

Stikine, Taku, and Alsek River Sockeye and Chinook
Salmon Baseline DNA Profiles 2007 - 2008.

(A study supported by the Northern Fund under the auspices of the Pacific Salmon Commission)

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Executive Summary

A total of \$260,472 Cdn has been received to date from the Northern Fund to support the collection of tissue samples from various transboundary chinook and sockeye salmon stocks in 2007 and 2008 in order to continue development of DNA baselines. A total of 1,225 chinook salmon samples and 3,462 sockeye salmon samples were collected from all three drainages combined. Problems with extreme high water in 2007, and below average returns for both chinook and sockeye salmon on all drainages for 2007 and 2008 had a negative effect on the number of stocks sampled and the number of samples collected from given stocks. As a result, the project was extended to include 2009. However, escapements were again below average and sample shortfalls still exist at the time of report preparation.

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1.0 Introduction

Improved in-season management of Transboundary River salmon is required to meet stock-specific spawning goals and harvest shares. The current techniques for identifying particular stocks of sockeye salmon include scale pattern analysis (SPA), measurement of egg size, and determination of brain parasite prevalence. Each of these has significant drawbacks and only measurement of egg diameter (which is limited to the Tahltan Lake stock) can be used for in-season management. The techniques available for identifying chinook salmon stocks are even more limited.

While this project focused on collection of samples for post-season estimates of weekly stock compositions, the long term goal is to have in-season capability. In addition, improved stock composition estimates will permit the compilation of stock recruitment data which will be used to establish biologically based escapement goals for particular stocks of interest (e.g. Tatsamenie sockeye salmon).

This project addresses the following strategic objective of the Northern Fund:

- *“improve the Parties ability to better manage the stocks and fisheries in the region (e.g. by developing methods to more accurately estimate inseason run sizes; to improve stock assessment capability; and to acquire the necessary information in a more timely fashion).”;*

It also addresses aspects of the Transboundary chinook salmon arrangements reached in February 2005 which include the following provisions:

- *Management of Stikine and Taku Chinook salmon will take into account the conservation of specific stocks or conservation units when planning and prosecuting their respective fisheries. To avoid over-harvesting of specific components of the run, weekly guideline harvests will be developed by apportioning their allowable harvest over the total Chinook season based on historical weekly run timing. The project will provide information to assess the run timing of various stocks or stock groupings through the inriver fishery.*
- *By 2008, the Parties agree to develop and implement through the Committee an agreed Chinook stock identification program to assist in the management of Stikine and Taku Chinook salmon.*

As such, the Transboundary Technical Committee seeks improved in-season stock identification for sockeye salmon and is tasked specifically with development of the capability for chinook salmon. Tahltan First Nation and Taku River Tlingit First Nation representatives on this committee, and the Transboundary Panel, are fully supportive of developing genetic stock identification for Stikine and Taku inriver fisheries.

2.0 Objectives

Collection of tissue samples from transboundary salmon stocks in order to establish a DNA baseline for identification of stocks in Canadian and U.S. fisheries.

3.0 Methods

Tissue samples consisting of individual opercular punches or axillary clips were taken from Transboundary chinook and sockeye salmon stocks (approximately 200 samples per stock), for inclusion in microsatellite and/or single nucleotide polymorphism (SNP) baselines. Many sockeye and chinook salmon stocks had already been sampled. However, for numerous populations, sample sizes fell short of the target sample size established by the TTC. Also, there were additional populations that had not yet been sampled; these are listed in TCTR (07)-02. Sampling was conducted according to the following protocol developed by the Transboundary Technical Committee:

- the target sample size is 200 adult samples per population;
- the preferred tissue to sample is the axillary appendage. For baseline samples, each fish will be sampled for two appendages; one to be sent to the DFO lab and the other to the ADF&G lab. For fishery samples, each fish will be sampled for one axillary appendage which will be shared if requested;
- if opercular punches are taken, two punches will be taken from each fish, again one for each of the respective labs. To eliminate problems associated with potential delamination of punches in composite samples i.e. where punches from one population and/or location are all stored in one vial as has been the practice, opercular punches will now be stored in individual labelled vials;
- Axillary appendages and opercular punches will be stored in ethanol (full strength) and each sample appropriately labeled (date, location, species, number of samples, fixative and volume thereof, collector, contact name, agency, phone number);

- although it is recognised that there are potential efficiencies in terms of effort, time, storage, shipping and archiving associated with using scale samples for GSI, this should not be a tissue of choice when obtaining fishery or other samples for GSI (e.g. out of a tote) but may be used as last resort.

