Taku River Watershed
Little Trapper Lake Sockeye Salmon Enumeration
and
Kowatua River and Tatsatua Creek
Chinook Salmon Post-spawn Sampling
2018

PSC NF-2018-I-15
DFO CA# 57676

Final Report
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Executive Summary

The Northern Endowment Fund provided Fisheries and Oceans Canada with monies to continue three unique but linked projects in the upper Taku River watershed in 2018. First, the enumeration and biological sampling of returning Little Trapper Lake sockeye salmon (*Oncorhynchus nerka),* second and third, post-spawn tag recovery and biological sampling of Chinook salmon (*Oncorhynchus tshawytscha)* in Kowatua River and Tatsatua Creek.

A total of 8,249 sockeye salmon were enumerated as they passed through a weir located at the outlet of Little Trapper Lake between 23 July and 12 September 2018. The target of 800 biological samples was achieved.

A total of 181 post-spawn Chinook salmon were assessed for tags and biologically sampled in Kowatua River via carcass pitch between 25 August and 11 September 2018.

A total of 243 post-spawn Chinook salmon were assessed for tags and biologically sampled via angling in Tatsatua Creek between 18 August and 7 September 2018.

Table of Contents

List of Tables

List of Figures

List of Appendices

1.0 Introduction

The purpose of this project was to provide an escapement count for Little Trapper Lake sockeye salmon, and to generate Event II (tag recovery) and biological data for the Taku River Chinook salmon mark-recapture project in 2018.

Sockeye salmon enumeration via counting fence has been conducted at Little Trapper Lake at the headwater of Kowatua River in the Taku River drainage for more than 30 years. This provides a long term index of sockeye escapement into the Taku River. The Little Trapper stock is the largest lake stock in the drainage and is an index for drainage wide abundance.

Tag recovery and biological sampling for Chinook salmon on Kowatua River and Tatsatua Creek (both are in the vicinity of Little Trapper Lake) has also occurred for many years and provides significant contributions (~50%) to the Event II tag recovery and biological data used in the estimation of drainage-wide Taku River Chinook salmon abundance. This involved boat surveys and a carcass pitch on Kowatua River and visual foot surveys and angling (snagging) on Tatsatua Creek.

The project provides high quality biological data (age, size) and samples (genetics) which significantly contribute to the stock assessment of both species in the Taku drainage.

