the 1992 forecast is the average of the forecasts derived from these methods. A brief description of each method and resulting forecast is given below.

The spawner-recruit non-Tahltan sockeye forecast was derived from data for the 1984 to 1991 sockeye runs. Runs were reconstructed using age-specific data from the U.S. District 106 and 108 commercial and test fisheries, the Canadian lower river commercial and test fisheries and upper river commercial and Indian food fisheries, and from the estimated escapements. For years in which U.S. test fishery catches were not sampled, catches were assumed to have the same weekly age and stock compositions as the appropriate commercial catches. It was assumed that 10% of the upper river commercial and Indian food fishery catches in Canada were composed of non-Tahltan stocks; it was also assumed that the age composition of the assumed catch was the same as that of the non-Tahltan sockeye catch in the lower river test fishery. Age-specific linearized Ricker spawner-recruit curves were

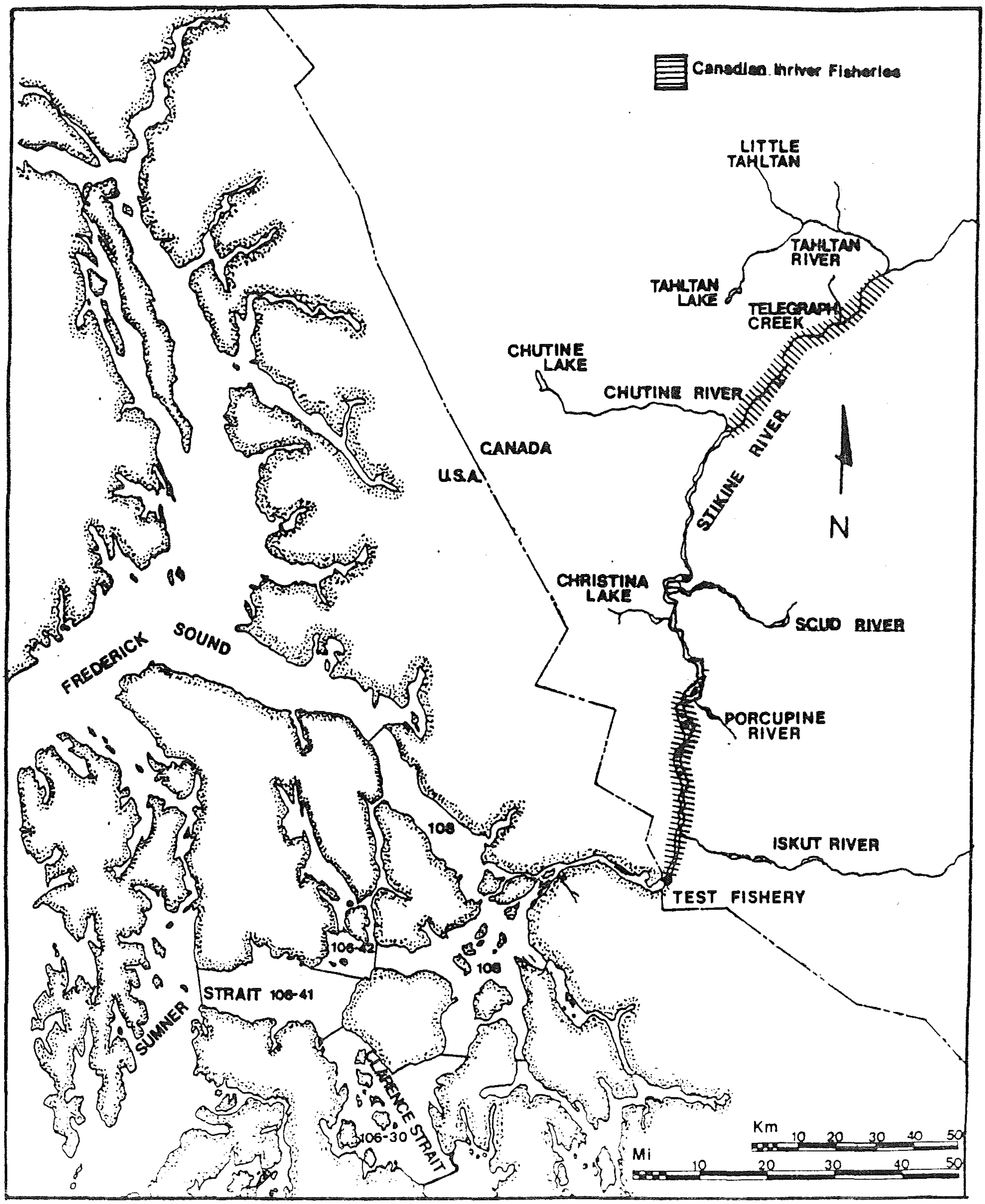

Figure 1. Location of principal U.S. and Canadian fishing areas where Stikine River salmon stocks are caught.

fitted to the sockeye runs from 1984 to 1991. The data were run through a simulation procedure and the resultant medians were used to predict the 1992 non-Tahltan sockeye run of 46,069 fish.

The 1992 non-Tahltan sockeye sibling forecast was based on data from 1983 through 1991. Runs were reconstructed using age-specific data from catches in U.S. District 106 and District 108 commercial and test fisheries, the Canadian lower river test and commercial fisheries and upper river commercial and Indian food fisheries, and from the estimated escapements. For years in which U.S. test fishery catches were not sampled, catches were assumed to have the same weekly age and stock compositions as the appropriate commercial catches. It was also assumed that 10% of the catches in the Canadian commercial and Indian food fisheries in the upper Stikine River were of non-Tahltan Lake origin having the same age composition as the catch of non-Tahltan sockeye salmon in the lower river test fishery.

Linear regression of age-1.2 (4_2) non-Tahltan sockeye salmon ($N_{1.2}$) on the following year's total run (catch and escapement, all ages) of non-Tahltan sockeye salmon (N) for the years 1983 to 1990 yielded the following equation:

$$N = 20{,}962 + 5.548 \times (N_{1.2}).$$

The coefficient of correlation (r) of this relationship is 0.68. The slope is statistically greater than zero ($t=2.252$, $df=6$, $p=0.0326$, one-tailed test). Based on the above equation and a total return estimate of 13,666 age-1.2 (4_2) non-Tahltan sockeye in 1991, the 1992 sibling forecast for non-Tahltan sockeye salmon is 96,782 fish.

The average of the spawner-recruitment- and sibling-based forecasts is 71,426 non-Tahltan sockeye salmon. This also constitutes an above average run; the 1982-1991 ten-year average non-Tahltan run size is 51,965 fish.

For 1992, there is a wide range in the Tahltan and non-Tahltan sockeye forecasts. The two techniques for each stock produced different forecasts; it is not known which forecast will most accurately predict the run. The various forecast techniques employed suffer from a relatively short time series of data and, therefore, not surprisingly, there has been wide discrepancies between past forecasts and actual runs. The relative uncertainty of each of the two methods is summarized below:

Stock	Forecast Method	1992 Forecast	Avg Absolute Error From Cross Validation		Prediction Interval	
			#	%	@ α = 0.05	@ α = 0.10
Tahltan	Sibling	80,962	27,691	70.9	23.8k-138.1k	35.2k-126.8k
Tahltan	Smolt	30,862	14,657	93.5	na	na
N-Tahl	Sibling	96,782	21,834	41.2	30.0k-163.6k	43.3k-150.3k
N-Tahl	S/R	46,069	20,511	38.4	20.3k-128.7k	23.5k-102.6k

note: For the smolt technique, the error applies to forecast simulations based on the average survival of all age groups (rather than individual age-specific age classes). The prediction interval for the spawner-recruit forecasts for the non-Tahltan run is based on simulation. The prediction interval for the sibling forecasts is a measure of the uncertainty of the predictions based on the sample variance and the distance X_0 is from the mean value of X. It is based on the following equation:

$$P_I = \pm t_{n-1,1-\alpha/2} S_{Y|X} \sqrt{1 + \frac{1}{n} + \frac{(X_0 - \bar{X})^2}{(n-1)S_X^2}}$$

where:

P_I	=	the prediction interval;
$t_{n-1,1-\alpha/2}$	=	value from statistical tables based on sample size (n), and desired significance level (α);
$S_{Y\|X}$	=	the sample variance;
X_0	=	the value of X used to predict Y;
$\bar{X}$	=	mean value of X data points;
S^{2X}	=	sample variance of X's.

Spawning Escapement Goals

Two sockeye stocks are recognized for the Stikine River: the Tahltan Lake stock which spawns in Tahltan Lake and the non-Tahltan stock which is a conglomerate of stocks which spawn elsewhere throughout the drainage. These stocks are considered to be independent. Surpluses or deficits in escapement realized in one stock shall not be used to balance deficits or surpluses in the other.

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. At present, our best judgement of the escapement goals for these stocks are:

Tahltan Lake Stock:

	TARGET = mid-point = 30k				
Escapement	0 - 18k	18k - 20k	20k - 40k	40k - 50k	>50k
Mgmt. Category	Red	Yellow	Green	Yellow	Red

Non-Tahltan Stocks:

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

A post-season 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 following databases for the Tahltan Lake stock will be developed and exchanged for use in evaluating escapement goals:

1. total returns from various levels of spawning escapements;
2. smolt production as a function of the number of spawners; and
3. adult production as a function of the number of smolts.

The following databases for the non-Tahltan stock will be developed and exchanged for use in evaluating escapement goals:

1. total returns from various levels of spawning escapements;
2. survey counts of non-Tahltan escapement indices; and
3. inventory and assessment data regarding the historical pattern of distribution, abundance, and timing of spawning fish.

Methodology for the analysis of the above-named databases is being developed by the Transboundary Technical Committee (TRTC) and will be used in reviewing escapement goals.

Harvest Sharing Objectives

The harvest and management of Stikine River stocks for the period 1988 through 1992 is governed by Annex IV, Chapter 1, of the Pacific Salmon Treaty as negotiated by the Pacific Salmon Commission in February of 1988. Sharing arrangements for sockeye salmon in 1992 are:

Sockeye Total Allowable Catch		Canadian Allowable Catch	
From	**To**	**Minimum**	**Maximum**
0	0	4,000	4,000
1	20,000	10,000	15,000
20,001	60,000	15,000	20,000
60,001	infinity	20,000	30,000

Under this annex, the U.S. is allowed to catch the remainder of the total allowable catch (TAC) of sockeye after the Canadian allowable catch is subtracted from the total. However, even when the calculated TAC for the U.S. is low or zero, incidental catches of Stikine sockeye salmon are allowable in District 106. This schedule, which is conditionally in effect through 1992, is tied to a commitment by the Parties to undertake a cooperative sockeye enhancement program commencing in 1989; an obligation which is currently being met.