The locations sampled are remote and generally not accessible by road except to limited departure points (Dease Lake, Telegraph Creek, Atlin, Haines Junction). Access to most spawning populations was via helicopter with a few accessible by river boat.

Sample collection took place from July through October 2007 and 2008, and also 2009. Fish capture methods included weirs for live fish and/or carcasses, angling, seine netting. See Appendix 3 “Hackett River and Yeth Creek – 2007; Chinook and Sockeye Genetic Sampling” and Appendix 4 “Taku Chinook Genetic Sampling: Yeth, Tseta and King Salmon Creeks – 2008” for sample detailed descriptions of methodology.

4.0 Results and Discussion

A total of 1,225 chinook salmon samples and 3,462 sockeye salmon samples were collected from all three drainages combined. Collections by species and drainage are presented in Tables 1-6.

Detailed reports on sample collection in Yeth, Tseta and King Salmon creeks, and the Hackett River, in the Taku River drainage are attached as examples of sampling excursions (Appendix 3 and Appendix 4).

Problems with extreme high water in 2007, and below average returns for both chinook and sockeye salmon on all drainages for 2007 and 2008 had a negative effect on the number of stocks sampled and the number of samples collected from given stocks. As a result the project was extended into 2009, however escapements were again below average and sample shortfalls still exist at time of report preparation (Figure 1).

A total of 413 samples were collected from five Stikine river chinook salmon stocks (Table 1).

Table 1. Chinook salmon samples collected in the Stikine River drainage 2007-2009.

Stock	2007	2008	2009	Total
Johnny Tashoots Creek		37	33	70
Shakes Creek	75			75
Tahltan River		83	89	172
Tuya River			6	6
Verrett Creek	90			90
Total	165	120	128	413

A total of 1,251 samples were collected from 13 Stikine River sockeye salmon stocks (Table 2).

Table 2. Sockeye salmon samples collected in the Stikine River drainage 2007-2009.

Stock	2007	2008	2009	Total
Bronson Slough		63		63
Chutine River		154	190	344
Chutine Lake			67	67
Devil's Elbow	50	150	50	250
Iskut (Bronson, near Craig misc.)			16	16
Porcupine Slough	36	3		39
Scud	90	48		138
Shakes Creek		30		30
Iskut (@Craig)		22	11	33
Stikine Main Andy Smith	10	4	11	25
Stikine Main Fowler	11	12	8	31
Tuya River		208		208
Zappa		7		7
Total	197	701	353	1251

A total of 710 samples were collected from seven Taku River chinook salmon stocks (Table 3).

Table 3. Chinook salmon samples collected in the Taku River drainage 2007-2009.

Stock	2007	2008	2009	Total
Hackett River	39	168		207
Tatsatua River	273			273
Nakina River	18	36		54
Nahlin River	34			34
King Salmon River	2	13		15
Tseta Creek		80		80
Yeth Creek		41	6	47
Total	366	338	6	710

A total of 1,335 samples were collected from ten Taku River sockeye salmon stocks (Table 4).

Table 4. Sockeye salmon samples collected in the Taku River drainage 2007-2009.

Stock	2007	2008	2009	Total
Hackett River	16	64	133	213
Nahlin River	76			76
Tulsequah River	18	53	199	270
Yellow Bluff		34		34
Tuskwa Creek		19		19
Tuskwa Slough		34	100	134
Tuskwa to Chunk		171	138	309
Shustahine Creek		95	112	207
Nakina River			4	4
Takwahoni / Sinwa			69	69
Total	110	470	755	1335

A total of 102 samples were collected from three Alsek River chinook salmon stocks (Table 5).

Table 5. Chinook salmon samples collected in the Alsek River drainage 2007-2009.

