Taku River Watershed
Little Trapper Lake Sockeye Salmon Enumeration
and
Kowatua River Chinook Salmon
Post-spawn Sampling
2020

PSC NF-2020-I-25

Final Report
January 2021

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Executive Summary

The Northern Endowment Fund provided monies to continue two unique but linked salmon assessment projects in the upper Taku River watershed in 2020. First, the enumeration and biological sampling of returning Little Trapper Lake sockeye salmon (*Oncorhynchus nerka)* and secondly, post-spawn tag recovery and biological sampling of Chinook salmon (*Oncorhynchus tshawytscha)* in Kowatua River.

A total of 7,670 sockeye salmon were enumerated as they passed through a weir located at the outlet of Little Trapper Lake between 23 July and 13 September 2020. This count was slightly above the recent average. The target of 800 biological samples was achieved.

A total of 266 Chinook salmon were inspected for tags and biologically sampled in Kowatua River via carcass pitch between 16 August and 12 September 2020, this was 29% of the drainage wide Chinook salmon headwater samples collected.

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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 spaghetti tag recoveries to contribute to the Taku River Chinook salmon mark-recapture abundance estimation project, inspect Chinook salmon for the presence of coded wire tags (CWTs), as well as collection of Chinook salmon biological data for 2020.

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 salmon escapement into the Taku River. The Little Trapper stock is the largest lake-type sockeye salmon stock in the drainage and is an index for drainage wide abundance.

Tag recovery and biological sampling of Chinook salmon on the Kowatua River has also occurred for many years and contributes to the Event II spaghetti tag recovery and biological data used in the estimation of drainage-wide Taku River Chinook salmon abundance. All Chinook salmon sampled are also inspected for the presence of CWTs, which contribute to several initiatives, including previous years smolt emigration estimates and marine survival estimates. Sampling involves boat surveys and a carcass pitch on accessible portions of the Kowatua River downstream of Little Trapper Lake.

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

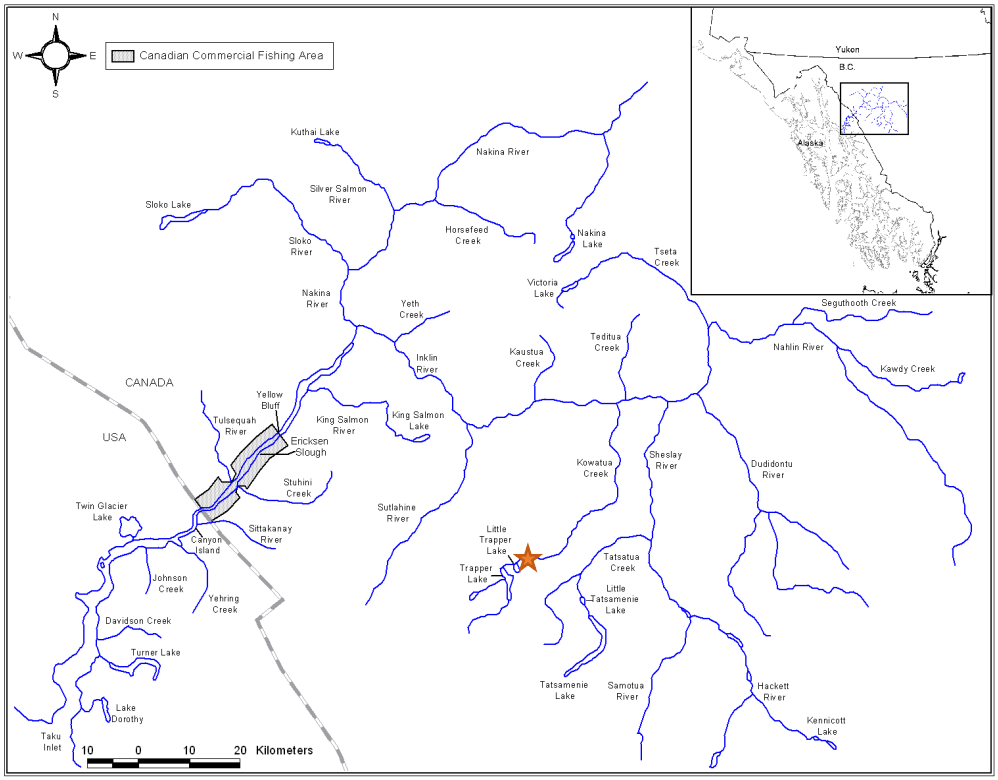

Figure 1. The Taku River drainage in British Columbia and Southeast Alaska. The orange star indicates the project area.