Management Procedures

United States: The fishery in Section 6-A (Sumner Strait, Figure 1) will open on the third Sunday in June (June 21, statistical week 26). Returning Stikine River sockeye salmon are a primary management concern during the first four weeks of the fishery. After that time, other sockeye stocks and salmon species greatly overshadow Stikine sockeye salmon in the catch. District 108 is generally managed through mid-July with Stikine sockeye salmon as the primary management consideration. Subsequent openings in Districts 106 and 108, after mid-July, will be based upon run sizes determined from the Stikine Management Model plus other jointly agreed to measurements of abundance. Initial openings in District 108 will be restricted to the outer areas of the district in order to minimize the interception of adult chinook salmon. Chinook salmon catches will also be a management concern in District 106 throughout the season and, if large numbers of small feeder chinook are caught, night closures will be instituted.

Announcements for fishery openings throughout Southeast Alaska are made on Thursday afternoons for gillnet fisheries, which begin the following Sunday. The U.S. fishery has historically fished these districts for one to three days per week with occasional closures or longer fishing periods during extremes in stock abundance. If weekly catch-per-unit-effort (CPUE) is above average, extensions in fishing time could occur. Weekly fishing time is regulated on gross evaluations of run strength. Achieving the desired escapement goal into the Stikine River and into major Alaskan sockeye systems is the primary objective. The secondary objective is achieving the harvest sharing arrangement in effect. Fishing gear used in Districts 106 and 108 is similar; common sockeye net sizes are between 5⅛ and 5½ inches (130 - 140 mm) stretched mesh, 60 meshes deep and 300 fathoms (549 m) long.

Management responses that will be used to reduce the sockeye harvest would begin with restrictions in fishing time in District 108. Next, closures of that district would be used followed by restrictions in fishing time in Sumner Strait. Finally, the most complete restriction would be the additional closure of Sumner Strait. The management responses for more liberal fisheries would start with increases in fishing time in District 108 and would extend to increases in time in District 106. When both districts are open, the fishing times in each will coincide, if possible.

A number of domestic considerations are involved in the District 106 and 108 fisheries. In District 108, chum salmon returns into Frederick Sound are a management consideration beginning the end of June. Chum salmon run strength assessments are based upon CPUE in test fishery catches. Pink salmon are occasionally a consideration in District 108 beginning in July. Pink salmon run strength assessments are based upon escapement surveys and CPUE in the test fisheries. Beginning in mid-June and occasionally extending to early August, sockeye runs in U.S. systems are a management consideration. The assessments of the strength of these runs are based upon commercial and test fishery CPUE, weir counts, and scale pattern analysis (SPA) to determine stock composition. Beginning in mid-July, pink salmon run strength may be a management consideration in the District 106 fishery. Assessment of pink run strength is based upon the predicted return, CPUE, and total catches in the commercial and test fisheries. Availability of pink and chum salmon in District 106 and District 108 is expected to be slightly above average in 1992.

Troll fishery regulations for 1992 are moderately different from those in effect in 1989 through 1991. The Alaska Board of Fisheries has set a catch limit of 35,000 non-Alaska hatchery-origin chinook salmon for the months of May and June. Experimental fisheries will occur two days per week in confined areas close to the hatchery release sites. Three experimental areas will be open in Frederick Sound initially on May 26-27 at Cape Fanshaw, Big Creek and Beacon Point, and in Stikine Strait on June 8-9 at Steamer Point. Inside waters will be open for a region-wide hatchery access fishery on June 1-3. A second opening will occur in late June if the catch during the first opening does not exceed 25,000 non-Alaskan hatchery origin chinook salmon, and if the projected total catch for May and June falls below 35,000 chinook (non-Alaskan hatchery-origin).

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: stock identification results from catches in Alaskan Districts 106 and 108 and in the Canadian lower river gillnet fishery; CPUE data from targeting fisheries; catch data; and escapement requirements. Consideration for Tahltan Lake sockeye stock management objectives should persist from the fishery opening June 29 to the end of July. Thereafter, the management attention will be focused primarily on non-Tahltan stock objectives. Actual time frames of responses to specific stock compositions will be fine-tuned in-season according to the weekly results of the stock identification program.

The achievement of escapement objectives is the foremost priority in management considerations. In-river allocation priority will be to fulfill the requirements of the traditional Indian food 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. Normal fishing periods of one to two days per week will be adjusted accordingly. Traditional gear limitations of one net per fisherman with a maximum length of 135 meters will be in effect. Fishing boundaries will remain unchanged from those established in previous years, i.e. from the international border upstream to boundary markers located near the Stikine-Porcupine confluence, and in the Iskut River to a marker located approximately 2 km. upstream from the mouth. In the upper Stikine commercial fishery, one day of fishing will be permitted each week. As in past years, weekly fishing times in the Indian food fishery will not normally be restricted.

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 Indian food fishery, reductions in fishing time would be considered if no other adjustments could be made in the lower and upper river commercial fisheries. Conservation measures for the protection of chinook salmon in the lower river commercial fishery include a maximum mesh size of less than 146 mm (5¾) through mid-July.

In the event that a more liberal management regime is justified, extensions to fishing time in the lower Stikine fishery for up to 24 hours would be granted. Additional fishing time beyond this would be dependent on stock escapement and catch considerations.

Summary: Attainment of escapement goals for the Tahltan and non-Tahltan portions of the run is the primary objective of Stikine sockeye management. Harvest sharing will be based upon the TAC projections derived from the model. The TAC estimates will likely change from week to week as the Stikine Management 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. If the model projection moves the TAC into a different harvest range for the following week, and the change is due to a difference of 2,000 or less sockeye salmon, managers may decide to wait for two similar consecutive weekly results before altering fishing time.

In-season 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.

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.

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

1. the lower river commercial fishery;
2. the upper river commercial fishery;
3. the Indian food fishery; and
4. the lower Stikine River test fishery conducted near the international border.

<u>Age Composition of Sockeye in Catches</u>: 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 fishery each week. Scale samples will not be collected from the upper river commercial and subsistence fisheries. Instead, samples collected at the Tahltan Lake weir will be used to characterize the age composition of catches of sockeye salmon in the upper river. Sockeye salmon caught in the lower Stikine River test fishery will be sampled for scales and for egg diameter, sex, and length data. Scale impressions will be available to ADF&G.

<u>Stock Composition of Alaska Catches</u>: During the fishing season, SPA will be used to estimate the contribution of Tahltan Lake and non-Tahltan sockeye stocks to the catches made each week in each subsection of District 106 (Clarence Strait and Sumner Strait), and District 108. The desired sample size from each of these strata is 600 fish per week. It is recognized that small catches in District 108, similar to previous years, may preclude temporal stratification at the desired level. A test fishery will be conducted in Frederick Sound beginning in statistical week 25. When a commercial fishery does not operate, stock composition estimates will be made using samples collected from the test fishery. In District 106, when a commercial fishery does not operate, a test fishery will be instituted for scale sample collection and abundance estimation. Post-seasonally, the estimates of stock composition will be updated based on revised scale pattern standards.

<u>Stock Composition of the In-river Canadian Catch</u>: Egg diameter data will be used to estimate the Tahltan Lake versus non-Tahltan contribution to the sockeye catches during the fishing season. This will also be the data used post-seasonally. Egg diameters will be measured from a desired sample size of 100 female sockeye salmon each week to determine stock composition; a total of 350 sockeye salmon will be randomly sampled each week for scales and sex. It is necessary to match the scale and egg data by fish to develop post-season stock-specific age composition estimates, and for the development of post-season scale pattern standards.

<u>Stock Composition and Run Timing in the Canadian Test Fishery</u>: The proportion of Tahltan Lake and non-Tahltan Lake sockeye salmon in test net catches in the lower Stikine River will be estimated in-season based on egg diameter data. Canada shall sample all fish for scales and all females for egg diameter (data to be matched with scale samples). The post-season estimate will be based on the egg diameter data.

Spawning Escapement Estimates: An adult enumeration weir will be used to determine the Tahltan Lake sockeye escapement. The age composition will be estimated from scale samples. Approximately 800 fish will be sampled during the season for scales, length, and sex. The non-Tahltan escapement will be estimated using migratory timing information obtained from CPUE data from the drift test fishery located near the international border combined with weekly stock compositions estimated from the combined drift and set net test fishery catches.

Post-season SPA standards: Scale pattern standards for Tahltan and non-Tahltan lake sockeye stocks will be made from scale samples collected in-river. For the Tahltan Lake stock, samples will be taken from both male and female sockeye at the Tahltan Lake weir, and from female sockeye caught in the lower river fisheries having small-diameter eggs. For the non-Tahltan stock, samples will be taken from female sockeye 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 Lake to non-Tahltan lake sockeye salmon in the test fishery is used post-seasonally 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 will be used to determine stock proportions in the test fishery catches for both in-season and post-season 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 1982 to 1991, used as input to the Stikine Management Model for 1992 is presented in Tables 1 to 3. The 1992 run size estimated by the model at the end of the fishing season will be updated in the fall of 1992 using post-season 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 in-season predictions of the total run and the total allowable catch (TAC) during the 1992 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**. 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 River sockeye salmon.

The model for 1992 is based on ten years of historical CPUE data from District 106 and nine years from the Canadian commercial fishery in the lower river. (There was no commercial fishing in-river in 1984.) A FORTRAN program has been written to determine the coefficients of the linear model of run size regressed on cumulative CPUE for each week of the fisheries beginning in week 26 for the District 106 fishery, and week 27 for the lower river fishery. The parameters from the linear regressions are presented in Table 4. In the past, two sets of CPUE data have been used to predict the total run. These included:

1. the District 106 cumulative CPUE of Stikine sockeye stocks which was used to predict the total run of Stikine River sockeye; and

2. the cumulative CPUE from the Canadian lower river commercial fishery which was used to predict the in-river Stikine River sockeye run. The total run was then determined as the in-river run plus the catch of Stikine River sockeye salmon in District 106, which was estimated as 10% of the total run (i.e. in-river estimate/0.9), plus the projected Stikine River sockeye catch in District 108.

As in 1991, the 1992 in-season model predictions will be based on the second method as described above. The reason for this is that weekly regressions of CPUE on total run using the in-river data usually have higher coefficients of correlation compared to those based on the District 106 CPUE data for corresponding weeks (Table 4). Predictions from the District 106 data will continue to be made to verify in-season estimates and provide post-season comparisons.

The TAC of Stikine sockeye salmon for the 1992 season will be determined each week from run size estimates according to the following schedule:

1. weeks 26 and 27 (6/21-7/04): the pre-season forecast of run size will be used;

2. weeks 28 and after (7/05-end of season): an estimate of run size will be determined each week from the cumulative CPUE of sockeye salmon in the lower river commercial fishery.

