

Taku River Watershed

Chinook Salmon Headwater Sampling 2019

PSC NF-2019-I-30
DFO CA# 58603

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Executive Summary

The Northern Endowment Fund provided Fisheries and Oceans Canada with monies to conduct annual Chinook salmon sampling on four established headwater spawning locations in the Taku River watershed, Tatsatua Creek, Tseta Creek, Nahlin River and Dudidontu River, as well as one exploratory location, the Sloko River. These sites include some of the major spawning locations in the Taku River drainage and are significant contributors of sample numbers and tag recoveries to several Taku River Chinook salmon assessment projects. This project is the second event of an established mark-recapture project which estimates the annual abundance of Chinook salmon in the Taku River, it gathers a large portion of annual Chinook salmon biological samples which inform key stock parameters and enables run forecasting, and it inspects for and collects coded wire tags (CWTs) from adult fish which contributes to numerous other stock assessment and management interests.

A total of 400 (234 large (>659 mm mid-eye to fork length)) Chinook salmon were assessed for tags and biologically sampled on Tatsatua River between 18 August and 03 September. Five CWT's and 22 spaghetti tags were recovered.

A total of 595 (439 large) Chinook salmon were assessed for tags and biologically sampled on Tseta Creek, Nahlin and Lower Dudidontu Rivers between 27 July and 07 August. Nine CWT's and 30 spaghetti tags were recovered.

A total of 5 (2 large) Chinook salmon were assessed for tags and biologically sampled on the Sloko River between 17 and 19 July. No CWT's or spaghetti tags were recovered.

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1.0 Introduction

The purpose of this project is to attend several key Taku River Chinook salmon spawning ground locations during the mid-to post-spawn period in order to gather biological samples and inspect fish for the presence of tags. Data collected complements several Taku River Chinook salmon projects. It is the critical second event (tag recovery) of an established spaghetti tag mark-recapture project which estimates the annual abundance of Chinook salmon in the Taku River, it gathers a large portion of annual Taku River Chinook salmon biological samples which inform key stock parameters and provides data essential for run forecasting, and it inspects for and recovers coded wire tags (CWTs) from adult fish which contributes to numerous stock assessment and management interests. For example, CWT recoveries allow estimates of Chinook salmon marine survival rates and an estimate of the number of Chinook salmon smolts that emigrated from the Taku River in previous years.

Sampling was conducted by Fisheries and Oceans Canada (DFO) in collaboration with the Taku River Tlingit First Nation (TRTFN) and the Alaska Department of Fish and Game (ADF&G).

This year we attended both established, annually sampled locations (Tatsatua Creek, Tseta Creek, Nahlin River and Lower Dudidontu River) as well as an exploratory area (Sloko River).

The bulk of this project funding was directed to tag recovery and biological sampling of Chinook salmon on Tatsatua Creek (in the vicinity of Tatsatua (Little Tatsamenie) Lake, a long standing DFO project which on average contributes more than 25% of the total Taku River Chinook salmon spaghetti tag recoveries, and numerous CWT recoveries. This component of the project has been funded by the NEF in recent years as part of a different proposal. The remainder of this project funding allowed DFO and TRTFN staff to fully participate with ADF&G on Taku River Chinook headwater sampling projects at other established sampling sites which also provide a significant tag recovery and sampling contribution to the Taku River Chinook mark-recapture and CWT programs.