Stock	2007	2008	2009	Total
Goat Creek	54	15	25	94
Kudwat Creek		3		3
Tweedsmuir			5	5
Total	54	18	30	102

A total of 876 samples were collected from seven Asek River sockeye salmon stocks (Table 6).

Table 6. Sockeye salmon samples collected in the Asek River drainage 2007-2009.

Stock	2007	2008	2009	Total
Blanchard	111	9	63	183
Border Slough	50	22	30	102
Goat Creek	13			13
Kudwat Creek	45	0	20	65
Nesketaheen	199			199
Tweedsmuir	51	0	66	117
Vern Richie	64	38	95	197
Total	533	69	274	876

Figures 1-6 depict escapements relative to the recent ten-year averages (1997-2006).

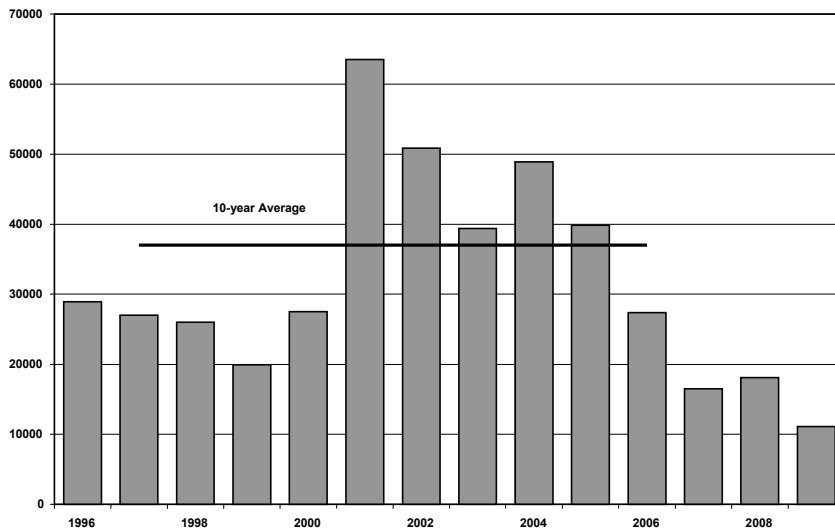


Figure 1. Escapements of chinook salmon to the Stikine River 1996-2009.

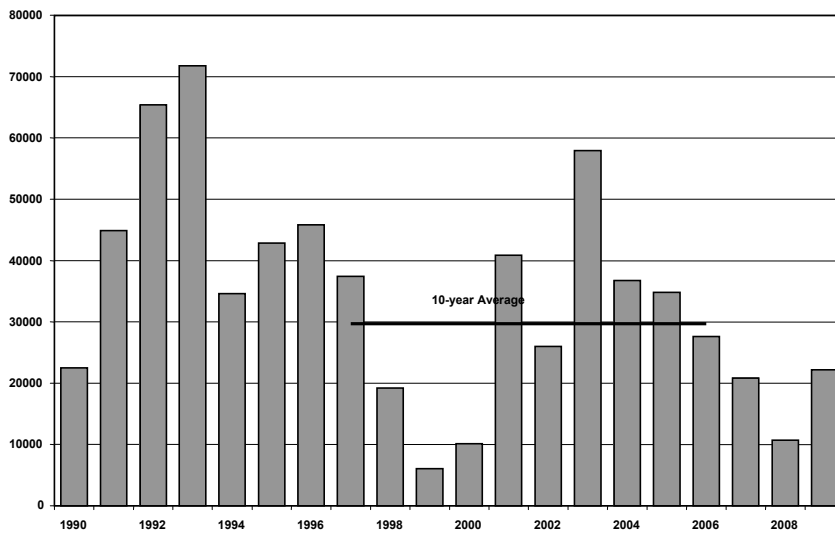


Figure 2. Escapements of sockeye salmon to the Stikine River 1990-2009. (Note: Excludes the Tahltan stock.)

