

Taku River Watershed
Little Trapper Lake Sockeye Salmon Enumeration
and
Kowatua River Chinook Salmon
Post-spawn Sampling
2019

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Executive Summary

The Northern Endowment Fund provided Fisheries and Oceans Canada with monies to continue two unique but linked projects in the upper Taku River watershed in 2019. 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 6,382 sockeye salmon were enumerated as they passed through a weir located at the outlet of Little Trapper Lake between 23 July and 12 September 2019. The target of 800 biological samples was achieved.

A total of 219 Chinook salmon were inspected for tags and biologically sampled in Kowatua River via carcass pitch between 17 August and 09 September 2019.

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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 2019.

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.

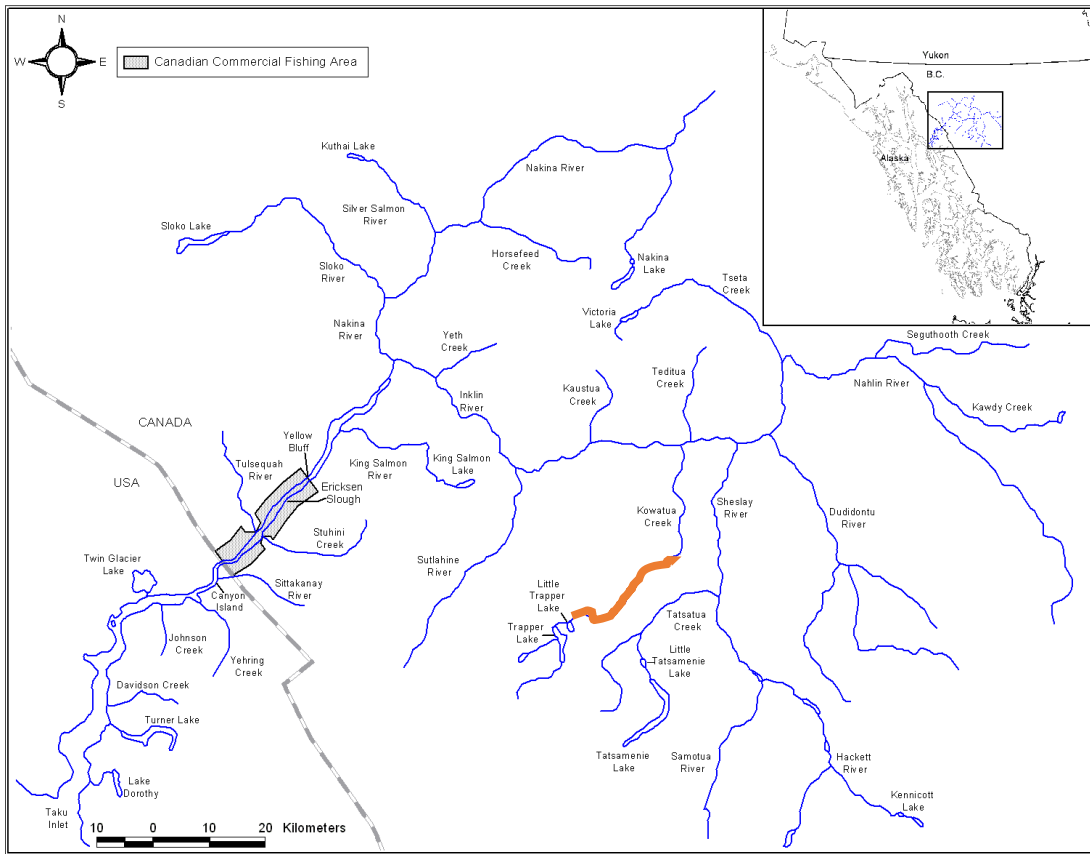


Figure 1. The Taku River drainage in British Columbia and Southeast Alaska. The orange highlighting approximates the project area.

2.0 Methods

In 2019 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.

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 2019. The personnel operating the Little Trapper weir also conducted the Kowatua River Chinook salmon carcass recovery and sampling beginning 17 August and concluding 09 September 2019 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 first sockeye were observed below the weir on 26 July (statistical week (SW) 30). Migration through the weir commenced 31 July (SW 30), and enumeration took place through 12 September 2019 (SW 37) when weir was removed.

A total of 6,382 sockeye salmon were enumerated through the weir over the seven and a half weeks of operation. Of these, 800 sockeye were biologically sampled in proportion to the run amounting to approximately 12% of the total count. Of the 800 sampled fish, 571 (71%) were female and 229 (29%) were male. This skew of sex ratio towards females is opposite of the sex ratio observed in 2018 where females comprised only 19% of the samples with males comprising 81%. The reason for this inter annual variation is unclear and is being investigated further.

Fish passing through the weir were inspected for spaghetti tags and radio tags. There were 115 spaghetti tags observed, of which 109 were recovered. Two radio tags were observed. There was no incidence of tag loss observed.

The 2019 sockeye weir count was below the 10 year average (2009-2018) count of 7,053.