Separate projections of run size will be made for the Tahltan Lake stock and for the entire Stikine sockeye run. This information will be used post-seasonally to help evaluate the performance of the model.

The estimates of TAC made each week after statistical week 27 will be based on CPUE data from the lower Stikine commercial fishery. In the event that the commercial fishery is closed for a given week, the CPUE data from the lower Stikine test fishery will be used. In this case, the average test fishery CPUE from Monday through Wednesday will be used.

The part of the model which determines total and weekly TAC levels for the U.S. and Canadian fisheries has been written on a Lotus worksheet for use by managers in-season. This part of the model uses the coefficients from the linear regression model, the established escapement goals, and Annex provisions of harvest sharing to determine the total TAC for each country. Weekly estimates of TAC and effort are provided as guidelines for the managers and are derived from the 1982-1991 average run timing of the stocks and the corresponding average CPUE levels of each fishery.

In-season Use: For 1992, 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.

Post-season 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 1991, the preliminary evaluation may be found in: **Preliminary Estimates of Transboundary River Salmon Production, Harvest, and Escapement and a Review of Joint Enhancement Activities, 1991**, Transboundary Technical Committee, December, 1991[1]. The summarized output of the Stikine Management Model during the 1991 fishing season is presented in Table 5. The in-season analyses under-estimated the U.S. marine catch of Stikine origin sockeye due to problems in distinguishing Stikine River and Alaskan stocks. This was corrected post-season with the use of current-year standards for stock identification.

Coho Salmon

Pre-season Forecast

The lack of information on the brood escapement or smolt production precludes specific numerical forecasts. A qualitative prediction of the 1992 run is that it will be of average magnitude based on the catches in the coho test fishery in the two principal brood years, 1988 and 1989. The return of 4-year-olds is expected to be below average; whereas, the return of 3-year-olds should be above average.

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[1] This report will be finalized in the winter of 1992/93 and published in the PSC series.

Escapement Goal

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

Harvest Sharing Objectives

Under Annex IV, Canada is allowed a maximum harvest of Stikine coho salmon of 4,000 fish.

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.

Management Procedures

United States: 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. The Canadian harvest allocation of 4,000 coho, as specified in the Annex IV of the Pacific Salmon Treaty, will be the basic management guide in the in-river fishery.

Chinook Salmon

Pre-season Forecast

The escapement through the Little Tahltan River chinook weir was below average in 1986 (2,891 counted) and slightly above average in 1987 (4,783 counted); 1986 and 1987 are the principal brood years of the 1992 run. For comparison, the 1985 to 1991 average weir count is 4,527 chinook. Overall, an average run size is expected in 1992. However, it should be noted that uncertainty over the historical total stock size, due to a lack of marine harvest data and total in-river spawning estimates, makes it difficult to relate the expected return with previous years.

Escapement Goal

The Transboundary Technical Committee recently revised the interim escapement goal range for Stikine River chinook salmon to make it more relevant to the current index escapement monitoring system. The former goal of 19,800 to 25,000 chinook salmon was a system-wide goal. Unfortunately, there is not an annual program to estimate the system-wide escapement. There is, however, an annual index escapement monitoring program using an enumeration weir on the Little Tahltan River. Therefore, it seemed more appropriate to express the goal in terms of the Little Tahltan River chinook count, for which annual data is collected, than in terms of a total system escapement which requires a number of unquantified and variable assumptions to be made in order to arrive at an annual estimate.

The new interim index escapement goal is 5,300 chinook salmon (excluding jack chinook) through the Little Tahltan River weir. Management systems have not yet evolved to actively target chinook escapement goals, although both countries have adopted conservative management plans with respect to chinook salmon to enable stocks to rebuild by 1995.

Harvest Sharing Objectives

Under Annex IV, Canada is allowed to harvest Stikine chinook salmon as an incidental harvest in the directed fishery for sockeye and coho salmon. Both Parties are to take appropriate management actions to ensure that escapement goals for chinook salmon bound for the Canadian portions of the Stikine River are achieved by 1995.

Management Procedures

<u>United States</u>: Initial openings in District 108 will be restricted to the outer areas of the district in order to minimize the interception of adult chinook salmon. Chinook salmon catches will also be a management concern in District 106 throughout the season and, if large numbers of small feeder chinook are caught, night closures will be instituted.

<u>Canada</u>: Chinook will be harvested in the commercial fisheries incidentally during the early sockeye fishery. Mesh size restrictions (maximum 146 mm) will be in effect through mid-July 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.

Table 1. Stikine River sockeye run sizes, 1979 to 1991.

Year	In-river run size estimates: Canada	U.S.	Average	Marine Catch[a/]	Total Run	Escapement
All Stikine Sockeye						
1979		40,353	40,353	8,299	48,652	26,819
1980		62,743	62,743	23,206	85,949	41,824
1981		140,029	140,029	27,538	167,567	112,405
1982		68,761	68,761	43,329	112,090	48,221
1983	77,260	66,838	71,683	5,810	77,493	50,563
1984	95,454	59,168	76,211	7,928	84,139	70,884
1985	237,261	138,498	184,747	29,747	214,494	157,943
1986			69,036	6,420	75,456	51,190
1987			39,264	4,077	43,342	27,981
1988			41,915	3,181	45,096	25,377
1989			75,054	15,335	90,389	53,415
1990			57,386	9,856	67,242	37,422
Averages						
1979 - 1990			77,265	15,394	157,059	58,670
1981 - 1990			82,409	15,322	97,731	63,540
1991			122,891	34,168	157,059	97,752
Tahltan Sockeye Stock						
1979			17,472	5,076	22,548	10,211
1980			19,137	11,239	30,376	11,018
1981			66,514	16,189	82,703	50,790
1982			42,493	24,785	67,278	28,257
1983			32,684	5,104	37,788	21,256
1984			37,571	3,251	40,822	32,777
1985			86,008	25,197	111,205	67,326
1986			31,015	2,757	33,771	20,280
1987			13,413	2,255	15,668	6,958
1988			7,222	2,129	9,351	2,536
1989			14,111	1,556	15,667	8,316
1990			23,923	2,307	26,230	14,927
Averages						
1979 - 1990			32,506	8,487	40,993	22,888
1980 - 1989			35,346	8,553	43,899	25,342
1991			67,393	23,468	90,861	50,135

a/ The marine catch includes test fishery catches.

Table 2. CPUE for all sockeye salmon and the proportion of Tahltan stock in the catch from the Canadian lower Stikine River commercial fishery from 1982 to 1991. For periods when the fishery was closed, values were filled in with averaging and interpolation techniques (these values are underlined in the table). For the 1992 regressions of total run on cumulative CPUE, the cumulative CPUE started with week 27, the week the fishery opens in 1992.

CPUE of all Sockeye Salmon in Catch

Week	1991	1990	1989	1988	1987	1986	1985	1983	1982
26	14.8	13.0	25.5	3.0	3.0	2.8	67.6	12.8	13.3
27	120.3	49.6	48.1	21.8	11.9	18.8	75.0	39.3	49.5
28	121.0	78.6	23.1	35.5	10.6	79.8	100.1	62.2	46.9
29	114.4	110.3	105.5	69.2	57.9	58.1	260.0	72.8	24.0
30	53.7	81.4	140.8	71.9	67.8	84.7	147.9	53.3	29.1
31	83.8	62.1	73.9	61.9	27.6	81.9	104.7	92.0	13.6
32	31.6	54.4	60.8	89.2	76.6	55.6	73.6	64.3	20.5
33	15.7	16.2	28.4	33.3	32.3	34.1	58.6	54.7	7.7
34	1.0	12.4	16.4	23.1	16.5	25.9	18.2	14.7	3.6
35	4.2	13.1	6.2	11.0	5.4	9.4	10.3	11.9	1.3

Proportion Tahltan Stock in Catch

Week	1991	1990	1989	1988	1987	1986	1985	1983	1982
26	0.80	0.73	0.65	0.77	0.74	0.73	0.89	0.83	0.93
27	0.83	0.80	0.49	0.77	0.74	0.77	0.90	0.86	0.93
28	0.86	0.69	0.38	0.69	0.88	0.83	0.90	0.83	0.89
29	0.75	0.35	0.21	0.42	0.66	0.73	0.79	0.62	0.67
30	0.37	0.25	0.03	0.27	0.24	0.52	0.42	0.48	0.42
31	0.12	0.06	0.02	0.10	0.11	0.19	0.29	0.24	0.16
32	0.08	0.03	0.02	0.04	0.05	0.09	0.20	0.14	0.20
33	0.00	0.03	0.00	0.07	0.04	0.02	0.20	0.11	0.21
34	0.00	0.03	0.00	0.09	0.07	0.01	0.20	0.09	0.21
35	0.08	0.01	0.00	0.00	0.08	0.00	0.20	0.02	0.21

Table 3. CPUE of all sockeye salmon and the proportion of Stikine River Tahltan and non-Tahltan stocks in the catch from the U.S. District 106-41/42 commercial fishery from 1982 to 1991. For periods when the fishery was closed, values were estimated using averaging and interpolation techniques (these values are underlined in the table). For the 1992 regressions of total run on cumulative CPUE, the cumulative CPUE started with week 26, the week the fishery opens in 1992.