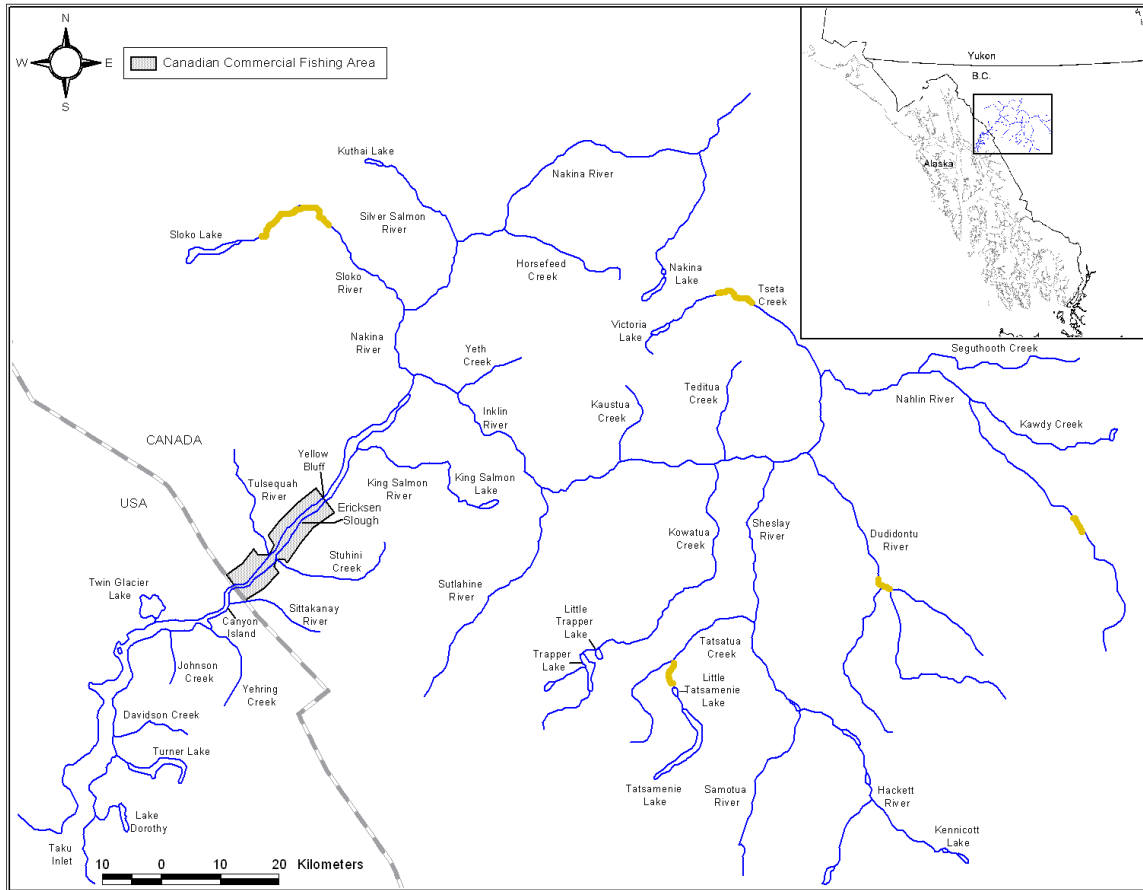


Figure 1. The Taku River drainage in British Columbia and Southeast Alaska. The highlighting approximates the project areas.

1.0 Objectives

Specific objectives of the project as proposed were to:

1. Collaborate with ADF&G to achieve sample targets from spawning Chinook salmon in Tseta Creek, Nahlin and Dudidontu rivers for adipose-clips/coded-wire tags, spaghetti tags/tag scars, length, sex, and scales.
2. Sample all available post-spawn Chinook salmon in Tatsatua Creek (and area) for adipose-clips/coded-wire tags, spaghetti tags/tag scars, length, sex, and scales over the course of the spawning/die off period.
3. Opportunistically explore new areas in the Taku River drainage to collect samples from spawning Chinook salmon for adipose-clips/coded-wire tags, spaghetti tags/tag scars, length, sex, scales, and genetics for baseline development.

2.0 Methods

In 2019 DFO again partnered with the TRTFN to deliver the Tatsatua Creek Chinook salmon sampling project. The two person crew based out of the float plane accessible DFO field camp which is located on Tatsatua Creek 1km downstream of Tatsatua Lake between 18 August and 03 September. Historically the project involved installing a carcass fence approximately 1km downstream of the DFO camp, which intercepts

drifting post-spawn dead or moribund Chinook salmon carcasses, as well as opportunistic rod and reel snagging of visible and accessible post-spawn Chinook salmon in the area. In 2019, given the very low Taku River Chinook salmon run size, combined with experience gained from past project results (particularly 2018), the carcass fence was not installed and sampling efforts were solely directed to seeking out and capturing Chinook salmon via rod and reel snagging.