2.0 Methods

In 2020 DFO partnered with Metla Environmental Inc. (MEI) of Whitehorse, Yukon and the Pacific Salmon Commission (PSC) to deliver the Little Trapper sockeye salmon weir and Kowatua River Chinook salmon 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 successfully 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 salmon 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 salmon for length, sex, scales, axillary appendage clips, and tags in proportion to run timing.

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

A traditional fence style weir with a trap and sampling area integrated was installed at the outlet of Little Trapper Lake into Kowatua River. . The personnel operating the Little Trapper weir also conducted the Kowatua River Chinook salmon carcass recovery and sampling 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 salmon. A small number of additional samples were collected from live Chinook salmon transiting the sockeye weir. Field staff were based at facilities owned by MEI.

Biological sampling included: length, sex, checks for spaghetti tags, radio tags, secondary marks or a scar to identify spaghetti tag loss, observation of Chinook salmon for adipose fin presence/absence which indicates a CWT), and scale collection for ageing and potential genetic analysis. Five scales were collected from all sockeye and five 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 salmon 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 CWT 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 weir was installed and made fish tight by 23 July and was in place through 13 September 2020. The first sockeye were observed below the weir on 03 August, and migration through the weir commenced 11 August, quickly building to peak daily count of 1,339 fish on 17 August (Figure 2 and Appx. A). The 2020 run timing was several weeks later than the recent average timing (Figure 2).