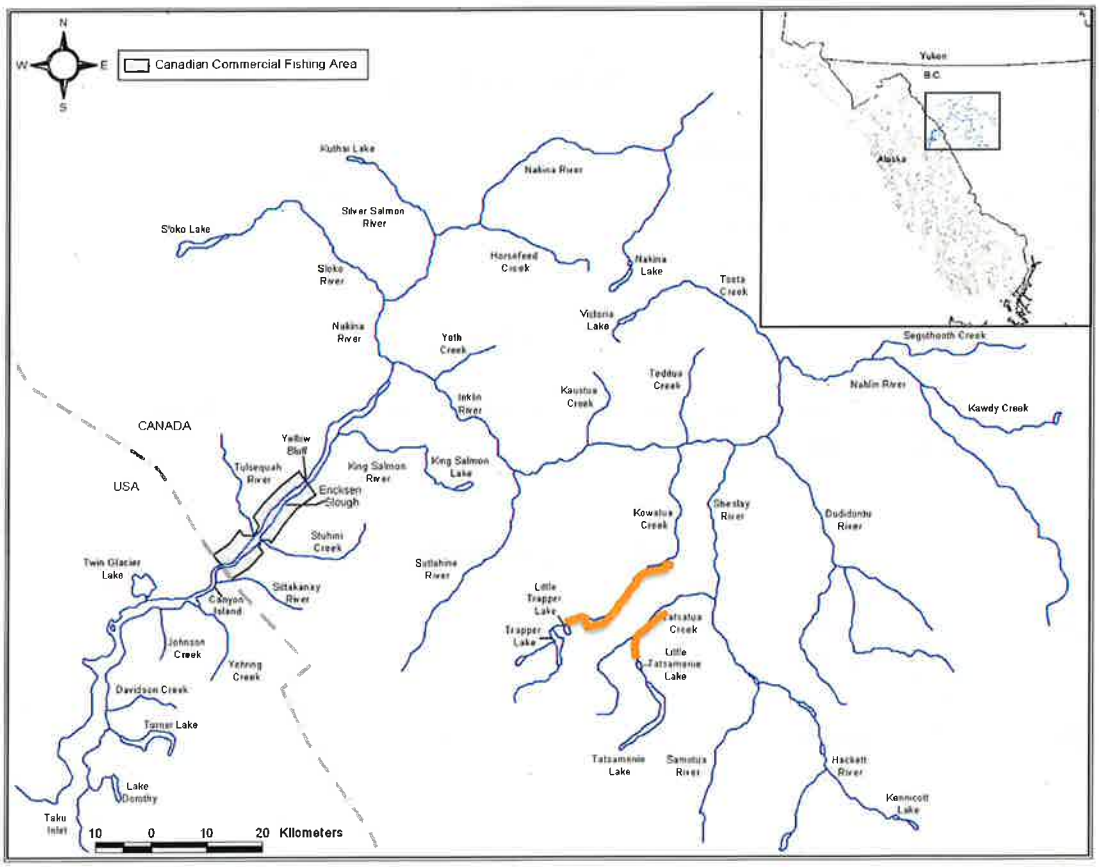

Figure 1. The Taku River drainage in British Columbia and Southeast Alaska. The orange highlighting approximates the project areas.

2.0 Methods

In 2018 DFO partnered with Metla Environmental Inc. (MEI) of Whitehorse, Yukon and the Pacific Salmon Commission (PSC) to deliver the Little Trapper weir and Kowatua river Chinook sampling projects. As the project proponent, DFO provided contract direction and oversight for a PSC contract directly let with MEI under this project funding. MEI has successfully delivered these projects for many years, and was able to utilize existing infrastructure, equipment and methodologies to complete the project again this year. The contract statement of work included the following elements, matching the objectives of the project:

1. Operation of an enumeration weir on the Kowatua River at the outlet of Little Trapper Lake, during the sockeye run.

2. Enumeration of all salmon and spaghetti tags passing through the enumeration weir. Recovery of as many spaghetti tags as possible without unduly disrupting migration.

3. Sampling 800 live sockeye for length, sex, scales, axillary appendage clips, and tags in proportion to run timing.

4. Sampling all available post-spawn Kowatua River Chinook for adipose-clips, floy tags, coded-wire tags, secondary marks, length, sex, and scales over the course of the spawning/die off period.

The weir at the outlet of Little Trapper Lake in Kowatua River was installed and made fish tight by 22 July and was in place through 12 September 2018. The personnel operating the Little Trapper weir also conducted the Kowatua River Chinook carcass recovery and sampling beginning 25 August and concluding 11 September 2018 dictated by run timing and carcass availability. A jet boat was utilized to access the river from the weir downstream approximately 8km. A spear was used to collect all available post-spawn dead or moribund Chinook. A small number of samples were collected from live Chinook transiting the sockeye weir. Field staff were based at facilities owned by MEI.

In 2018 DFO partnered with the Taku River Tlingit First Nation (TRTFN) to deliver the Tatsatua Creek Chinook sampling project. The crew was based out of the DFO field camp which is located 1km downstream of Little Tatsamenie Lake. Typically the project involves installing a carcass fence approximately 1km downstream of the DFO camp, which intercepts floating post-spawn dead or moribund Chinook, as well as opportunistic angling (snagging) of any visible post-spawn Chinook in the area. In 2018, given the very low Chinook run size, combined with experience gained from past project results, the carcass fence was not installed and efforts were solely directed to seeking out and capturing post-spawn Chinook via angling (snagging).

Biological sampling included: length, sex, checks for spaghetti tags, radio tags, secondary marks or a scar to identify spaghetti tag loss, observation of adipose presence for coded wire tagged (CWT) Chinook, and scale collection for ageing and genetic analysis. For

age determination and later genetic analysis, five scales were collected from all sockeye and ten scales were collected from all Chinook salmon. 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 had their heads removed and tagged with a mouth cinch tag, were frozen and transported to DFO offices in Whitehorse, Yukon. These samples were shipped to the DFO contracted 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 Little Trapper Weir

Sockeye Salmon

The first sockeye were observed below the weir on 27 July (statistical week (SW) 30). Migration through the weir commenced 30 July (SW 30), and enumeration took place through 12 September 2018 (SW 37) when weir was removed.