CPUE of all Sockeye Salmon in Catch

Week	1991	1990	1989	1988	1987	1986	1985	1984	1983	1982
25	51.4	29.2	46.8	16.5	19.3	14.1	91.0	45.3	38.2	101.9
26	117.0	33.6	51.9	22.9	29.1	16.9	126.9	69.6	57.7	119.1
27	52.9	78.2	66.1	58.7	52.2	63.0	162.9	89.4	38.6	124.9
28	90.8	84.5	147.1	66.8	103.9	75.5	117.4	80.9	65.9	156.9
29	87.5	116.1	109.4	103.6	83.9	88.0	113.3	79.7	76.1	160.5
30	95.5	176.9	89.4	87.6	155.9	100.6	108.7	148.3	69.9	164.1
31	100.7	78.4	93.4	59.3	106.6	105.8	189.1	53.0	44.4	137.3
32	52.7	45.1	36.2	92.2	115.4	82.1	69.0	45.6	40.5	95.2
33	24.7	30.6	33.5	67.7	88.3	60.1	100.5	14.9	18.2	53.1
34	12.9	12.6	7.7	20.5	45.9	28.8	37.8	5.4	6.2	11.1
35	8.4	4.2	2.9	11.0	3.4	8.9	5.9	1.1	5.7	4.4

Proportion Tahltan Stock in Catch

Week	1991	1990	1989	1988	1987	1986	1985	1984	1983	1982
25	0.23	0.02	0.03	0.04	0.04	0.00	0.10	0.07	0.04	0.01
26	0.40	0.03	0.09	0.09	0.01	0.02	0.11	0.08	0.10	0.15
27	0.26	0.03	0.03	0.07	0.01	0.09	0.35	0.11	0.19	0.11
28	0.10	0.01	0.00	0.05	0.05	0.11	0.24	0.11	0.12	0.19
29	0.01	0.01	0.00	0.01	0.01	0.06	0.13	0.02	0.08	0.17
30	0.10	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.13	0.06
31	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.02	0.08
32	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00
33	0.05	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.05	0.00
34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00
35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00

Proportion Non-Tahltan Stock in Catch

Week	1991	1990	1989	1988	1987	1986	1985	1984	1983	1982
25	0.09	0.06	0.06	0.00	0.00	0.00	0.00	0.01	0.01	0.01
26	0.02	0.02	0.10	0.00	0.00	0.00	0.03	0.05	0.02	0.03
27	0.03	0.02	0.16	0.00	0.00	0.03	0.01	0.04	0.01	0.02
28	0.01	0.02	0.05	0.00	0.00	0.02	0.01	0.01	0.01	0.08
29	0.09	0.01	0.01	0.00	0.00	0.04	0.01	0.13	0.06	0.09
30	0.03	0.01	0.00	0.00	0.02	0.01	0.03	0.02	0.01	0.17
31	0.05	0.04	0.02	0.00	0.00	0.00	0.00	0.03	0.00	0.09
32	0.01	0.05	0.01	0.01	0.00	0.00	0.00	0.02	0.03	0.00
33	0.00	0.00	0.01	0.00	0.00	0.00	0.02	0.04	0.03	0.00
34	0.00	0.02	0.01	0.00	0.00	0.00	0.04	0.04	0.00	0.00
35	0.01	0.02	0.01	0.00	0.00	0.00	0.05	0.04	0.02	0.00

Table 4. Model parameters from the linear regression of run size on cumulative CPUE for the 1992 Stikine Management Model. (Due to rounding, the run fraction column may not total 1.0).

Canadian lower river commercial fishery catch of sockeye salmon

WEEK	R^2	RUN F.	INTERCEPT	SLOPE	SD(R.F)	SD(INT)	SD(SLOPE)	AVG.CPUE
27	0.51	0.11	33712.04	984.01	0.077	20871.73	362.54	48.25
28	0.58	0.14	22561.04	531.93	0.072	21771.97	172.44	61.97
29	0.86	0.19	6162.94	362.25	0.057	13026.25	55.50	96.90
30	0.84	0.17	-5355.08	300.20	0.054	15659.32	49.40	81.18
31	0.81	0.14	-8710.03	253.16	0.041	17852.90	46.14	66.83
32	0.75	0.13	-17702.18	239.09	0.061	22941.24	51.87	58.51
33	0.74	0.07	-18549.40	224.22	0.031	23938.01	50.44	31.20
34	0.71	0.03	-19173.90	218.44	0.019	25670.55	52.52	14.63
35	0.70	0.02	-18880.70	214.04	0.008	26484.55	53.30	8.08

Canadian lower river commercial fishery catch of Tahltan sockeye salmon

WEEK	R^2	RUN F.	INTERCEPT	SLOPE	SD(R.F)	SD(INT)	SD(SLOPE)	AVG.CPUE
27	0.71	0.22	5505.25	764.47	0.114	8692.30	182.51	38.84
28	0.81	0.25	-159.27	398.77	0.089	7619.22	72.54	49.82
29	0.92	0.29	704.20	235.02	0.105	4786.63	26.82	58.10
30	0.90	0.14	-450.41	207.74	0.060	5407.64	26.26	24.83
31	0.89	0.05	-134.43	193.84	0.031	5672.77	25.92	10.67
32	0.89	0.03	-192.21	188.94	0.014	5745.42	25.56	5.04
33	0.88	0.01	98.49	184.72	0.012	5816.11	25.46	2.70
34	0.88	0.00	118.55	183.60	0.007	5869.81	25.56	1.05
35	0.88	0.00	179.16	182.87	0.002	5870.12	25.49	0.44

District 106-41 fishery catch of Stikine River sockeye salmon

WEEK	R^2	RUN F.	INTERCEPT	SLOPE	SD(R.F)	SD(INT)	SD(SLOPE)	AVG.CPUE
26	0.48	0.17	67841.65	2469.25	0.145	16640.89	910.60	11.68
27	0.95	0.22	47450.72	1974.38	0.121	5726.28	163.04	13.26
28	0.87	0.24	44053.88	1398.48	0.113	9618.62	191.04	12.70
29	0.72	0.14	48532.16	1010.26	0.087	14123.99	221.96	10.03
30	0.58	0.11	54716.68	764.51	0.103	16993.25	228.71	7.23
31	0.51	0.06	58430.54	650.17	0.065	18221.09	226.31	3.94
32	0.51	0.03	57573.48	653.21	0.048	18468.43	227.82	1.04
33	0.51	0.01	57019.80	655.94	0.009	18398.75	225.43	0.59
34	0.52	0.00	56753.82	657.81	0.005	18301.91	223.50	0.23
35	0.52	0.00	56684.73	658.16	0.002	18292.68	223.20	0.07

District 106-41 fishery catch of Tahltan sockeye salmon

WEEK	R^2	RUN F.	INTERCEPT	SLOPE	SD(R.F)	SD(INT)	SD(SLOPE)	AVG.CPUE
26	0.53	0.23	27632.55	1763.62	0.226	9744.04	588.35	9.69
27	0.94	0.27	16302.87	1340.89	0.139	3661.23	115.43	11.50
28	0.95	0.27	12887.60	1015.39	0.170	3551.26	80.16	10.16
29	0.89	0.12	13770.18	831.85	0.085	5311.54	101.20	5.86
30	0.88	0.06	13154.53	784.19	0.077	5662.32	101.00	3.05
31	0.84	0.03	13860.07	737.98	0.057	6517.18	111.87	1.56
32	0.84	0.00	13564.15	737.00	0.028	6554.56	111.82	0.46
33	0.85	0.00	13383.26	736.42	0.010	6514.96	110.64	0.28
34	0.85	0.00	13364.45	736.31	0.002	6523.58	110.74	0.03
35	0.85	0.00	13353.45	736.24	0.001	6528.79	110.80	0.02

Table 5. Evaluation of the Stikine Management Model for the 1991 season. Weekly forecasts of run size for 1991 are given along with the total allowable catch for Stikine River sockeye salmon.

Model runs generated in U.S. management office in Petersburg

Week	Start Date	Forecasts Run Size	Forecasts TAC	U.S. Fishing Regime 6	U.S. Fishing Regime 8	U.S. Fishing Regime TAC	Canada TAC	Cumulative Catch U.S.	Cumulative Catch Canada
25	16-Jun	94,000	34,000	I	D ←	14,000	20,000	282	0
26	23-Jun	94,000	34,000	I	D	14,000	20,000	2,105	134
27	30-Jun	72,449	80,690	I	I	2,449	10,000	3,617	2,734
28	07-Jul	159,459	35,671	I	D	69,459	30,000	5,897	7,529
29	14-Jul	192,246	46,106	I	D	102,246	30,000	8,221	12,740
30	21-Jul	151,205	50,962	I	D	61,205	30,000	8,756	17,562
31	28-Jul	130,329	45,128	I	D	40,329	30,000	9,180	22,020
32	04-Aug	130,487	44,970	I	D	40,487	30,000	9,646	22,326
33	11-Aug	120,493	60,493	I	D	30,493	30,000	9,646	22,326
post-season estimate		157,059	97,059			67,059	30,000	34,164	22,763

Model runs generated in Canadian management office in Whitehorse, 1991.

Week	Start Date	Forecasts Run Size	Forecasts TAC	U.S. Fishing Regime 6	U.S. Fishing Regime 8	U.S. Fishing Regime TAC	Canada TAC	Cumulative Catch U.S.	Cumulative Catch Canada
25	16-Jun	94,000	34,000	I	D ←	14,000	20,000	282	0
26	23-Jun	94,000	34,000	I	D	14,000	20,000	2,338	163
27	30-Jun	72,449	12,449	I	I	2,449	10,000	4,249	3,050
28	07-Jul	177,333	117,333	I	D	87,333	30,000	4,196 ✓	7,539
29	14-Jul	191,851	131,851	I	D	101,851	30,000	4,402	14,380
30	21-Jul	148,143	88,143	I	D	58,143	30,000	9,272	16,289
31	28-Jul	129,918	69,918	I	D	39,918	30,000	9,315	21,820
32	04-Aug	130,686	70,686	I	D	40,686	30,000	9,648	22,435
33	11-Aug	122,059	62,059	I	D	32,059	30,000	9,761	22,653
34	19-Aug	116,369	56,369	I	D	36,369	20,000	9,964	22,659
35	26-Aug	112,575	52,575	I	D	32,575	20,000	10,062	22,699
post-season estimate		157,059	97,059			67,059	30,000	34,164	22,763

← **I** indicates indirect fishery allowed; **D** indicates directed fishery allowed.

✓ Cumulative U.S. catch decreased due to updated U.S. catch information.

TAKU RIVER

Pre-season Forecasts

The overall Taku River sockeye salmon run is expected to be below average in 1992. This outlook is based on the below average above-border escapements estimated for the two principal brood years contributing to the 1992 run, i.e. 1987 and 1988. The above-border escapements in 1987 and 1988 were estimated from Canada/U.S. mark-recapture studies to be 73,339 sockeye and 74,061 fish, respectively. Although both estimates fell within the interim escapement goal range of 71,000 to 80,000 sockeye salmon, the escapement in each year was well below the 1984 to 1991 average of 95,149 sockeye salmon. Little Trapper Lake sockeye salmon are expected to return in average numbers in 1992 based on the near average escapements enumerated in 1987 (12,007 sockeye) and 1988 (10,629 sockeye). However, a small run is expected for Tatsamenie stocks because of the low numbers of spawners counted in 1987 (2,794 sockeye) and 1988 (2,063 sockeye).

The 1992 coho run to the Taku River is expected to be below average to average. Coho escapements into Canada in 1988 and 1989 were estimated to be 39,450 and 56,808 fish, respectively. The average for the period 1987 to 1991 is 69,622 coho salmon. Both brood year escapement estimates exceeded the interim escapement goal of 27,500 to 35,000 fish.