In 2019 DFO again partnered with ADF&G to deliver the Tseta Creek, Nahlin and Lower Dudidontu Rivers portion of the project. As historically done, sampling crews accessed sites by rotary wing aircraft, camped at established locations, and moved around on foot, sampling via rod and reel snagging. Three ADF&G staff began sampling at Tseta Creek on 27 July and a DFO staff member joined on 29 July. A crew of two ADF&G and one DFO staff moved to the Nahlin River from 30 July to 02 August, and moved again to the Lower Dudidontu River from 04 to 07 August.

In 2019, an exploratory trip was made to the Sloko River. Radio telemetry has shown the Sloko River to be home to a largely unsampled population of Chinook salmon, and a primary goal of the project is to gather tissue samples for contribution to the Taku River Chinook salmon genetic baseline. The Sloko River is a challenging whitewater river with limited aerial access points. We hoped to define sampling areas in the upper-mid section of the river that could be accessed via an aerial drop of a crew equipped with an inflatable raft. Sampling techniques and locations were to be determined as the crew drifted downstream to a pre-determined takeout location. Two DFO staff, and one TRTFN staff member flew in by helicopter and sampled the Sloko River from 17 to 19 July. Sampling gear employed at various locations included a set gillnet that was continually monitored so captured fish could be released live, and rod and reel snagging. The river is almost exclusively fast and turbid water, so snagging yielded minimal results, but the gillnet proved useful in appropriate locations.

Biological sampling included: length, sex, checks for spaghetti tags, radio tags (there was a Chinook salmon telemetry project in 2019), secondary marks or a scar to identify spaghetti tag loss, observation of adipose fin presence/absence to indicate coded wire tagged (CWT) Chinook, and scale collection for ageing and potential genetic analysis. For age determination and later genetic analysis, sampled at Tseta, Nahlin and Dudidontu Rivers. Ten scales were collected from all Chinook salmon sampled at the Sloko and Tatsatua River. Scales were sent to DFO's Schlerochronology Lab at the Pacific Biological Station in Nanaimo, B.C for age analysis, where scales are also archived for future genetic analysis should funding become available.

Chinook recovered with missing adipose fins and suspected of carrying a CWT were killed, had their heads removed and tagged with a mouth cinch tag, frozen, and transported to DFO offices in Whitehorse, Yukon. These samples were shipped to the DFO contracted head lab (J.O. Thomas and Associates) in Vancouver, B.C. for coded wire tag extraction and decoding. Data were uploaded into DFO's Mark Recovery Database.

3.0 Results and Discussion

3.1 Tatsatua Creek

A total of 400 (234 large) Chinook salmon were assessed for tags and biologically sampled on Tatsatua Creek between 18 August and 03 September 2019. This biological sampling included the recovery of twenty-two spaghetti tags and five CWT heads. No radio tag were recovered. The recent 10 year average number of annual samples collected from Tatsatua Creek via rod and reel snagging is 275.

Table 1. Tatsatua Creek Chinook salmon sampling summary, 2019.

Chinook Salmon	Female	Male	Total	10 Year Avg. 2009-2018
Sampled	120	280	400	275
Coded Wire Tags Recovered	2	3	5	-
Spaghetti Tags Recovered	4	18	22	-
Radio Tags Recovered	0	0	0	-

3.2 Tseta, Nahlin and Lower Dudidontu Rivers

A total of 595 (439 large (>659 mm mid-eye to fork length)) Chinook salmon were assessed for tags and biologically sampled on Tseta Creek, Nahlin, and Lower Dudidontu Rivers between 27 July and 07 August 2019. This biological sampling included the recovery of thirty spaghetti tags, nine CWT heads, and eight radio tags.

Table 2. Tseta Creek, Nahlin and Dudidontu Rivers Chinook salmon sampling summary, 2019.

Chinook Salmon	Female	Male	Total
Sampled	222	373	595
Coded Wire Tags Recovered	4	5	9
Spaghetti Tags Recovered	11	19	30
Radio Tags Recovered	2	6	8

3.3 Sloko River

A total of 5 (2 large) Chinook salmon were assessed for tags and biologically sampled on the Sloko Rivers between 17 and 19 July 2019. No spaghetti tags, CWT heads, or radio tags were recovered.