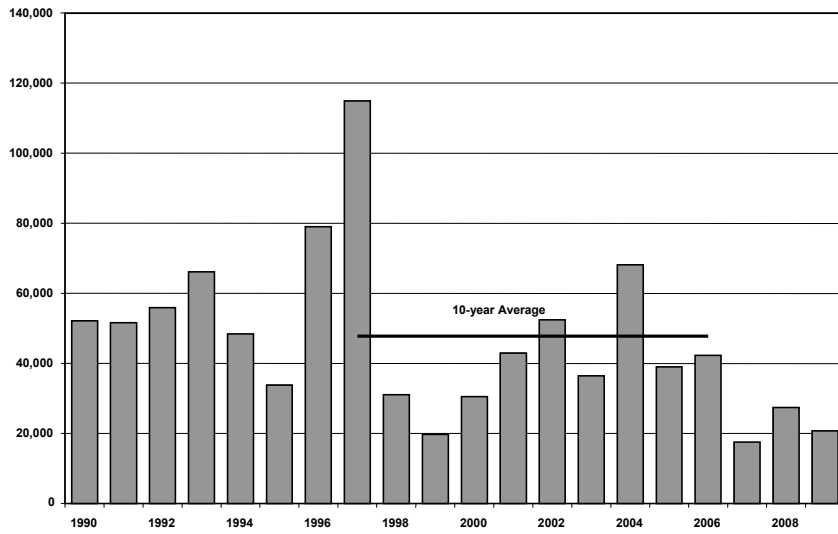


Figure 3. Escapements of chinook salmon to the Taku River 1990-2009.

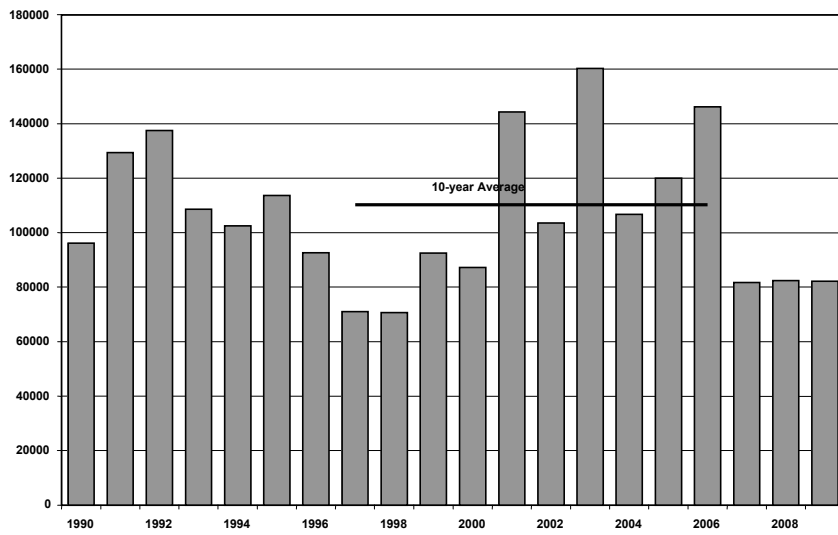


Figure 4. Escapements of sockeye salmon to the Taku River 1990-2009.

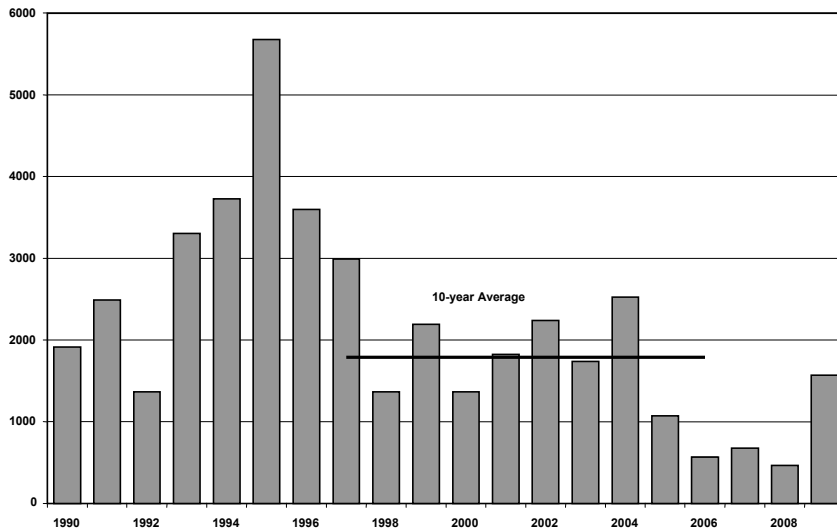


Figure 5. Escapements of chinook salmon to the Klukshu River 1990-2009. (Note: The Klukshu River serves as an index for the Alek River drainage.)