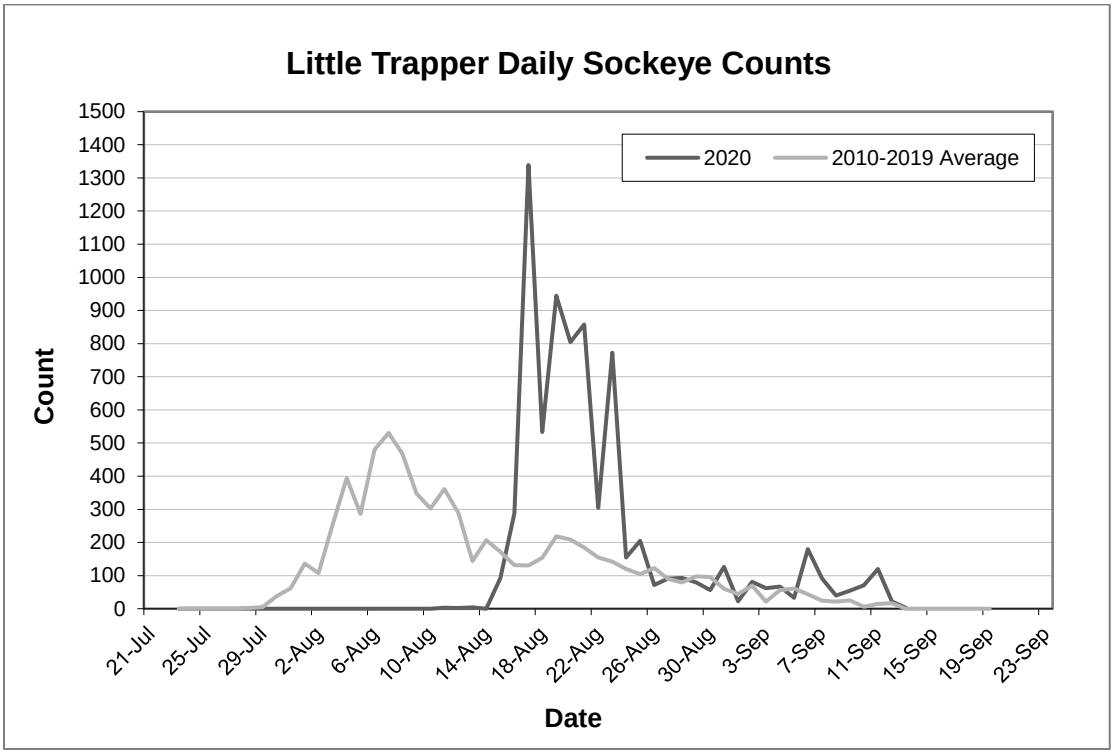

Figure 2. Little Trapper daily sockeye salmon passage through the weir in 2020 relative to the ten year average (2010-2019).

A total of 7,670 sockeye salmon were enumerated through the weir over the seven and a half weeks of operation. Of these, 800 sockeye were live sampled in proportion to the run for biological data. Of the 800 sampled fish, 192 were female and 608 were male. Interestingly, we observed a similar skew to males in 2018, but an opposite skew to females in 2019. Initial investigations do not appear to have an age correlate, and are ongoing.

The 2020 Little Trapper Lake sockeye weir count was below the 10 year average (2010-2019) count of 7,081.

Fish passing through the weir were inspected for spaghetti tags and radio tags. There were 158 spaghetti tags observed, of which 145 were recovered. Two radio tags were observed. There was no incidence of tag loss observed.

Table 1. Little Trapper weir summary

Sockeye Salmon	Female	Male	Total	10 Year Avg. 2010-2019
Weir Count	-	-	7,670	7,081
Sampled	192	608	800	-
Tag Scars	0	0	0	-
Spaghetti Tags Recovered	-	-	145	-
Radio Tags Recovered	-	-	1	-

3.2 Kowatua River

Chinook Salmon Carcass Recovery

Chinook salmon carcass sampling began on 16 August and ended on 12 September 2020. There were 266 Chinook salmon inspected and sampled for biological data; 253 were collected by spear and the remaining 13 were sampled at the Little Trapper weir. Biological sampling showed 134 females and 132 males, and included the recovery of eight CWT heads and five spaghetti tags. No radio tags were recovered. These samples comprised 29% of the Taku River drainage wide escapement samples collected in 2020.

Table 2. Kowatua Creek summary

Chinook Salmon	Female	Male	Total	10 Year Avg. 2010-2019
Sampled	134	132	266	287
Coded Wire Tags Recovered	3	5	8	-
Spaghetti Tags Recovered	3	2	5	-
Radio Tags Recovered	0	0	0	-

4.0 Budget Summary

The budget approved to DFO for this project by the Northern Endowment Fund was zero dollars. There was no Collaborative Agreement developed this year and DFO is expecting no funds from the PSC for this project.

We are very grateful to the PSC for their administrative assistance in delivering the reminder of this project budget ($63,550) in a direct award contract to the project consultant, Metla Environmental Inc to conduct the field work portion of the project.

5.0 Conclusion

The project objectives for 2020 were fully achieved. A complete count of the sockeye salmon run was obtained at Little Trapper Lake and sample goals were achieved. The 2020

run size was slightly above the recent average and skewed to males. Adult sockeye salmon escapement counts into Little Trapper Lake as well as age, sex, and length information serve as an index and provide insight on the system wide escapement estimates derived from the Taku River sockeye salmon mark recapture program.

The Chinook salmon samples collected from Kowatua River comprised 29% of the escapement samples drainage wide and provided a solid contribution to the Taku River Chinook salmon mark recapture program in 2020. The Chinook salmon age, sex, and length information contribute to the overall Taku River Chinook salmon escapement estimates and biological metrics of the stock. Sample numbers were below the ten year average, but commendable give the low overall number of Chinook salmon returning to the Taku River in 2020.