An average to above average Taku chinook run is expected in 1992 based on the above average index escapements recorded in 1986 (index count of 7,520 chinook salmon) and 1988 (index count of 8,626 chinook salmon). The return of 5-year-olds is expected to be below average reflecting the below average escapement index count in 1987 of 5,743 chinook. The recent average (1982 to 1991) index count is 7,176 chinook salmon. The Taku chinook escapement index is the combined peak aerial count of chinook in six tributaries throughout the drainage including the Nakina, Nahlin, Tatsamenie, Kowatua and Dudidontu rivers and Tseta Creek. The interim index escapement goal is 13,200 chinook salmon.

An even-year Taku River pink salmon run is usually much weaker than dominant odd-year returns. Therefore, a below average pink run is expected in 1992. However, when compared to previous even-year returns, the 1992 run is expected to be above average based on the above average (even-year average) catches in 1990 in the Canyon Island fishwheels and in the District 111 gillnet fishery.

Taku River chum salmon escapements were judged to be below average in 1987 and 1988, and to be below the interim escapement goal range of 50,000 to 80,000 fish. Therefore, a below average run is expected in 1992.

Escapement Goals

Interim escapement goals set by the Transboundary Technical Committee for salmon spawning in Canadian portions of the Taku River are as follows:

Species	Interim Escapement Goal Ranges	
	From	To
Sockeye	71,000	80,000
Coho	27,500	35,000
Chinook	13,200 (index count)[2]	13,200 (index count)
Pink	150,000	250,000
Chum	50,000	80,000

Harvest Sharing Objectives

Annex IV of the Pacific Salmon Treaty provides for the following harvest sharing arrangements for salmon originating in Canadian portions of the Taku River:

Species	Canadian Share	United States Share
Sockeye	18% of TAC	82% of TAC
Coho	3,000	
Chinook, Pink, Chum	Incidental Harvest	

[2] The Transboundary Technical Committee recently revised the interim escapement goal range for Taku River chinook salmon to make it more relevant to the current index escapement monitoring system. The former goal of 25,600 to 30,000 chinook salmon was a system-wide goal. Unfortunately, there is not an annual program to estimate the system-wide escapement. There is, however, an annual index escapement monitoring program using aerial surveys of some key spawning areas. Therefore, it seemed more appropriate to express the goal in terms of the index, for which annual data is collected, than in terms of a total system escapement which requires a number of unquantified and variable assumptions to be made in order to arrive at an annual estimate.

The new interim index escapement goal is 13,200 chinook salmon which was developed by summing the peak counts between 1965 and 1981 for each of six index areas including the Nakina, Nahlin, Dudidontu, Kowatua and Tatsamenie rivers, and Tseta Creek. Management systems have not yet evolved to actively target chinook escapement goals, although both countries have adopted conservative management plans with respect to chinook salmon to enable stocks to rebuild by 1995.

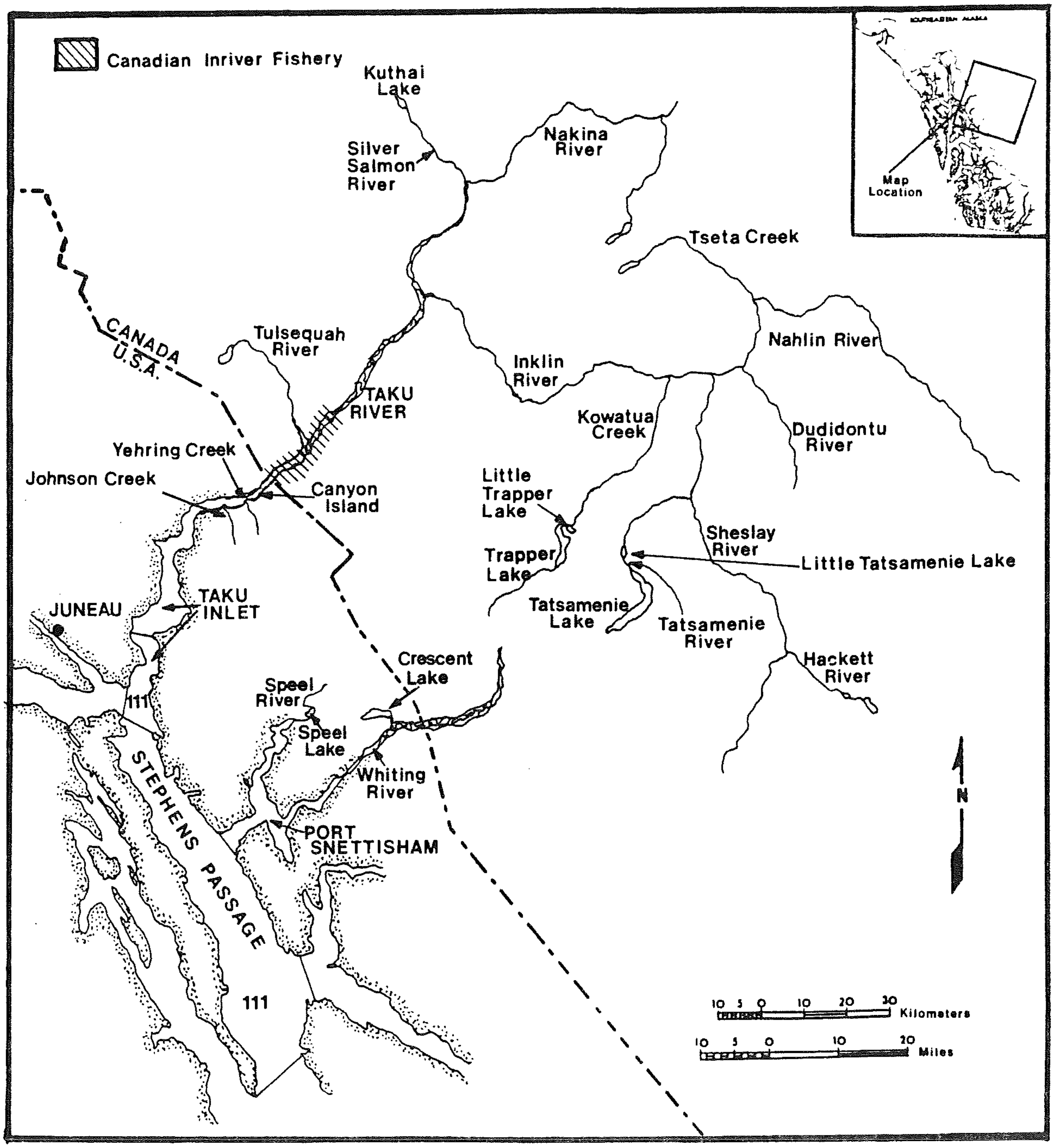

Figure 2. The Taku River and principal U.S. and Canadian fishing areas.

Both Parties agree to take appropriate management actions to ensure that the escapement goals for chinook salmon bound for Canadian portions of the Taku River are achieved by 1995.

Collateral United States management goals for the District 111 fishery are as follows:

1. Provide for an orderly fishery while harvesting those fish in excess of spawning escapement needs in the Taku River, subject to harvest sharing obligations;

2. Promote the harvest and processing of good quality fish within the constraints dictated by run size;

3. Manage, in conjunction with other drift gillnet fisheries in the region, to minimize chinook catches in District 111 and to keep the all-district catch below 7,600 chinook salmon (exclusive of Alaska hatchery add-on fish);

4. Minimize, to the extent practical, the incidental harvest of immature chinook salmon; and

5. Provide for sufficient salmon spawning escapements to the Port Snettisham and Stephens Passage streams.

Management Procedures

The management coordination between U.S. and Canadian fishery managers will involve weekly conferences between designated managers or alternates.

United States: Section 11-B (Stephens Passage, Figure 2) will initially open for a 72-hour period on the third Sunday of June (June 21, statistical week 26). The strength of the sockeye salmon run will be evaluated using CPUE analysis and weekly escapement estimates derived from the Taku River fish wheel mark-recapture project. Analysis of scale pattern and brain parasite incidence data will be used post-seasonally to estimate the contributions of Taku River and Port Snettisham sockeye salmon to the District 111 catch.

Protection of Port Snettisham sockeye salmon will be attempted again this year in order to rebuild production of these stocks to historical levels. Port Snettisham will be closed inside a line from Point Anmer to Point Styleman through approximately August 15.

To minimize the harvest of mature chinook salmon, Taku Inlet will be closed north of the latitude of Jaw Point during the first week (Figure 3). In addition, night closures will be imposed if catches of juvenile chinook salmon (feeders) are above average levels. Based on catch rates in previous years, night closures could be expected through the end of July.

Harvestable returns of summer run hatchery chum salmon are expected to return from fry outplants to the Limestone Inlet area of Stephens Passage. Additional fishing time is expected in Stephens Passage to harvest these fish. A six inch (152mm) minimum mesh size restriction will be employed to minimize the catch of sockeye salmon during these openings.

Although the Taku River pink salmon run is anticipated to be above average for an even year run, no additional fishing time will be allowed within Taku Inlet to target this species. Additional fishing time may be warranted to harvest pink salmon returns to streams in District 111 in lower Stephens Passage and Seymour Canal, and the northern portions of District 110.

In 1989, the Alaska Board of Fisheries re-opened the purse seine fishery in a small area in northern Chatham Strait (Sub-District 112-16) which had been closed since 1984 during the month of July. The area encompasses waters along the western shore of Admiralty Island north of Point Marsden (Figure 3). A harvestable surplus of pink salmon returning to the Taku River is not expected in 1992. As a result, an early-July seine fishery will not occur in the Hawk Inlet shore area. Purse seine openings along the Hawk Inlet shore after mid-July will be based on assessments of abundance of other north migrating pink salmon stocks in the upper Stephens Passage and Lynn Canal areas. During August, fishery openings along the Hawk Inlet shore may extend northward to the latitude of Hanus Reef Light when north-migrating pink salmon stock strength warrants. In addition, if north migrating pink salmon runs are poor, and south migrating stocks are strong, seining may be allowed only south of Point Marsden.

Beginning in mid-August, management emphasis will switch to fall chum and coho salmon. Fishing time and area will then be dependent upon the developing run strengths of the wild stocks of fall chum salmon and coho salmon. Management will be based on evaluation of catch, CPUE, and fishing effort. The coho salmon catches and escapement estimates developed by the Taku River mark-recapture project will also be considered in making management decisions.

The chinook sport fishery will be open in the marine waters near Juneau throughout the year. However, Taku Inlet, north of a line from Point Bishop to Dorothy Creek, will be closed to sport fishing from April 16 through June 14 to protect returning Taku River chinook salmon. The daily bag and possession limits were two chinook salmon per person in recent years; however, this was restricted to one salmon per person after May 15 in 1992. Further restrictions in the S.E. Alaska sport fishery may be implemented if the sport harvest exceeds the limit necessitated by the Pacific Salmon Treaty.

