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PACIFIC SALMON COMMISSION
TRANSBOUNDARY TECHNICAL COMMITTEE REPORT

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STIKINE RIVER SOCKEYE SALMON
MANAGEMENT PLAN
1987

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Prepared by

Transboundary Rivers Technical Committee
of the
Pacific Salmon Commission

During a Meeting Held in
Vancouver, B.C. Canada

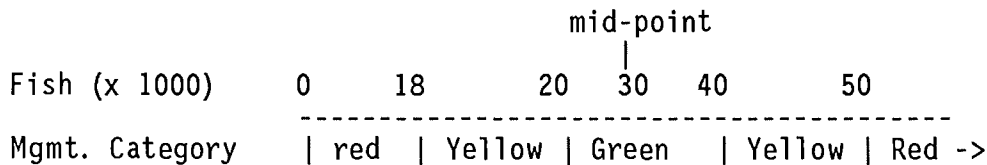
STIKINE RIVER SOCKEYE SALMON MANAGEMENT PLAN

A. MANAGEMENT GOALS

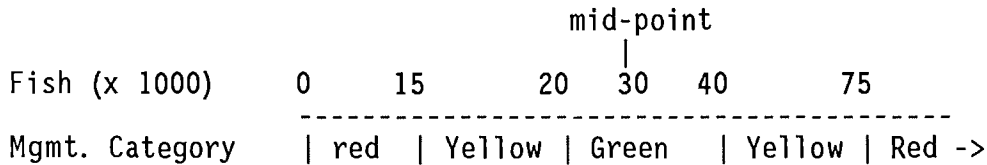
1. Escapement Goals

- a. We agree to recognize two stocks:
 - i. The Tahltan Lake stock which spawns in Tahltan Lake.
 - ii. The Non-Tahltan stock which is a conglomerate of biological stocks which spawn throughout the the drainage.
 - iii. These stocks are considered to be independent.
 - iv. Excess or deficits in escapement realized in one stock shall not be used to balance deficits or surpluses in the other.
- b. We agree to establish escapement goals as ranges which reflect:
 - i. Biological data regarding stock productivity.
 - ii. The ability of existing management systems to deliver established goals.
 - iii. The accuracy and precision of estimates of escapement generated by stock assessment programs.
 - iv. The degree of risk considered acceptable.
- c. We agree to present established goals as ranges within three categories:
 - i. An agreed point estimate of escapement in a year that falls with in the Green Range shall be considered fully acceptable.
 - ii. An estimate that falls within the Yellow Range shall be considered acceptable but not desired.
 - iii. An estimate that falls within the Red Range shall be considered as a failure in the management system.
- d. For the Tahltan Lake stock, we agree to develop and exchange the following data bases for use in setting an escapement goal:
 - i. Brood tables.
 - ii. Smolt production as a function of number of spawners.
 - iii. The number of adults produced as a function of the number of smolts.
 - iv. A limnological model based on euphotic volume and surface area developed by Jeff Koenings, A.D.F.& G..
 - v. The availability of spawning habitat.

- e. For the Non-Tahltan stock we agree to develop and exchange the following data bases for use in setting an escapement goal:
 - i. Brood tables.
 - ii. Inventory and assessment data regarding the historic pattern of distribution, abundance and timing of spawning fish.
 - iii. Inventory and assessment data regarding the distribution, abundance, size and condition factors of rearing juvenile fish.
- f. We agree to develop joint methodology for summarization and interpretation of the data bases listed in (d) and (e).
- g. We agree that as of April 28, 1987 our best judgment of escapement goals for these stocks is:
 - i. Tahltan Lake.



ii. Non-Tahltan.



- h. In early June , 1987 we agree to review the appropriateness of the Tahltan Lake goal in light of the estimated number of smolts that migrate to sea from the 1985 brood year.

2. Harvest Shares

- a. We agree to insert as management goals those developed at the June, 1987 meeting of the Pacific Salmon Commission.

3. Collateral Management Goals

- a. We agree to implement all collateral management objectives identified by the Pacific Salmon Commission. Those currently known include:

- i. Rebuild naturally spawning Stikine River chinook salmon stocks by 1995.
- b. We agree to identify concurrent management goals of each responsible agency.