The number of samples gathered was small, as the Sloko River is notoriously difficult to sample. Although we had recent Chinook salmon radio tag location data to assist us in targeting areas of potential Chinook salmon aggregation, the river does not present classic meandering slower flow spawning habitats from which to target and sample fish. The fast and turbid water runs bank to bank with few side channels and/or refuge areas for fish. There is significant water flow outside of the main channel in and through

nearby forest habitats as well. Fish must be utilizing small and sporadic bank habitats with overhanging vegetation, and instream features, which make sampling almost impossible. The turbidity of the water makes visually targeting of fish impossible as well and locations to safely stop a raft for sampling are minimal.

We launched our raft at the first optional landing location below the upper river beaver pond area that appears to be the extent of Chinook salmon use, and below a series of significant rapids. From here we floated about 16 km of river which ranged from fast water to class 3 rapids. We took out at the lowest possible location prior to a series of large log jams and continuous whitewater for the remainder of the river to its confluence with the Nakina River.

We experimented with a variety of capture techniques in all suitable sampling locations, but found the only tenable option was to set a gillnet in one of the few larger eddy habitats and continually monitor it. As soon as a fish encountered the net, we would disentangle, sample, and release it. As this technique is encountering migrating fish, we recommend that the best way to sample Chinook salmon from the Sloko River is to use this monitored gillnet technique lower in the river and earlier in the migration, so as to increase the odds of fish capture. We plan to investigate suitable sites in 2020 in collaboration with TRTFN.

Table 3. Sloko River summary

Chinook Salmon	Female	Male	Total
Sampled	1	4	5
Coded Wire Tapes Recovered	0	0	0
Spaghetti Tags Recovered	0	0	0
Radio Tags Recovered	0	0	0

4.0 Budget Summary

The total budget approved for this project by the Northern Endowment Fund was \$66,896.60. Project expenditures amounted to \$60,807.91 which is slightly over (\$600.61) the 90% of the approved budget previously advanced by the PSC. This small overage will be covered by DFO along with our other in-kind project expenditures of \$7,208.00. The 10% holdback of \$6,690 is not required from the PSC. A budget summary of expenditures can be referenced in Appendix C.

5.0 Conclusion

The project objectives for 2019 were fully achieved. All established locations were attended as planned, timing for optimal fish sampling was ideal, and all available samples were collected at each location. One new location was investigated, a few samples were collected, and plans for future sampling in this area were informed and solidified.

Overall, we collected a total of 1,000 Chinook salmon samples from Tatsatua Creek, and the Nahlin, Tseta, lower Dudidontu, and Sloko Rivers. This comprised 88% of the escapement samples drainage-wide for the Taku River mark-recapture program (i.e. 1,000 of 1,137 samples). These samples contributed to ensuring a robust estimate of Taku River Chinook salmon abundance in 2019.

6.0 Acknowledgments

Mathieu Ducharme (DFO) and Trevor Williams (TRTFN) conducted the Tatsatua Creek field work. Sean Stark (DFO) and Joe Simonowicz, Nathan Frost, Stephen Warta and Jeff Williams (ADF&G) conducted the Tseta Creek, Nahlin and Dudidontu Rivers sampling. Aaron Foos (DFO), Adam Brennan (DFO) and Mark Connor (TRTFN) completed the Sloko River project. Colleen Claggett (DFO) assisted with the financial administration and accounting for this project.