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 1992. A seasonal bag limit of five sockeye salmon per person or ten sockeye salmon per household will be allowed to be taken using set gill nets.

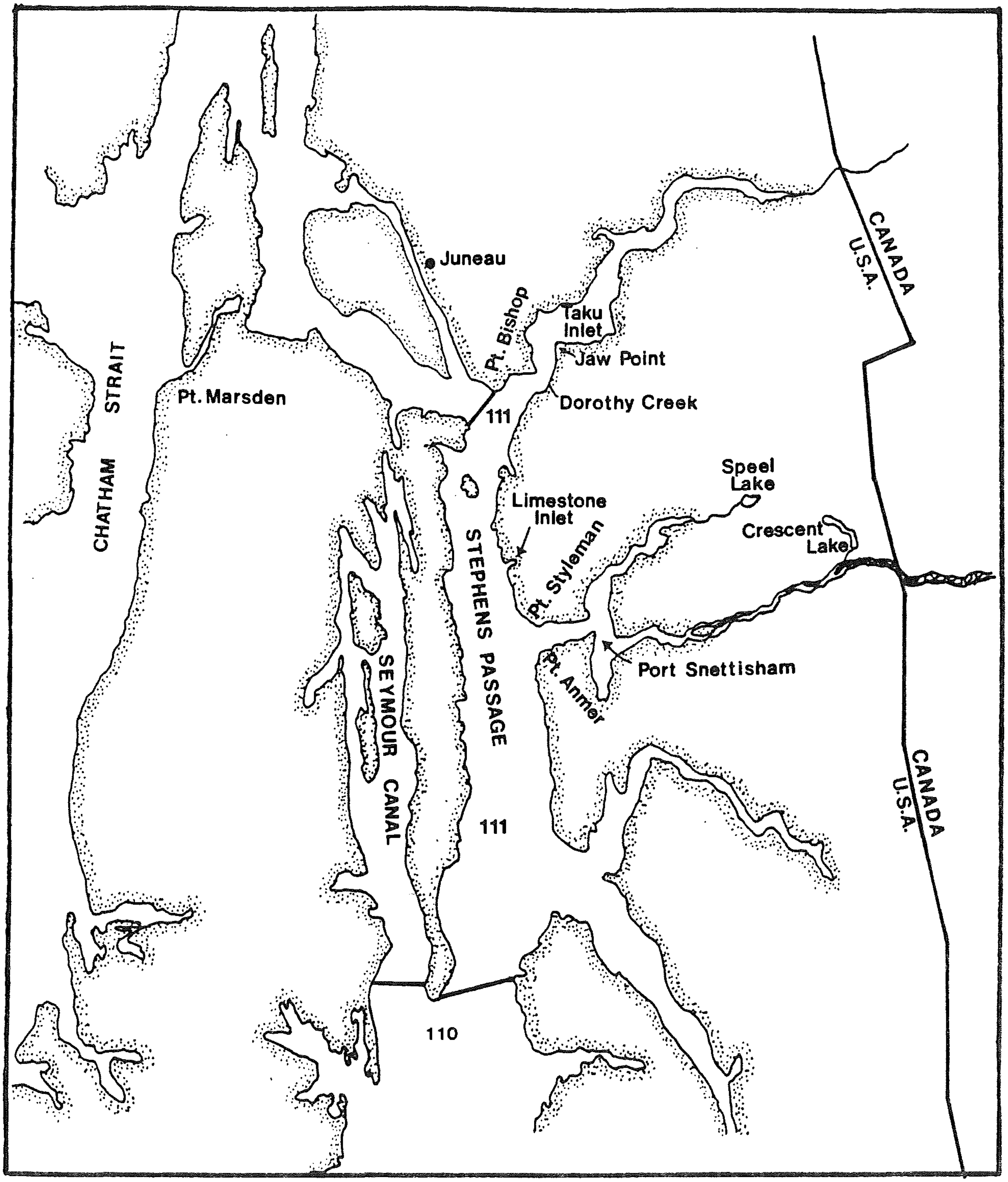

Figure 3. Location of U.S. fishing areas adjacent to the Taku River.

Canada: The Canadian fishery will open Monday, June 22 for an initial 48 hour period to target early sockeye runs. A maximum mesh size restriction of 146 mm (5¾ inches) will be in effect through mid-July 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 and total allowable catch (TAC). The weekly projection of the seasonal TAC will be made using the following calculations:

$$TAC=\frac{E_w+CC_w+(AC_{w-1})}{PRT_w}-Eg;$$

Where:	TAC	=	the projected total allowable catch for the season;
	E_w	=	the total escapement to date, i.e., to week w;
	CC_w	=	the total Canadian catch to date, i.e., to week w;
	AC_{w-1}	=	the estimated cumulative Alaskan catch of Taku sockeye to the preceding week $w-1$ (preceding week used to allow for migration time). Catches in Districts 111 and 112 will be considered for inclusion in this estimate;
	PRT_w	=	the estimated proportion of run through to week w determined from the average in-river run timing based on historical CPUE data from the Canadian fishery. (Run timing estimates will be adjusted in-season according to in-season CPUE data relative to historical data in both U.S. and Canadian fisheries); and
	Eg	=	the system-wide escapement goal. (A value of 75,000 will be used reflecting the midpoint in the interim range of 71,000 to 80,000).

Weekly TAC projections for sockeye salmon will be used to develop the total Canadian guideline harvest by applying the 18% allocation specified in Annex IV of the Treaty. Run timing will be used to apportion the projected total season catch into weekly harvest guidelines.

The Canadian fishery will be monitored daily by a resident DFO Fishery Officer and/or Guardian who will collect catch and tag recovery information. Catch information will be relayed to the DFO office in Whitehorse, collated, and exchanged with a designated ADF&G contact person during weekly telephone contacts. Tag recovery information will be forwarded to the DFO/ADF&G tagging crew located at Canyon Island, Alaska.

Weekly and cumulative sockeye population and escapement estimates will be developed from catch and tag recovery information using both the Schaefer and Stratified Petersen algorithms. Examination of these factors will be used to determine if the Canadian sockeye catch is on target; adjustments will be made to weekly fishing time to compensate for deficit/surplus situations.

ALSEK RIVER

Pre-season Forecasts

The chinook salmon run in 1992 is expected to be slightly above average due to the above average Klukshu River weir counts in 1986 and 1987 (2,709 and 2,616 fish, respectively). The return of 4-year-olds is expected to be below average due to the below average weir count in 1988 (2,037 chinook). For comparison, the 1982 to 1991 10-year average weir count is 2,226 chinook salmon.

The overall Alsek-Tatshenshini sockeye run is expected to be below average in 1992 with an average to above average early run and a below average late run. The early-run weir count in the primary brood years was 3,269 in 1987 and 585 in 1988, compared to the 1982 to 1991 average of 2,802 sockeye. Late-run sockeye weir counts in 1987 and 1988 were 7,235 and 8,756 sockeye, respectively, which were the two lowest counts on record and compare poorly with the 1982 to 1991 average of 17,072 sockeye.

The 1992 coho run is expected to be above average. Brood year index counts at the Klukshu River weir in 1988 and 1989 were 2,774 coho and 2,219 coho, respectively, considerably above the 1982 to 1991 average count of 1,637 coho.

Escapement Goals

Interim escapement goals set by the Transboundary Technical Committee for salmon spawning in the Canadian portion of the Alsek River drainage are:

Species	Interim Escapement Goal Ranges	
	From	To
Sockeye	33,000	58,000
Coho	5,400	25,000
Chinook	4,700 (Klukshu only)[3]	4,700 (Klukshu only)

[3] The TRTC recently revised the interim escapement goal range for Alsek River chinook salmon to make it more relevant to the current index escapement monitoring system. The former goal of 5,000 to 12,500 chinook salmon was a system-wide goal. As with the other Transboundary Rivers, there is no annual program established to estimate the system-wide escapement. It seemed more appropriate to develop a goal which had direct relevance to data collected consistently on an annual basis and was free of a number of unquantified expansion factors (which were necessary to estimate system-wide escapement). The new interim index escapement goal is 4,700 chinook salmon in the Klukshu River (weir count minus IFF catch upstream); this represents the average of the Canadian goal of 5,000 chinook, and the U.S. goal of 4,400 chinook.

Harvest Sharing Objectives

Annex IV of Pacific Salmon Treaty requires that the Parties take the necessary management actions to rebuild Alsek chinook and early-run sockeye salmon stocks.

Management Procedures

United States: The initial opening for the Alsek River fishery (Dry Bay, Figure 4) during the 1992 season will be for twenty-four hours on the second Thursday in June (June 11). Although weekly openings typically begin on a Monday, the first opening will be delayed until a Thursday because of a concurrent halibut opening. The initial opening is in statistical week 24, a delay of about one and one half weeks relative to fishery openings between 1963 and 1982. Prior to 1963, the fishery opened in May. The early sockeye run is expected to be large enough to support some harvest, but the initial opening will be limited to 24 hours to reduce the harvest of chinook salmon. The next opening will be for a 24-hour period starting the following Monday. An extension of fishing time may be allowed if sockeye salmon run strength is sufficient and the harvest of chinook salmon can be kept low. The duration of fishing periods during the remainder of the sockeye season will be based on evaluation of sockeye salmon catches and effort levels. Gillnets will be restricted to a maximum mesh size of six inches (152 mm) through July 1 to minimize incidental chinook salmon harvests.

After the first several weeks of the fishing season, U.S. managers will use two in-season sockeye salmon abundance models to predict the total Dry Bay catch and the index run size (Dry Bay catch plus Klukshu River weir count). One model employs a simple linear regression between harvest rate and effort together with historical migratory timing data, while the other model uses multiple regression techniques. Model results have yielded highly accurate predictions in most years as early as the third week of the season.

The Alsek River sockeye salmon 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 salmon fishery will be based on a comparison of current year fishery performance with historical performance.

The Alsek River surf fishing area will likely be open during the same time period as the in-river fishery. The surf fishery areas include the shoreline, ¾ of a mile (1.2 km) in each direction from the river mouth to the outermost bar where the surf breaks.

Canada: Management of both the sport and Indian food fisheries in the Alsek River (Figure 4) will be similar to that of the last several years with conservation measures in place to protect chinook and early-run sockeye salmon.

Final plans for the Indian food fishery will be made after discussions between the Department of Fisheries and Oceans and the Champagne/Aishihik Indian Band, the primary user of the resource. The fishing pattern in recent years has involved a closure early in the season followed by a period during which the fishery opened for only one day per week. Thereafter, the fishery has been permitted to operate for longer fishing periods. The escapement of sockeye salmon through the Klukshu weir serves as an in-season indicator of stock strength and adjustments to the fishery may be made on the basis of weir counts.