A total of 8,249 sockeye salmon were enumerated through the weir over the eight weeks of operation. Of these, 800 sockeye were biologically sampled in proportion to the run amounting to approximately 10% of the total count. Of the 800 sampled fish, 647 were males and 123 were female, a very atypical result, and inconsistent with other sockeye stocks in the Taku watershed in 2018.

Fish passing through the weir were inspected for spaghetti tags and radio tags. There were 181 spaghetti tags observed, of which 171 (95%) were recovered. No radio tags were observed. There was one incidence of tag loss observed.

The 2018 sockeye weir count was above the 10 year average (2008-2017) count of 6,605.

Table 1. Little Trapper weir summary

Sockeye Salmon	Female	Male	Total	10 Year Avg. 2008-2017
Weir Count			8,249	6,605
Sampled	123	647	800	
Tag Scars			1	
Spaghetti Tags Recovered			171	
Radio Tags Recovered			0	

3.2 Kowatua River

Chinook Carcass Recovery

There were 181 Chinook samples obtained (115 male, 66 female) over the two and a half weeks of sampling. Biological sampling included the recovery of three CWT heads and two spaghetti tags. No radio tags were recovered.

Table 2. Kowatua Creek summary

Chinook Salmon	Female	Male	Total	10 Year Avg. 2008-2017
Sampled	66	115	181	291
Adipose Clips (CWT) Recovered			3	
Spaghetti Tags Recovered			2	
Radio Tags Recovered			0	

3.3 Tatsatua Creek

Chinook Carcass Recovery via Angling

There were a total of 243 Chinook samples obtained (71 female, 172 male) through angling (snagging) over three weeks of sampling. Three CWT heads, two spaghetti tags and one radio tag were recovered during biological sampling. The recent 10 year average number of samples collected via angling is 286. The Taku River drainage wide Chinook run was well below average in 2018 making samples difficult to collect.

Table 3. Tatsatua Creek summary

Chinook Salmon	Female	Male	Total	10 Year Avg. 2008-2017
Sampled	71	172	243	286
Adipose Clips (CWT) Recovered			3	
Spaghetti Tags Recovered			2	
Radio Tags Recovered			1	

4.0 Budget Summary

The total budget approved for this project by the Northern Endowment Fund was $95,000. The Pacific Salmon Commission directly contracted Metla Environmental Inc for their contribution to the project ($60,000) as overseen and approved by DFO.

The NEF allocation to DFO of $35,000 was not fully expended as DFO used in-kind funds to cover the TRTFN contract line item in this project ($8,500). Total expenditures amounted to $29,506.11 which shows here as $5,493.89 under budget. The 10% holdback of $3,500 is not required from the PSC, and once the final project report is accepted by the PSC, DFO will issue a refund of $1.993.89 of unspent advance monies. A budget summary of expenditures can be referenced in Appendix C.

5.0 Conclusion

The project objectives for 2018 were fully achieved. A complete sockeye count was obtained at Little Trapper Lake and sample goals were achieved. The sex ratio of sockeye was strongly skewed to males in 2018.

The number of Chinook salmon samples collected from Kowatua River and Tatsatua Creek comprised 59% of the escapement samples drainage-wide for the Taku River mark-recapture program (i.e. 577 of 984 samples). Sample numbers were below the ten year average, but commendable give the low number of Chinook returning to the Taku in 2018.

Adult sockeye escapements into Little Trapper Lake as well as baseline age and length information serve as an index and provide insight on the system wide escapement estimates derived from the Taku River sockeye mark recapture program. The Chinook tag recovery and age, sex, length information contribute to the overall Taku River Chinook escapement estimates and biological metrics of the stock.

6.0 Acknowledgments

Bonnie Huebschwerlen coordinated the field components of these projects and assisted with data preparation. Brian Mercer of Metla Environmental Inc. and his field crew capably delivered their contract supported by this funding, and Mathieu Ducharme (DFO) and Chris Kirby (TRTFN) conducted the Tatsatua Creek field work. Mark Connor (TRTFN) coordinated TRTFN involvement with the project. Colleen Claggett (DFO) assisted with the financial administration and accounting for this project.

7.0 Appendices

Appendix A: Sockeye Data

Appendix A-1. Daily counts of adult sockeye salmon passing through Little Trapper Lake weir, 2018.