B. STOCK ASSESSMENT PROGRAM

1. Catch Statistics

- a. The U.S. shall report catch and effort in the following strata for each fishing period
 - i. 106 - 41 & 42 (Sumner Strait)
 - ii. 106 - 30 (Clarence Strait)
 - iii. 108 - 10 through 40 (Stikine - Wrangell side)
 - iv. 108 - 50 & 60 (Stikine - Frederick S. side)
- b. Canada shall report catch and effort statistics in the following stratum:
 - i. Lower River Commercial (by period)
 - ii. Upper River Commercial (by week)
 - iii. Upper River Subsistence (by week)
- c. We agree to evaluate the possibility of obtaining and will provide if available, the temporal pattern of catch and effort that occurs within fishing periods in Alaska's District 106 and 108 and from the Canadian lower river commercial fishery.

2. Age Composition of Catch: We agree to collect scales and associated length to estimate age. The desired number of fish to sample from each stratum defined below is 700.

- i. The U.S. shall provide samples stratified as listed in 1(a) above, for each fishing period, recognizing that small catches in District 108 similar to previous years, may preclude spatial and temporal stratification at the desired level.
- ii. Canada shall provide samples from 300 fish caught in the lower river commercial fishery each week. ADF&G agrees to review the need to obtain length data from these samples.
- iii. We agree that scale samples will not be collected from the upper river commercial and subsistence fisheries. We agree that samples collected at either the Tahltan Weir or from the lower river commercial fishery will be used to characterize the age composition of this catch and that a judgment as to the appropriate source of samples will be made by the Technical Committee.

- iv. A.D.F.& G. agrees to age all scales collected from the U.S. and Canadian commercial fisheries and provide data summaries in-season. All original data will be returned to the appropriate party as expeditiously as possible.

3. Stock Composition of the In-river Canadian Catch

- i. We agree to use weekly samples of egg diameter to estimate the Tahltan vs Non-Tahltan contribution during the fishing season.
- ii. We agree to compute the contribution of Tahltan and Non-Tahltan stocks made to the catches each week using scale patterns analysis after the fishing season.
- iii. We agree to combine (post - season) the weekly estimates of stock composition of the in-river catches by weighting each estimate by the inverse of its variance, unless other procedures are agreed to.

4. Stock Composition of Alaska Marine Catches

- i. During the fishing season we agree to use scale patterns analysis to estimate the contribution of Tahltan and Non-Tahltan stocks each fishing period (typically weekly) to the catches made in each sub-section of District 106 (Clarence Strait and Sumner Strait) and to Catches made in Frederick Sound (District 108).
- ii. We agree that the priority for analysis is 1) Sumner Strait 2) Frederick Sound and 3) Clarence Strait.
- iii. We agree that in Sumner Strait and Frederick Sound a test fishery will operate in those weeks when a commercial fishery does not operate and that stock composition estimates will be made using samples collected from fish caught during test fishing. We recognize that Alaskan administrative regulations imposed on test fish contracts may limit the Frederick Sound test fishery to the period 18 June to 24 July.
- iv. Post-season, we agree to update the estimates of stock composition based on scale samples collected from escapements in the current year.
- v. The U.S. agrees to collect 300 matched samples of brains, scales, heart, liver, eye, and if possible muscle each week from the Sumner Strait portion of District 106 commercial catch. These samples will be analyzed post-season.
- vi. We agree that post-season estimates of the contribution of Tahltan Lake fish to the Sumner Strait catch will be computed using both scale patterns analysis and PGA will be used post season. Evaluation and use of these data will be determined at a later date by the Joint Technical Committee

5. Tahltan Lake Escapement

- i. We agree to use weir counts to estimate the number of fish escaping
- ii. We agree that age composition will be estimated from scale samples. Approximately 800 fish will be sampled during the season.

6. Non-Tahltan Lake escapement

- i. We agree to estimate the Non-Tahltan escapement using migratory timing information obtained from test fishery catches made near the international boarder. The design of such program will be reviewed and approved by DFO and ADF&G in early June, 1987.
- ii. The proportion of Tahltan and Non-Tahltan fish in test net catches will be determined in-season based on egg diameter data.
- iii. Post-season, the stock composition of test-fishery catches will be made by weighting (by the inverse of the variance or other agreed procedure) estimates made using scale patterns, egg diameter and PGA.
- iv. We agree that all sockeye salmon caught in the test fishery will be sampled for scales, that about one half of the sockeye caught each day will be sampled for brains, livers and nematode parasites.