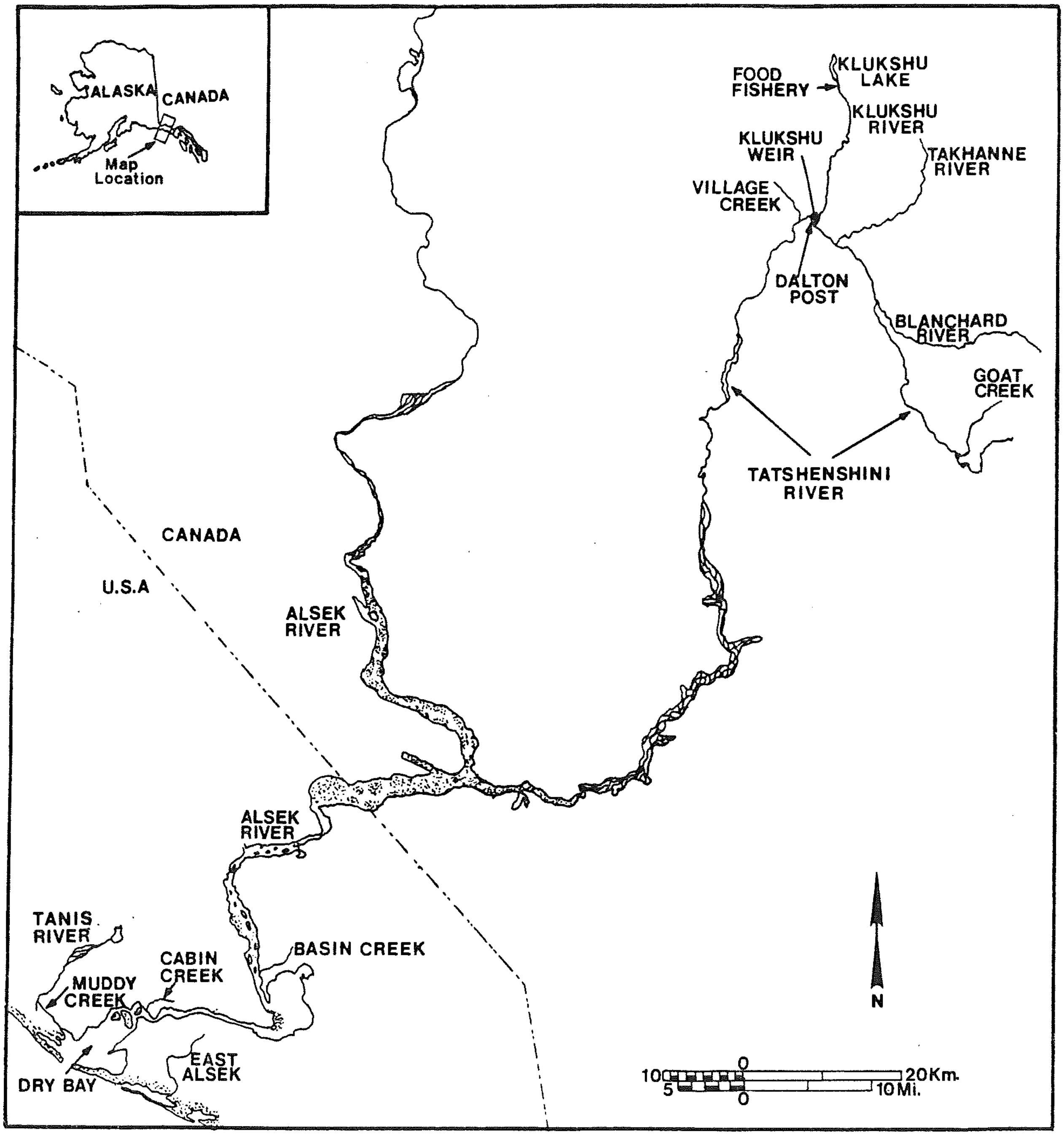

Figure 4. Location of the principal U.S. and Canadian fishing areas where Alsek River salmon stocks are caught.

1992 TRANSBOUNDARY ENHANCEMENT PLANS

Fry Plants

Stikine River System

Tahltan Lake: As of April 9, 1992, there were 1.40 million sockeye alevins incubating at the Snettisham Central Incubation Facility (CIF) from the 1991 Tahltan Lake sockeye brood stock, destined to be planted back into Tahltan Lake. The otoliths of this group of alevins have been mass marked with a band of four rings. Fry out-planting into Tahltan Lake is expected to begin on, or about, June 15. Survival in the CIF has been high so far and little mortality is expected prior to out-planting.

Tuya Lake: As of April 9, 1992, there were 2.57 million sockeye alevins incubating at the CIF, also from 1991 Tahltan Lake brood stock, but destined for out-planting to Tuya Lake. Thermal marking of the otoliths of this group of alevins has been completed; the mark consists of a band of six rings. Out-planting of fry to Tuya Lake is scheduled to commence on or about June 7. Again, little mortality is expected prior to out-planting.

Fry originating from the 1991 Tahltan sockeye egg-take will be out-planted to both Tahltan and Tuya Lakes in accordance with the Pacific Salmon Treaty agreement regarding Stikine River sockeye enhancement. The agreement states: "When the sockeye escapement through the Tahltan Lake weir is greater than 15,000, the fry will be distributed to Tahltan and Tuya Lakes in a manner which maximizes harvestable production and provides information on the potential production capacity of Tuya Lake." At Tahltan escapements of less than 15,000 sockeye, all fry are to be returned to Tahltan Lake. In 1991, the Tahltan Lake sockeye escapement of 50,135 fish exceeded the 15,000 fish guideline for the first time since outplanting of this stock began. As 1992 will be the first year that Tahltan Lake sockeye fry will be planted into Tuya Lake, the TRTC proposed that Tahltan and Tuya lakes receive 1.4 and 2.6 million fry respectively for the following reasons:

1. Tuya Lake is large in area and has a rich, under-utilized plankton forage base. It is postulated that a minimal outplant of 2.0-2.5 million fry is required to allow effective monitoring of their growth, survival, and any impact on the forage base.

2. Although Tuya Lake appears to have an under-utilized carrying capacity that would accommodate much more than 2.6 million sockeye fry, there is some element of risk in the first outplant to Tuya Lake. Rather than commit all fry to Tuya Lake, the TRTC decided that a substantial number of fry should be out-planted to Tahltan Lake, where successful survival to the smolt stage has been demonstrated and there is a reasonable assurance of good production.

Taku River System

<u>Tatsamenie Lake</u>: As of April 9, 1992, 1.26 million sockeye alevins from the 1991 Little Tatsamenie egg-take were incubating at the Snettisham CIF for out-planting to Tatsamenie Lake. Otoliths of these alevins have been marked with a band of four rings. Out-planting is scheduled to begin approximately June 15. As with the Tahltan Lake sockeye stock, survival in the CIF has been high thus far, and little mortality is expected prior to out-planting.

<u>Trapper Lake</u>: As of May 22, 1992, 1.86 million sockeye alevins from the 1991 Little Trapper egg-take were incubating at the Snettisham CIF for out-planting to Trapper Lake. Otoliths of the alevins of this group have been marked with a band of six rings. Out-planting is scheduled to commence on or about June 15. Survival in the CIF had been high up until an outbreak of IHNV occurred in the Little Trapper Lake fry. Approximately 600,000 fry fry were subsequently destroyed.

Egg Collections

The following 1992 levels of egg collections were agreed to at the April TRTC meeting in Juneau:

Stikine River

Tahltan Lake - 5.4 million;

Taku River

Little Tatsamenie Lake	- 1.75 million
Little Trapper Lake	- <u>2.75 million</u>
TOTAL	4.50 million.

The 1992 target level of 5.4 million sockeye eggs for the Stikine drainage meets the Treaty requirement of 5-6 million eggs; however, the target of 4.5 million for the Taku drainage is slightly less than the 5 million specified in the Treaty.

The TRTC is recommending this reduced target in the Taku drainage in 1992 for the following reasons:

1. Female sockeye brood stock holding mortality at Little Tatsamenie Lake was 34% in 1990, the first year that eggs were taken at that site. Although mortality was reduced to 8% in 1991, Canadian Salmon Enhancement Program personnel would like another year with mortalities below 10% to confirm that this is repeatable before expanding the operation beyond 1.75 million eggs.

2. There are uncertainties about the carrying capacity of Trapper Lake and the fry resulting from an egg collection of 2.75 million may be the maximal number that the lake can support without causing long term, or possibly permanent, damage to the forage base. Monitoring of an outplant of the proposed magnitude will provide information needed to better assess the carrying capacity.

3. The optimal loading density for the incubation units (Kitoi boxes) at the Snettisham CIF appears to be 250,000 average-sized eggs per unit. However, because the Tahltan Lake sockeye stock has eggs that are notably small, the TRTC agreed that the 5.4 million egg target could be met with little risk by loading each incubator with 300,000 eggs. Eggs of Little Tatsamenie and Little Trapper lake sockeye stocks are considerably larger than Tahltan sockeye eggs and it is therefore desirable that the units for these stocks be loaded at densities closer to the 250,000 egg guideline. The target level of 4.5 million eggs from the Taku River drainage will require loading the available units at densities of approximately 250,000 to 275,000 per unit.

Every effort will be made to deliver the eggs from the lakes to the CIF on the day that they are collected. However, the TRTC agreed that egg shipments will be accepted at the hatchery for a period up to 48 hours after collection, providing the eggs are treated in a similar manner as was a delayed lot that was received from Little Tatsamenie Lake in 1991; these were chilled adequately during the 48 hours before reaching the CIF.

PROPOSED TRANSBOUNDARY FIELD PROJECTS FOR 1992

Stikine River

Proposed projects regarding Stikine River salmon stocks are summarized in Table 6. For each project listed, corresponding information regarding the primary objectives, dates of operation, and agency roles and contacts are described. The overall Stikine field program is similar to 1991.

Taku River

Proposed projects regarding Taku River salmon stocks are summarized in Table 7. For each project listed, corresponding information regarding the primary objectives, dates of operation, and agency roles and contacts are described. The overall Taku field program is similar to 1991 with the exception of the cancellation of the Tatsamenie coho coded-wire-tag study, cancellation of coho aerial surveys, the collection of matched brain parasite/scale samples District 111, and an expanded radio tagging program on Taku coho.

Alsek River

Proposed projects regarding Alsek River salmon stocks are summarized in Table 8. For each project listed, corresponding information regarding the primary objectives, dates of operation, and agency roles and contacts are described. The overall Alsek field program is similar to 1991.