DATE	Weir Count			Tag Scars		Tags		
	Not Sampled	Sampled	Total	Fish Inspected	Observed	Recovered	Not Recovered	Total
23-Jul	0	0	0	0	0	0	0	0
24-Jul	0	0	0	0	0	0	0	0
25-Jul	0	0	0	0	0	0	0	0
26-Jul	0	0	0	0	0	0	0	0
27-Jul	0	0	0	0	0	0	0	0
28-Jul	0	0	0	0	0	0	0	0
29-Jul	0	0	0	0	0	0	0	0
30-Jul	67	0	67	0	0	0	0	0
31-Jul	121	30	151	0	0	0	0	0
1-Aug	245	30	275	30	0	4	1	5
2-Aug	113	30	143	30	0	0	1	1
3-Aug	36	30	66	30	0	1	0	1
4-Aug	333	30	363	30	0	4	0	4
5-Aug	68	20	88	20	0	2	0	2
6-Aug	1	10	11	10	0	0	0	0
7-Aug	20	20	40	20	1	1	0	1
8-Aug	3	0	3	0	0	1	0	1
9-Aug	71	30	101	30	0	0	1	1
10-Aug	77	30	107	30	0	1	0	1
11-Aug	87	30	117	30	0	2	0	2
12-Aug	14	30	44	30	0	0	0	0
13-Aug	25	10	35	10	0	1	0	1
14-Aug	130	20	150	20	0	0	0	0
15-Aug	1	20	21	20	0	1	0	1
16-Aug	56	40	96	40	0	2	0	2
17-Aug	4	30	34	30	0	0	0	0
18-Aug	3	0	3	0	0	0	0	0
19-Aug	1170	30	1200	30	0	11	2	13
20-Aug	1240	30	1270	30	0	29	1	30
21-Aug	967	30	997	30	0	25	0	25
22-Aug	607	30	637	30	0	21	1	22
23-Aug	530	30	560	30	0	13	0	13
24-Aug	143	30	173	30	0	6	0	6
25-Aug	286	30	316	30	0	5	0	5
26-Aug	142	30	172	30	0	4	0	4
27-Aug	113	20	133	20	0	8	0	8
28-Aug	100	20	120	20	0	6	1	7
29-Aug	57	0	57	0	0	2	0	2
30-Aug	36	20	56	20	0	3	0	3
31-Aug	47	10	57	10	0	2	0	2
1-Sep	37	0	37	0	0	0	0	0
2-Sep	47	10	57	10	0	2	0	2
3-Sep	0	10	10	0	0	0	0	0
4-Sep	61	10	71	10	0	3	0	3
5-Sep	76	10	86	10	0	3	0	3
6-Sep	42	0	42	0	0	3	0	3
7-Sep	1	10	11	10	0	0	0	0
8-Sep	5	0	5	0	0	0	0	0
9-Sep	100	0	100	0	0	3	1	4
10-Sep	1	0	1	0	0	0	0	0
11-Sep	45	0	45	0	0	0	1	1
12-Sep	121	0	121	0	0	2	0	2
TOTAL	7449	800	8249	760	1	171	10	181

Appendix B: Chinook Data

Appendix B-1. Daily counts of Chinook salmon sampled on Kowatua Creek, 2018.

DATE	Sampled			Adipose Clip (CWT)	Tags
	Female	Male	Total	Recovered	Recovered
25-Aug	1	2	3	1	
26-Aug					
27-Aug	4	8	12		
28-Aug	1	7	8		
29-Aug					
30-Aug	12	18	30	1	
31-Aug	18	14	32		1
1-Sep	5	14	19		
2-Sep	15	25	40		
3-Sep	9	22	31		
4-Sep					
5-Sep					
6-Sep					
7-Sep	1	3	4		1
8-Sep					
9-Sep		1	1	1	
10-Sep					
11-Sep		1	1		
TOTAL	66	115	181	3	2

Appendix B-2. Daily counts of Chinook salmon sampled on Tatsatua Creek with sport rod, 2018.