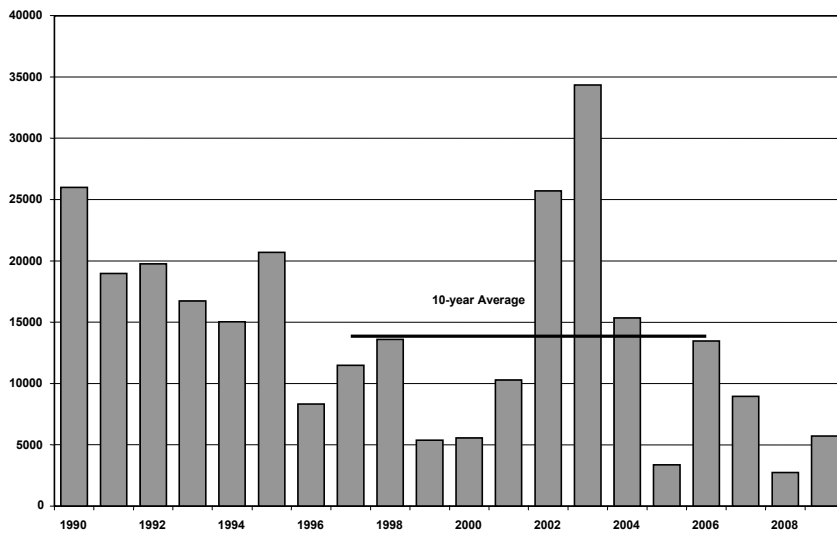


Figure 6. Escapements of sockeye salmon to the Klukshu River 1990-2009. (Note: The Klukshu River serves as an index for the Alek River drainage.)

4.1 Budget and Project Operations

The project was extended to March 31, 2009. The total expenditures match the amount received from the Fund to date. Overages in the technicians, site support and administration categories are offset by an underage in the service contract category. This reflects a greater reliance on the expertise of in-house staff than anticipated.

- a) Personnel
 - i) technicians/ surveyors : \$ 17,650 sampling; Actual: \$27,161; Balance: -9,511
 - ii) service contracts: \$ 88,599 Stikine and Taku river contracted samplers
Actual: 52,976; Balance: 35,621

- b) Site support
 - i) Travel: 132,015; Actual: 143,862
 - ii) facilities: 0; Actual: 327
 - iii) equipment: 2,000; Actual: 1,034
 - iv) supplies and materials 0; Actual 31,350
 - v) sample collections 0; Actual: 0
 - Total: 159,233; Actual: 176,574; Balance: -17,351

- c) Administrative support
 - i) phone, long distance and misc. costs: 2,000; Actual: 3,759; Balance: -1,759

- d) Estimated value
 - i) \$269,472 in cash; Actual to date: **\$260,472**; Balance: **\$9,000**

Detailed Fund expenditures are presented in Appendix 2.

5.0 Conclusion

There are still some outstanding sample requirements as identified in TCTR (10)-01 *Salmon management and enhancement plans for the Stikine, Taku and Alsek rivers, 2010*. It is expected that it will take a number of years before these are achieved.

6.0 Acknowledgements

Peter Etherton, Bill Waugh of DFO oversaw sample collection in the Stikine and Alsek river drainages. Members of, and contractors for, the Tahltan, Champagne Aishihik and Taku River Tlingit First Nations, Round River Conservation Studies, along with other DFO contractors and staff, also contributed to this project.

7.0 Literature Cited

Pacific Salmon Commission 2007. Joint Transboundary Technical Committee Report. TCTR 07-02: *Summary of the Transboundary Genetic Stock ID Workshop: January 18-19, 2007.*)

Pacific Salmon Commission 2010. Joint Transboundary Technical Committee Report. TCTR (10)-1. *Salmon management and enhancement plans for the Stikine, Taku and Alsek rivers, 2010.*

Appendix 1.
Financial Summary

Project Budget Form

please note that this project was extended into 2009

Name of Project:

Stikine, Taku, and Alsek River Sockeye and Chinook Salmon Baseline DNA Profiles, 2007-8.