Transboundary Enhancement

Proposed projects regarding joint Transboundary river salmon enhancement are summarized in Table 9. For each project listed, corresponding information regarding the primary objectives, dates of operation, and agency roles and contacts are described.

Table 6. Proposed Stikine River field projects, 1992. [a]

Location	Function	Dates	Agency	Responsibility
District 106 & 108 Fishery	Generate in-season stock composition estimates via SPA	6/17-8/09	ADF&G	All aspects
	Sample 20% of chinook, coho, chum, and sockeye catches per district for CWT; all species except pinks for age-sex-length (goals are 520 sockeye scales per week for 106-41, 106-30, and 108; 520 per district per season for chinook, coho, and chum); collect 400 otolith samples from sockeye caught in District 106 fishery for analysis of wild stock patterns.	6/17-9/20	ADF&G	All aspects
Lower Stikine	Conduct test fishery to assess size and timing of sockeye run. Collect age, sex, and size data. Sample all sockeye for scales and all females for egg diameter (stock i.d.)	6/08- 9/03	DFO	All aspects
	Sample commercial catches (up to 350 sockeye scales and 100 egg diameter samples and 300 chinook scales per week).			
Tahltan Lake	Estimate age, size, and timing of sockeye smolt outmigration.	4/27-6/19	DFO	All aspects
	Enumerate adult sockeye and collect age-sex-length data on 800 fish.	7/07-9/04	DFO	All aspects
	Sample smolts for otoliths	4/27-6/19	DFO	Smolt collection Otolith analysis
	Sockeye GSI sampling	9/01-9/30	DFO DFO/NMFS	GSI sampling Split analysis
Little Tahltan	Enumerate adult chinook and collect age-sex-length data. (800 samples)	6/17-8/21	DFO	All aspects
Tahltan River, Little Tahltan, Beatty & Andrew Cr.	Aerial survey estimates of spawning chinook salmon in index areas.	8/10-8/15	ADF&G	All aspects
Lower Stikine	Aerial surveys of spawning coho salmon in mainstem tributaries from mouth to U.S./Canada border.	10/5-31	ADF&G	All aspects

[a] Contacts:

Sandy Johnston (DFO) - all DFO projects
Pete Etherton (DFO) - all DFO projects
Keith Pahlke (ADF&G) - chinook aerial surveys
Brian Lynch (ADF&G) - District 106 & 108 fishery sampling
Kathleen Jensen (ADF&G) - District 106 and 108 sockeye stock ID
Chuck Guthrie (NMFS) - GSI projects
Chris Wood (DFO) - GSI projects

Table 7. Proposed Taku River field projects, 1992. [a]

Location	Function	Dates	Agency	Responsibility
Nakina River	Chinook carcass weir; enumerate and sample for age-sex-length (1,000 samples).	7/25-8/28	DFO	All aspects
Little Trapper Lake	Adult salmon weir (sockeye); enumerate and sample for age-sex-length (750 samples) and adult tags.	7/11-9/15	DFO	All aspects
	Sockeye GSI sampling	9/01-9/30	DFO DFO/NMFS	GSI sampling Split analysis
Little Tatsamenie Lake	Adult sockeye, chinook, and coho weir. Enumerate and sample for age-sex-length and coded-wire and adult tags (750 sockeye and 350 coho scale samples).	7/25-11/04	DFO	All aspects
	Sockeye GSI sampling	9/01-9/30	DFO DFO/NMFS	GSI sampling Split analysis
Canyon Island	Mark-recapture studies to estimate sockeye and coho escapement. Sample 300 sockeye/wk for age-sex-length, and 520 coho and chum for the entire season.	6/01-10/15	ADF&G	Three personnel, June 1-Aug. 30, including one biologist until 10/15;one boat & motor, camp supplies, food/tagging equip.
		6/01-10/15	DFO	Biologist (6/1-10/15), Tech. (6/1-10/15), two boats,etc.
	Radio tag 50 early run coho salmon	7/15-8/15	NMFS ADF&G/DFO	All aspects but fish capture. Capture fish in fish wheels.
	Radio tag ~10 steelhead	9/15-10/15	NMFS ADF&G/DFO	All aspects but fish capture. Capture fish in fish wheels.
Lower River	Juvenile coho trapping. CWT tag all coho smolts, sample for scales.	5/01-6/30	ADF&G	All aspects
	Capture and radio tag 400 coho salmon	8/15-10/15	NMFS	All aspects
	Radio tag 50-100 coho salmon in Taku R. estuary.	9/06-9/19	NMFS	All aspects
Tributaries	Installation of additional radio tracking stations	6/01-7/15	NMFS	All aspects
Esc. Sampling	Sample sockeye escapements at Kuthai Lake and mainstem areas for age-sex-length (600 samples per area), adult tags, and brain parasites (200 per area if poss.)	9/5-10/10	ADF&G/DFO	1-3 days of sampling/site

-Continued-

Table 7. Proposed Taku River field projects, 1992. Continued. [a]

Location	Function	Dates	Agency	Responsibility
Canadian Fishery	Recover spaghetti tagged coho, sockeye; Recover CWT'd coho. Sample coho and sockeye for age-sex-length (200 samples per week for sockeye; 520 per season for coho).	6/20-9/30	DFO/ADF&G	Samp. by Canyon Is. crew. Tagged salmon collected Fisheries Officer.
Canadian Test Fishery	Recapture of adult tags and sample total catch for coded-wire tagged coho. Sample age-sex-length compositions of coho catches (50% of coho catch).	8/01-10/29	DFO	All aspects
District 111 Fishery	Sample 20% of chinook, coho, chum catches for coded-wire tags; all species except pinks for age-sex-length (goals are 600 and 260 per week for sockeye and chum, and 520 per season for chinook and coho); Collect 200 matched brain-scale sockeye samples per week. Collect 400 otolith samples from sockeye caught in District 111 fishery for analysis of wild stock patterns.	6/20-9/30	ADF&G	All aspects
Nakina, Nahlin, Dudidontu, Tatsamenie, Kowatua and Tseta	Aerial surveys of spawning chinook salmon in index tributaries.	7/25-8/25	ADF&G	All aspects
Flannigan Slough, Fish, Yehring, Moose, Johnson, and Sockeye Creeks	Coho helicopter and foot surveys	10/10-11/05	ADF&G	All aspects

[a] Contacts:

John Eiler (NMFS)	-	Radio telemetry (all aspects)
Steve Elliott (ADFG)	-	Lower river coho smolt tagging
Andy McGregor (ADFG)	-	Canyon Island , U.S./Canada fishery sampling, sockeye esc. samp.
Keith Pahlke (ADFG)	-	Chinook aerial surveys
Pat Milligan (DFO)	-	Contact for all Taku projects funded by DFO
Kathleen Jensen (ADF&G)	-	Sockeye stock identification
Chuck Guthrie (NMFS)	-	GSI projects
Chris Wood (DFO)	-	GSI projects

Table 8. Proposed Alsek River field projects, 1992.[a]

Location	Function	Dates	Agency	Responsibility
Klukshu River	Enumerate chinook, sockeye, & coho at adult weir; estimate sport and food fishery catches; collect age-sex-length and CWT's on all salmon species (750 scale samples per species),	6/01-10/10	DFO	All aspects
	Coded-wire tag and release approx. ~60K juvenile chinook reared at Klukshu hatchery.	6/15-7/15	DFO	All aspects
	Sockeye GSI sampling	9/01-9/30	DFO DFO/NMFS	GSI sampling Split analysis
Village Creek	Enumerate spawning sockeye using an electronic counter.	6/10-10/18	DFO	All aspects
Blanchard, Takhanne, and Klukshu Rivers and Goat Creek	Aerial surveys of spawning chinook salmon in index areas.	8/10	ADF&G	All aspects
Lower Alsek	Sample commercial catches of all salmon at lower Alsek and East River. Collect age-sex-length data (sockeye-520;chinook -520;coho-520), CWT chinook catches).	6/16-9/15	ADF&G	All aspects
Cabin, Tanis, Muddy and Basin Creeks	Aerial surveys of spawning sockeye salmon in index areas.	8/01-8/15 10/1-10/15	ADF&G	All aspects

[a] Contacts:
Sandy Johnston (DFO) - all DFO projects
Pete Etherton (DFO) - all DFO projects
Keith Pahlke (ADF&G) - chinook aerial surveys
Andy McGregor (ADF&G) - Lower Alsek and East Rivers commercial catch sampling
Keith Weiland (ADF&G) - all ADF&G projects
Chuck Guthrie (NMFS) - GSI projects
Chris Wood (DFO) - GSI projects

Table 9. Proposed enhancement projects for transboundary rivers, 1992. [a]

Location	Function	Dates	Agency	Responsibility
Tahltan Lake	Backplant sockeye fry from Snettisham	6/01-7/01	ADF&G	All aspects
			ADF&G	Disease sampling
	Take 5.4 million sockeye eggs	9/01-9/30	DFO ADF&G	Egg take & transport Incubation & otolith marking.
	Hydroacoustic/limnological surveys to evaluate success of fry outplant.	6/01-9/30	DFO	All aspects
Little Tatsamenie Lake	Backplant sockeye fry from Snettisham	6/01-7/01	ADF&G	All aspects
	Take 1.75 million sockeye eggs	8/15-9/30	DFO ADF&G	Egg take & transport Incubation & otolith marking
	Hydroacoustic/limnological surveys to evaluate success of fry outplant.	6/01-9/30	DFO	All aspects
	Sample smolt outmigration (2-3 trips/300-500 samples)	spring	DFO	All aspects
Little Trapper Lake	Backplant sockeye fry from Snettisham	6/01-7/01	ADF&G	All aspects
	Take 2.75 million sockeye eggs	9/01-9/30	DFO ADF&G	Egg take & transport Incubation & otolith marking
	Hydroacoustic/limnological surveys to evaluate success of fry outplant.	6/01-9/30	DFO	All aspects
	Sample smolt outmigration (2-3 trips/300-500 samples)	spring	DFO	All aspects
Tuya Lake	Backplant sockeye fry from Snettisham	6/01-7/01	ADF&G	All aspects
	Hydroacoustic/limnological surveys to evaluate success of fry outplant & effects on lake	6/01-9/30	DFO	All aspects
Snettisham	Thermal marking of juvenile sockeye otoliths at Snettisham hatchery.	1/01-3/30	ADF&G	All aspects

[a] Contacts: Bruce Morley (DFO) all DFO projects
Pat Milligan (DFO) all DFO projects
Doug Lofthouse (DFO) all DFO projects
Ken Leon (ADF&G) all ADF&G projects
Pete Hagan (ADF&G) - Thermal mark analysis