C. DATA EVALUATION PROCEDURES

1. Historic Data Base: A historical data set since 1982 seems appropriate; before that time there is too much variation in net efficiencies, estimation techniques and assumptions. SPA stock separation estimates are used for Tahltan proportions in 1982-1985; the combined SPA/PGA estimates are used for 1986.
2. Modelling: To make in-season predictions each week of the total run and the weekly total allowable catch (TAC), a model based on Barth's model for run size and Sandy's model for TAC will be constructed.
 - a. The purpose of the model is to aid managers in making weekly harvest decisions to meet US/Canada treaty obligations based on total escapement goals and harvest sharing agreements.
 - b. The model is based on five years of historical CPUE data from district 106 and from the commercial in-river fishery and is updated weekly by cumulative CPUE from both fisheries. To predict in-river TAC, estimates from the district 106 fishery will be lagged one week.

- c. Separate model projections will be made for the Tahltan stock (for which we have tight confidence intervals on the estimates) and for the entire Stikine sockeye run.
 - d. A FORTRAN program will be written to determine the coefficients of Barth's model and for simulation studies. The model will also be available in lotus spread sheet form for use by managers in-season. A first version of the program will be ready before the June meeting for testing and evaluation.
3. Confidence in Predictions: Variance estimates and 90% confidence intervals will be constructed for the run and for the escapement given the point catch allowances predicted by the model.
 4. In-season Use: For 1987 the model predictions will provide the managers with an additional piece of 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.
 5. Post-season Evaluation: Post seasonally, the Technical Committee will evaluate how well the model did in predicting the entire run, where discrepancies occurred and what might have caused them; it will also determine whether escapement goals were met and how the model may be improved or used to help meet the escapement goal next season.

D. MANAGEMENT RESPONSES FOR STIKINE SOCKEYE SALMON

1. United States Management:

- a. The U.S. fishery in Section 6A and District 8 is managed for Stikine returning sockeye during the first 4 weeks of the fishery, statistical weeks 25 through 28. After that time, other sockeye stocks and species greatly overshadow the Stikine fish that are present in the fishery. District 8 generally has a one week later time period, through week 29, that Stikine sockeye are the primary management objective. Initial openings in the Sumner Strait portion of District 6 and District 8 are based upon expected sockeye run strength to the Stikine. Subsequent openings are based upon CPUE in the commercial and test fisheries, the scale pattern analysis which identifies individual sockeye stock groups, and by the third week in the fishery, CPUE and possibly stock composition will be available from either the commercial and/or test fisheries in-river. Initial openings in District 8 will be restricted to the outer areas of the district to minimize the interception of adult king salmon. King salmon catches will

also be a management concern in District 6 throughout the season and if large catches of small feeder kings are made, night closures will be instituted.

- b. The U.S. fishery has historically fished these areas for one to three days per week with occasional closures or longer fishing periods based upon extremes in sockeye stock abundance. Announcements for fishery openings throughout South-eastern Alaska are made on Thursday afternoons for gillnet fisheries beginning the following Sunday. If weekly CPUE is above average, extensions in fishing time may occur. Fishing time has been regulated on gross expectations of run strength each week with achieving the desired escapement goal into Tahltan Lake being the primary objective and the secondary objective being the harvest sharing arrangement. Fishing gear used in both Districts is similar with common sockeye net sizes being between 5 1/8 and 5 1/2 inches stretched mesh, 60 meshes deep and 300 fathoms long.
- c. The management responses used in the U.S. to restrict the sockeye harvest would initially begin with restrictions in time in the terminal District 8 fishery and then closures of that District followed by restrictions in fishing time in Sumner Strait with the most complete restriction being the closure of Sumner Strait. The responses for more liberal fisheries would initially start with increases in fishing time in District 8 and then in District 6 if the Stikine run is strong. If possible, the two districts are managed to have common fishing times each week.
- d. A number of domestic considerations are involved in the District 6 and 8 fisheries. In District 8, chum salmon returns into Frederick Sound are a management consideration beginning in week 27. Chum salmon run strength assessments are based upon test fishery catches. Pink salmon are occasionally a consideration in District 8 usually beginning in week 28. Pink salmon run strength assessments are based upon escapement surveys and CPUE in the test fisheries. Beginning in week 26 and occasionally extending through week 31 sockeye returns in U.S. systems are a management consideration. Run strengths are based upon Commercial and test fishery CPUE, weir counts, and SPA for stock composition. Beginning in week 29, pink salmon run strength may be a management consideration in the District 6 fishery. Assessments of pink run strength are based upon the predicted return, CPUE and total catches in the commercial and test fisheries. District 6 and 8 both may have king salmon terminal hatchery area fisheries occurring off the mouth of Blind Slough beginning in week 24.