Table 1. Little Trapper weir summary

Sockeye Salmon	Female	Male	Total	10 Year Avg. 2009-2018
Weir Count	-	-	6,382	7,053
Sampled	571	229	800	-
Tag Scars	0	0	0	-
Spaghetti Tags Recovered	-	-	109	-
Radio Tags Recovered	-	-	0	-

3.2 Kowatua River

Chinook Salmon Carcass Recovery

There were 219 Chinook salmon samples obtained (82 female, 137 male) over the two and a half weeks of sampling. 200 of these Chinook samples were collected by spear, and the remaining 19 were sampled at the Lake Trapper weir. Biological sampling included the recovery of five CWT heads and eight spaghetti tags. No radio tags were recovered.

Table 2. Kowatua Creek summary

Chinook Salmon	Female	Male	Total	10 Year Avg. 2009-2018
Sampled	82	137	219	287
Coded Wire Tags Recovered	2	3	5	-
Spaghetti Tags Recovered	1	7	8	-
Radio Tags Recovered	0	0	0	-

4.0 Budget Summary

The total budget approved for this project by the Northern Endowment Fund was \$62,000. The Pacific Salmon Commission directly contracted Metla Environmental Inc for their delivery of the field portion of the project (\$62,000) as overseen and approved by DFO. No funds were advanced to DFO in 2019 and none were requested as DFO used in-kind funds (\$3,686) to cover two biologists staff time to administer and support the project, process data, and report results.

5.0 Conclusion

The project objectives for 2019 were fully achieved. A complete count of the sockeye salmon run was obtained at Little Trapper Lake and sample goals were achieved. Opposite to results from 2018, the sex ratio of sockeye was skewed towards females in 2019, reasons are unclear and veing investigated. 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 18% of the escapement samples drainage wide and provided a solid contribution to the Taku River Chinook salmon mark recapture program in 2019. 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 2019.

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. Financial administrative assistance from Angus MacKay and Victor Keong of the PSC was very appreciated. Colleen Claggett (DFO) assisted with financial administration and accounting for this project.

7.0 Appendices

Appendix A: Daily counts of adult sockeye salmon passing through Little Trapper Lake weir, 2019

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	332	20	352	20	0	4	0	4
1-Aug	163	30	193	30	0	3	0	3
2-Aug	48	0	48	0	0	3	0	3
3-Aug	367	20	387	20	0	6	1	7
4-Aug	369	30	399	30	0	1	0	1
5-Aug	106	20	126	20	0	2	0	2
6-Aug	663	20	683	20	0	12	1	13
7-Aug	352	40	392	40	0	4	0	4
8-Aug	204	50	254	50	0	3	0	3
9-Aug	157	50	207	50	0	5	1	6
10-Aug	41	0	41	0	0	1	0	1
11-Aug	230	20	250	20	0	3	1	4
12-Aug	150	40	190	30	0	2	0	2
13-Aug	191	40	231	40	0	2	1	3
14-Aug	62	10	72	10	0	0	0	0
15-Aug	103	20	123	20	0	3	0	3
16-Aug	103	20	123	20	0	3	0	3
17-Aug	139	10	149	10	0	9	0	9
18-Aug	121	30	151	30	0	2	0	2
19-Aug	155	30	185	30	0	2	1	3
20-Aug	138	30	168	30	0	2	0	2
21-Aug	103	30	133	30	0	3	0	3
22-Aug	42	30	72	30	0	1	0	1
23-Aug	116	30	146	30	0	4	0	4
24-Aug	62	30	92	30	0	3	0	3
25-Aug	32	30	62	30	0	2	0	2
26-Aug	53	20	73	20	0	3	0	3
27-Aug	206	20	226	20	0	7	0	7
28-Aug	78	20	98	20	0	2	0	2
29-Aug	209	20	229	20	0	2	0	2
30-Aug	175	10	185	10	0	2	0	2
31-Aug	10	10	20	10	0	1	0	1
1-Sep	23	10	33	10	0	0	0	0
2-Sep	10	10	20	10	0	1	0	1
3-Sep	54	0	54	0	0	0	0	0
4-Sep	8	0	8	0	0	0	0	0
5-Sep	98	0	98	0	0	3	0	3
6-Sep	36	0	36	0	0	0	0	0
7-Sep	13	0	13	0	0	1	0	1
8-Sep	20	0	20	0	0	1	0	1
9-Sep	30	0	30	0	0	1	0	1
10-Sep	3	0	3	0	0	0	0	0
11-Sep	1	0	1	0	0	0	0	0
12-Sep	6	0	6	0	0	0	0	0
TOTAL	5582	800	6382	790	0	109	6	115

Appendix B: Daily counts of Chinook salmon sampled on Kowatua Creek, 2019.

Date	Sample			CWT Recovered	Tags Recovered
	Female	Male	Total		
17-Aug	0	1	1	0	1
21-Aug	0	1	1	0	0
22-Aug	1	0	1	0	0
25-Aug	1	2	3	0	1
26-Aug	0	7	7	0	0
27-Aug	0	4	4	0	0
28-Aug	15	21	36	0	2
29-Aug	1	1	2	0	0
30-Aug	0	1	1	0	0
31-Aug	13	36	49	3	2
2-Sep	6	22	28	0	0
3-Sep	0	1	1	0	0
4-Sep	0	1	1	0	0
5-Sep	15	17	32	1	1
7-Sep	17	14	31	1	1
9-Sep	13	8	21	0	0
TOTAL	82	137	219	5	8

Appendix C. Photographs



Photograph 1. Little Trapper weir - Sockeye sampling.



Photograph 2. Kowatua Creek - Chinook carcass sampling.