6.0 Acknowledgments

Sean Stark assisted with coordination of the field components of these projects and assisted with data preparation. Brian Mercer of Metla Environmental Inc. and his experienced staff capably delivered their contract supported by this funding. We are grateful to Tom Alpe and Victor Keong of the PSC for administrative assistance with this project and related financial arrangements.

7.0 Appendices

Appendix A: Daily counts of adult sockeye salmon passing through Little Trapper Lake weir, 2020

Date	Weir Count			Tag Scars		Spaghetti 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	0	0	0	0	0	0	0	0
31-Jul	0	0	0	0	0	0	0	0
1-Aug	0	0	0	0	0	0	0	0
2-Aug	0	0	0	0	0	0	0	0
3-Aug	0	0	0	0	0	0	0	0
4-Aug	0	0	0	0	0	0	0	0
5-Aug	0	0	0	0	0	0	0	0
6-Aug	0	0	0	0	0	0	0	0
7-Aug	0	0	0	0	0	0	0	0
8-Aug	0	0	0	0	0	0	0	0
9-Aug	0	0	0	0	0	0	0	0
10-Aug	0	0	0	0	0	0	0	0
11-Aug	3	0	3	0	0	0	0	0
12-Aug	2	0	2	0	0	0	0	0
13-Aug	4	0	4	0	0	0	0	0
14-Aug	0	0	0	0	0	0	0	0
15-Aug	72	20	92	20	0	0	0	0
16-Aug	258	30	288	30	0	3	0	3
17-Aug	1239	100	1339	100	0	17	3	20
18-Aug	473	60	533	60	0	6	0	6
19-Aug	845	100	945	100	0	19	0	19
20-Aug	745	60	805	60	0	30	0	30
21-Aug	778	80	858	80	0	13	0	13
22-Aug	254	50	304	50	0	6	0	6
23-Aug	713	60	773	60	0	13	0	13
24-Aug	125	30	155	30	0	5	0	5
25-Aug	175	30	205	30	0	5	0	5
26-Aug	52	20	72	30	0	2	0	2
27-Aug	71	20	91	20	0	3	0	3
28-Aug	73	20	93	20	0	2	0	2
29-Aug	59	20	79	20	0	1	0	1
30-Aug	36	20	56	20	0	2	0	2
31-Aug	117	10	127	10	0	0	3	3
1-Sep	12	10	22	10	0	0	0	0
2-Sep	61	20	81	10	0	3	0	3
3-Sep	52	10	62	10	0	2	0	2
4-Sep	57	10	67	10	0	0	0	0
5-Sep	23	10	33	10	0	0	0	0
6-Sep	170	10	180	10	0	6	1	7
7-Sep	92	0	92	0	0	2	0	2
8-Sep	40	0	40	0	0	2	0	2
9-Sep	54	0	54	0	0	0	0	0
10-Sep	71	0	71	0	0	1	3	4
11-Sep	120	0	120	0	0	0	3	3
12-Sep	21	0	21	0	0	1	0	1
13-Sep	3	0	3	0	0	1	0	1
TOTAL	**6870**	**800**	**7670**	**800**	**0**	**145**	**13**	**158**

Appendix B: Daily counts of Chinook salmon sampled on Kowatua Creek, 2020.

Date	Sample			CWT Recovered	Tags Recovered
	Female	Male	Total		
16-Aug		1	1		
17-Aug		2	2		
20-Aug		1	1		
22-Aug	1	1	2	1	
24-Aug		1	1		
25-Aug		1	1		
26-Aug	11	10	21		1
28-Aug	17	14	31	2	
29-Aug	18	22	40	1	3
30-Aug	10	29	39	1	
31-Aug	17	14	31		
1-Sep	5	10	15		
5-Sep	15	10	25	1	1
7-Sep		2	2		
8-Sep		1	1		
9-Sep		2	2		
10-Sep	20	10	30	1	
12-Sep	20	1	21	1	
TOTAL	**134**	**132**	**266**	**8**	**5**

Appendix C. Photographs

Photograph 1. Little Trapper weir - Sockeye sampling.

Photograph 2. Kowatua Creek - Chinook carcass sampling.