E. CANADIAN MANAGEMENT

- a. The Canadian Stikine fisheries will be managed on a weekly basis with management actions driven by results of stock, catch and escapement projections derived from the Stikine R. management

model. Weekly inputs to the model will include: stock identification results from Alaskan District 106 and 108, and Canadian lower river gillnet fisheries; C.P.U.E. data from targeting fisheries; catch data; and escapement requirements. Consideration for Tahltan 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 I.D. program.

- b. As per D.F.O. national policy, 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 located near Telegraph Creek. 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.
- c. Fishing time in the lower Stikine fishery will be 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 less than 135 meters will be in effect. Fishing boundaries will remain unchanged from those established in previous years, ie. from the border upstream to boundary markers located near the Stikine - Porcupine confluence, and in the Iskut R. 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. Weekly fishing time in the upper Stikine Indian Food Fishery will not normally be restricted as in past years.
- d. Restrictive measures in the lower Stikine commercial fishery (in order of implementation) will include:
 - i. fishing gear: mesh sizes restricted to less than 146mm (5.75 in.) to July 26;
 - ii. fishing area: boundaries may be relocated to protect isolated spawning populations;
 - iii. fishing time: the major tool used in the regulation of the fishery.
- e. In the upper Stikine fisheries, reductions in fishing time would be examined if no other adjustments could be made in the lower river commercial fishery.
- f. 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.

Another factor that has affected fishing time decisions in past years has been abnormal water conditions. Flooding and/or high

debris loading has infrequently shut down the fishery. Compensation for this anomaly usually results in postponement of the remainder of the fishing period to later in the week.

3. Summary

Attainment of the escapement goals for the Tahltan and non-Tahltan portions of the run is the primary objective. Harvest sharing arrangements will be based upon the model. If the catch projections are near the outer edges of the confidence limits of the model, managers will take the more conservative approach.

A number of different harvesting patterns will occur within each country's fisheries to satisfy both the escapement goals and the harvest sharing arrangements. These management actions will often not be similar due to changes in projections of run strength each week and because the in-river estimates of Stikine sockeye stock size will be more accurate than estimates of run size in the marine fisheries. The most unique management actions will occur when the projected TAC in-river is much higher or much lower than the projected run size in the U. S. fisheries. Generally, if U. S. fisheries allow more fish into the river than is needed for escapement plus the Canadian harvest share, the Canadian fishery will harvest the excess. If the in-river run is weaker than expected and there is not enough fish left to harvest to satisfy the Canadian harvest allocation, the Canadian fishery will be reduced to satisfy the escapement goals. Options for catch-up will be discussed and implemented weekly to achieve the harvest sharing arrangement as close as possible.

F. IN-SEASON DATA EXCHANGE AND REVIEW

Weekly data exchanges will be conducted by telephone on Wednesday afternoon of each week during the fishing season. At that time, current catch statistics and stock assessment data will be updated, exchanged, and/or reviewed. The next week's management plans 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 6 and 8: 11:00 a.m. Thursday Alaska Daylight Time b) for the Canadian Stikine fishery: 10:00 a.m. Friday Pacific Daylight Time.

Table 1. Summary of 1987 biological sampling goals for Alaska's District 106 and 108 commercial and test fisheries and Canada's Stikine in-river fisheries and escapements.

Catches (in-season)				
Area	Weekly sampling goals			
	Scales	Eggs	Parasite	GSI
Alaska's fisheries				
106-41 1/	700 2/		300	300
108 1/	700 2/			
106-30	700 2/			
Canada's in-river fisheries				
Lower river test	all	all 2/	1/2 catch 4/	1/2 catch 4/
Lower river commercial	400	100 2/		
Upper river food				
Escapements (post-season)				
Area	Season sampling goals			
	Scales	Eggs	Parasite 3/	GSI
Canadian escapements				
Tahltan Lake	700	100	100	100
Chutine Lake		100	100	100
Mainstem Stikine	700 5/	100	100	100
Iskut (at Verrett)		100	100	100
Alaskan escapements				
Standard 20 systems	500			
10? select systems	500		100	100

- 1/ Test fisheries will be sampled for scale data if commercial fishery is not open.
- 2/ Samples to be used in in-season analysis.
- 3/ Parasite sample will include *Philonema oncorhynche* in addition to *Myxobolus neurobius*.
- 4/ Overall target is approximately 800 fish throughout the run.
- 5/ Samples to be spread throughout Iskut, Chutine, and mainstem Stikine River.