7.0 Appendices

Appendix A: Expenditures

Taku River - Chinook Salmon Headwater Sampling, 2019 (NF-2019-I-30)							
EXPENDITURES							
Labour							
DFO Employee Salaries and Benefits							
Position		Expenditures (DFO Inkind + PSC)	DFO-Inkind	PSC funding (expenses)	Approved Budget (PSC Funding)	Total PSC Funded Expenditure	Variance
Biologist BI-03	Salary	\$ 2,025.00	\$ 2,025.00				
	Benefits	\$ 546.75	\$ 546.75		\$ -		
Biologist BI-02	Salary	\$ 3,375.00	\$ 3,375.00				
	Benefits	\$ 911.25	\$ 911.25		\$ -		
Technician EG-03	Salary	\$ 11,719.52		\$ 11,719.52	\$ 16,080.00		
	Benefits	\$ 3,140.24		\$ 3,140.24	\$ 4,341.60		
	Total Expended	\$ 21,717.76	\$ 6,858.00	\$ 14,859.76	\$ 20,421.60	\$ 14,859.76	\$ 5,561.84
Subcontractors & Consultants							
Contract		Contract Amount Expended	Inkind	PSC funding (expenses)	Approved Budget	Total PSC Funded Expenditure	Variance
Contract services - TRTFN - Sr Tech		\$ 11,438.85		\$ 11,438.85	10,625		
Air charter services		\$ 25,690.57		\$ 25,690.57	25,600		
Contract C		\$ -					
		\$ -					
	Total Expended	\$ 37,129.42	\$ -	\$ 37,129.42	\$ 36,225.00	\$ 37,129.42	\$ (904.42)
			\$ 6,858.00		Total \$ 56,646.60	\$ 51,989.18	\$ 4,657.42
Site / Project Costs							
Item		Amount Expended	Inkind	PSC funding (expenses)	Approved Budget	Total PSC Funded Expenditure	Variance
Travel		\$ 1,055.79		\$ 1,055.79	\$ 1,500.00		
Small Tools & Equipment		\$ 1,020.91		\$ 1,020.91	\$ 2,100.00		
Site Supplies & Materials		\$ 6,742.03		\$ 6,742.03	\$ 3,950.00		
Equipment Rental		\$ -					
Work & Safety Gear		\$ -			\$ 1,200.00		
Repairs & Maintenance		\$ -			\$ 1,500.00		
Permits		\$ -					
Other costs		\$ -					
	Total Expended	\$ 8,818.73	\$ -	\$ 8,818.73	\$ 10,250.00		
			\$ -		\$ 10,250.00	\$ 8,818.73	\$ 1,431.27
Training Costs							
Item		Amount Expended	Inkind	PSC funding (expenses)	Approved Budget	Total PSC Funded Expenditure	Variance
Name of course		\$ -					
		\$ -					
	Total Expended	\$ -	\$ -	\$ -	\$ -		
			\$ -		\$ -	\$ -	\$ -

Overhead / Indirect Costs							
Item	Amount Expended	Inkind	PSC funding (expenses)	Approved Budget	Total PSC Funded Expenditure	Variance	
Office space; including utilities, etc.	\$ -						
Insurance	\$ -						
Office supplies	\$ -						
Telephone & long Distance	\$ -						
Photocopies & printing	\$ -						
Indirect/overhead costs - Field Worker Safety	\$ 350.00	350					
Administration and financial management	\$ -						
(If the PSC contribution to Indirect costs exceeds 20% of the total PSC grant submission of back-up documentation justifying the expense is required).							
Total Expended	\$ 350.00	\$ 350.00	\$ -	\$ -	\$ -	\$ -	\$ -
		\$ 350.00		\$ -	\$ -	\$ -	\$ -

Capital Costs / Assets (Value > \$250.00)							
Item	Amount Expended	Inkind	PSC funding (expenses)	Approved Budget	Total PSC Funded Expenditure	Variance	
	\$ -						
	\$ -						
	\$ -						
	\$ -						
Total Expended	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
		\$ -		\$ -	\$ -	\$ -	\$ -

Financial Report

Categories	DFO InKind	Approved Budget (PSC Grant)	Project Expenditures (PSC\$)	Variance
Labour	\$ 6,858.00	\$ 56,646.60	\$ 51,989.18	\$ 4,657.42
Site / Project Costs	\$ -	\$ 10,250.00	\$ 8,818.73	\$ 1,431.27
Training	\$ -	\$ -	\$ -	\$ -
Overhead / Indirect Costs	\$ 350.00	\$ -	\$ -	\$ -
Capital Costs / Assets	\$ -	\$ -	\$ -	\$ -
TOTAL		\$ 66,896.60	\$ 60,807.91	\$ 6,088.69

PSC Project Funding Grant Advance Amount Received	\$ (60,207.30)	(funds rec enter as negative)
PSC Project Funding Grant Amount Remaining to be Paid	\$ -	(positive refundable to PSC)
Difference Between Grant Amount and Project Expenditures	\$ (600.61)	

Justification if Variance

Project Manager Name Aaron Foos

Project Manager Signature
Date

DFO Responsibility Center Manager Name William Waugh

DFO Responsibility Center Manager Signature
Date

Appendix B: Photographs



Photograph 1. Tseta Creek - Chinook Sampling



Photograph 2. Tatsatua Creek - Chinook sampling.