ELIGIBLE COSTS

BUDGET

PSC EXPENDITURES PSC FUNDING BALANCE

Labour

Wages & Salaries

Position	# of crew	# of work days	hrs per day	rate per hour	Total (PSC + In-kind + cash)	In-Kind & Cash	Expenditures				
project manager (DFO Bi-4)	1	7.5	7.5	50.67	2,850	2,850					
biologist (DFO Bi-3)	1	5	7.5	48.00	1,800	1,800					
Stikine technician (DFO Eg-5)	1	15	7.5	37.33	4,200	4,200					
Alsek technician (DFO Eg-5)	1	15	7.5	42.67	4,800	4,800					
Taku technician (DFO Eg-5)	1	15	7.5	37.33	4,200	4,200					
Financial officer (DFO As-2)	1	7.5	7.5	34.67	1,950	1,950					
sampling technicians	4	15	7.5	23.00	10,350		27,161				
Person Days (# of crew x work days)					sub total	30,150					
						19,800	27,161	17,650	(9,511)		

Labour - Employer Costs (percent of wages subtotal amount)

rate	0%						
				sub total			

Subcontractors & Consultants

# of crew	# of work days	hrs per day	rate per hour	Total	In-Kind & Cash	Expenditures				
contracted samplers (Stikine)					23,700		23,672			
contracted samplers (Taku)					18,990		29,305			
Lab analysis					40,000		-			
Insurance if applicable										
					sub total	82,690		52,978	88,599	35,621

Volunteer Labour

# of crew	# of work days	hrs per day	rate per hour	Total	In-Kind & Cash	Expenditures			
Skilled									
Un-skilled									
Insurance if applicable									
					sub total				

Total Labour Costs 112,840 19,800 80,139

**Provide details in the space below
(use an additional page if needed)**

Site / Project Costs

Travel (do not include to & from work)	helicopter and fixed-wing charter, travel claims	143,862				143,862			
Fuels & Chemicals						9,784			
Small Tools & Equipment						274			
Site Supplies & Materials	sampling equip, groceries	18,547				18,547			
Equipment Rental						-			
Work & Safety Gear						3,019			
Repairs & Maintenance						760			
Permits						-			
Technical Monitoring						-			
Other site costs		5,327				5,000		327	
Total Site / Project Costs		167,737				5,000	176,574	159,223	(17,351)

ELIGIBLE COSTS

BUDGET

OTHER CONTRIBUTION FUNDING FUNDING

Training (e.g Swiftwater, bear aware, electrofishing, etc).

Name of course	# of crew	# of days	rate per hour	Total (PSC + In-kind + cash)	In-Kind & Cash	PSC Amount			
Total Training Costs									

Administrative Costs

Office space; including utilities, etc.		1,000				1,000			
Office supplies								89	
Telephone & Long Distance		500						1,822	
Photocopies & printing	shipping, fax,	1,000				500		1,848	
Insurance									
Indirect/overhead costs									
(If the Indirect cost level exceeds 20% of the total PSC grant you will be required to submit back-up documentation justifying the expense).									
Other overhead costs (give details)									
Total Administrative Costs		2,500				1,500	3,759	2,000	(1,759)

**Provide details in the space below
(use an additional page if needed)**

Capital Costs / Assets

Assets are things of value that have an initial cost of \$250 CAN or more and which can be readily misappropriated for personal use or gain or which are not, or will not be, fully consumed during the term of the project.

inflatable									
Total Capital Costs									

Project Total Costs 283,077 26,300 260,472 269,472 9,000

Appendix 2.
Expenditure Details



57102.pdf (59 KB)

Appendix 3.

Hackett River and Yeth Creek – 2007; Chinook and Sockeye Genetic Sampling



Adobe Acrobat
Document

Appendix 4.

Taku Chinook Genetic Sampling: Yeth, Tseta and King Salmon Creeks – 2008



2008 Taku Chinook
GSI final report.pdf