DATE	Rod/Snagging Sample			Adipose Clip (CWT)	Tags
	Female	Male	Total	Recovered	Recovered
18-Aug	1	2	3		
19-Aug	3	7	10		
20-Aug		5	5		
21-Aug	1	8	9		
22-Aug	3	10	13	1	
23-Aug	1	4	5		
24-Aug	1		1		
25-Aug	6	10	16		
26-Aug	7	11	18	1	
27-Aug	2	8	10		
28-Aug					
29-Aug	3	8	11		
30-Aug					
31-Aug	3	1	4		
1-Sep	3	16	19	1	1
2-Sep	4	17	21		
3-Sep	8	13	21		
4-Sep	7	23	30		
5-Sep	7	13	20		
6-Sep	10	15	25		1
7-Sep	1	1	2		
TOTAL	71	172	243	3	2

Appendix C: Expenditures

Fisheries and Oceans Canada - PSC Project Budget Financial Report

Name of Project and PSC#:

Taku L. Trapper Sockeye and Kowatua-Tatsatua Chinook, 2018 (NF-2018-I-15)

EXPENDITURES

Labour

DFO Employee Salaries and Benefits

Position	Expenditures		Approved Budget	Total Expenditure	Variance
DFO Fishery Technician EG 3	$ 9,467.63		$ 8,750.00		
	$ 1,893.53		$ 1,750.00		
Total Expended	$ 11,361.16	Total Budget	$ 10,500.00	$ 11,361.16	$ (861.16)

Subcontractors & Consultants

Contract	Contract Amount Expended		Approved Budget	Total Expenditure	Variance
contract services - TRTFN			$ 8,500.00		
Total Expended	$ -	Total Budget	$ 8,500.00	$ -	$ 8,500.00
		Total Labour Summary	$ 19,000.00	$ 11,361.16	$ 7,638.84

Site / Project Costs

Item	Amount Expended		Approved Budget	Total Expenditure	Variance
Travel	$ 7,798.91		7,500		
Small Tools & Equipment	$ 2,520.50		$ 1,900.00		
Site Supplies & Materials	$ 5,760.55		$ 5,100.00		
Equipment Rental			-		
Work & Safety Gear	$ 932.33		$ 500.00		
Repairs & Maintenance	$ 1,132.66		$ 1,000.00		
Permits			-		
Other costs			-		
Total Expended	$ 18,144.95	Total Budget	$ 16,000.00	$ 18,144.95	$ (2,144.95)
		Total Site / Project Summary	$ 16,000.00	$ 18,144.95	$ (2,144.95)

Training Costs

Item	Amount Expended		Approved Budget	Total Expenditure	Variance
Name of course					
Total Expended	$ -	Total Budget	$ -	$ -	$ -
		Total Training Summary	$ -	$ -	$ -

Fisheries and Oceans Canada - PSC Project Budget Financial Report

Overhead / Indirect Costs

Item	Amount Expended		Approved Budget	Total Expenditure	Variance
Office space; including utilities, etc.					
Insurance					
Office supplies					
Telephone & long Distance					
Photocopies & printing					
Indirect/overhead costs					
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	$ -	Total Budget	$ -	$ -	$ -
		Total Overhead / Indirect Summary	$ -	$ -	$ -

Capital Costs / Assets (Value > $250.00)

Item	Amount Expended		Approved Budget	Total Expenditure	Variance
Total Expended	$ -	Total Budget	$ -	$ -	$ -
		Total Capital Cost / Asset Summary	$ -	$ -	$ -

Financial Report

Categories	Approved Budget (PSC Grant)	Project Expenditures	Variance
Labour	$ 19,000.00	$ 11,361.16	$ 7,638.84
Site / Project Costs	$ 16,000.00	$ 18,144.95	$ (2,144.95)
Training	$ -	$ -	$ -
Overhead / Indirect Costs	$ -	$ -	$ -
Capital Costs / Assets	$ -	$ -	$ -
TOTAL	**$ 35,000.00**	**$ 29,506.11**	**$ 5,493.89**

PST Project Funding Grant Advance Amount Received	**$ (31,500.00)**
PST Project Funding Grant Amount Remaining to be Paid	
Difference Between Grant Amount and Project Expenditures	**$ 1,993.89**

Project Manager Name Aaron Foos

Project Manager Signature

Date 25 March 20A

DFO Responsibility Center Manager Name William Waugh

DFO Responsibility Center Manager Signature

Date Mar. 26/19

Appendix D: Photographs

Photograph 1. Little Trapper Lake Weir.

Photograph 2. Little Trapper weir - Sockeye sampling.

Photograph 3. Kowatua Creek - Chinook carcass sampling.

Photograph 4. Tatsatua Creek - Chinook sampling.