Taku River Sockeye Salmon Genetic Stock Identification Analysis of 2019 Commercial Samples

(A project supported by the Northern Fund through the Pacific Salmon Commission)

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Executive Summary

This report documents the results of the Taku River Sockeye Salmon Genetic Stock Identification Analysis of 2019 Commercial Samples supported by the Northern Fund of the Pacific Salmon Commission.

A total of $29,700 (CAD) of Northern Fund monies has been expended to carry out genetic stock identification (GSI) of sockeye harvested in the 2019 Taku River commercial fishery. Sample targets were achieved and tissue samples are being processed at the time of report preparation. The results will provide run timing characteristics and proportionality of individual stocks while in transit through the Taku River commercial fishing grounds. This information will assist understanding the stock composition of the Taku River sockeye salmon stock aggregate and allow managers to refining management regimes designed to protect any stocks of concern.

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1 Introduction

Northern Endowment Fund (NEF) monies were provided for genetic analysis of scale samples collected from the commercial sockeye fishery on the Taku River in 2019. This activity was first supported by the NEF in 2008 and makes use of the baseline samples collected with Fund assistance from 2007-12.

Genetic analysis will identify the composition of the commercial harvest by stock groupings. In addition, when coupled with escapement counts from headwater counting fences (weirs), it will permit estimation of drainage-wide abundance for comparison with the estimate derived from mark-recapture or other assessment methodologies.

The project addresses Goal 1 of the Northern Fund:

Development of improved information for resource management, including better stock assessment, data acquisition and improved scientific understanding of limiting factors affecting salmon production in the freshwater and marine environments.

Specifically, the project addresses the following goals:

- Goal 1 (a) Catch accounting including both stock identification and harvest enumeration

- Goal 1 (b) Escapement enumeration of stocks harvested in fisheries of both nations; data needed to estimate optimal escapement. Baseline data necessary to forecast returns and determine fishery stock composition for stocks originating in rivers on the geographic area and harvested in the fisheries of both nations.

As detailed in the Transboundary chapter of the PST, the Parties agree to conduct assessment programs in support of the abundance-based management regime for Taku River sockeye salmon. This project will serve to assist in fulfilling that obligation.

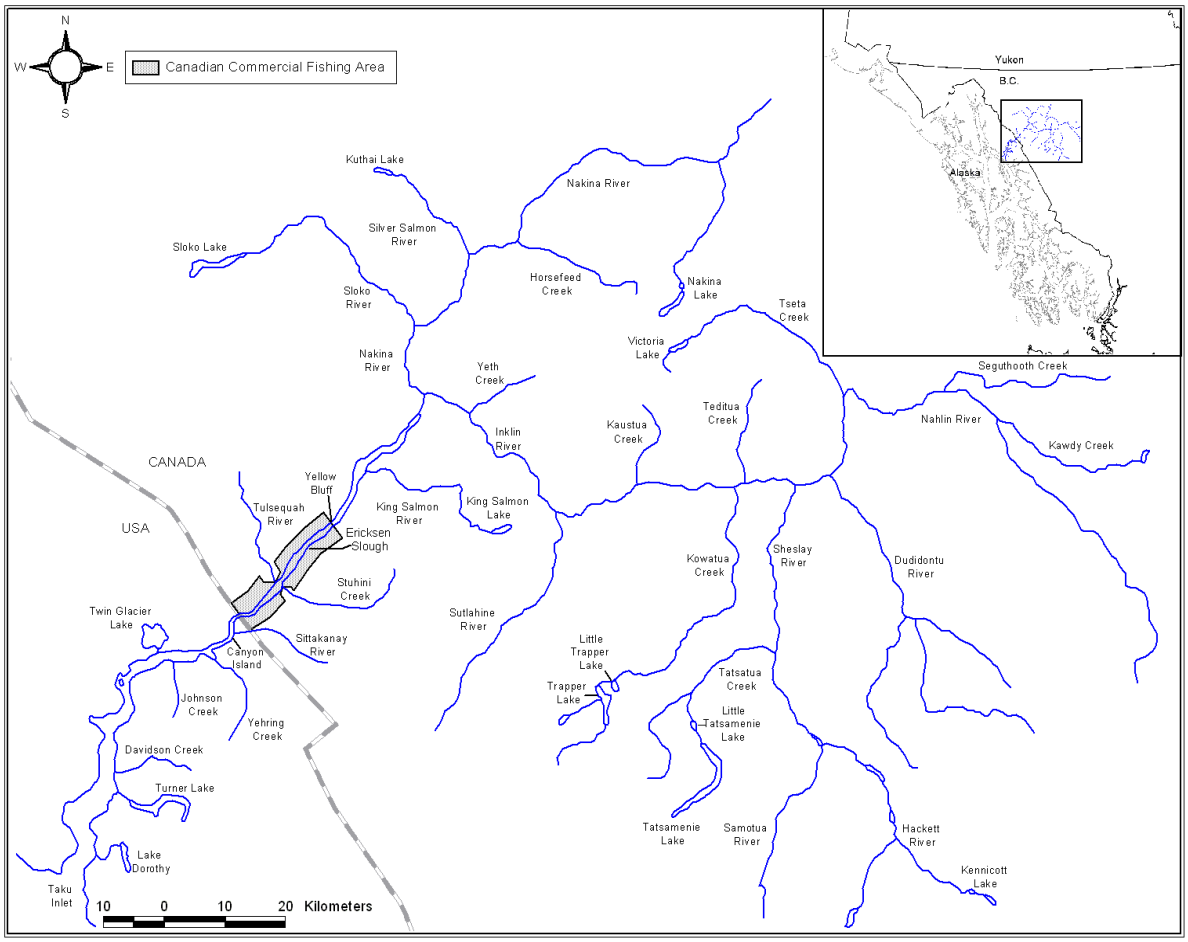

Figure 1. The Taku River drainage in British Columbia and Southeast Alaska.

2 Methods

Following is the sampling protocol, as developed by the Transboundary Technical Committee (TTC, Pacific Salmon Commission TCTR (07)-02, 2007), used to guide collection of axillary appendages from sockeye harvested in the Taku River commercial fishery in 2019. The following parameters were used in the selection of sample size to ensure an adequate sample was retained for the analysis:

Probability of a Type 1 error (α): 0.10

Absolute Precision (p): +/- 0.10

The analysis will be used to establish genetic profiles for all salmon included in the survey and to estimate weekly stock composition in the Taku River commercial fishery in 2019 such that the estimated proportion of a given stock is accurate within 10%, 90% of the time. This was based on three stock groupings. These are the transboundary fisheries management reporting groups identified at the TTC Genetics workshop in April 2013, specifically:

Taku River sockeye
1. Tatsamenie Lake
2. Taku Lakes Other
3. Taku River-Type

Scale samples from 150 sockeye for each week of the fishery are currently being processed for microsatellite markers using a DNA sequencer in the Molecular Genetics Laboratory (MGL) at the Pacific Biological Station in Nanaimo, British Columbia.

Primers for all microsatellites to be employed have existed for some time and thus are available to be applied to all samples. The number of fish surveyed for microsatellites is easily within the capacity of the PBS Molecular Genetics Laboratory (MGL) to attain. It has been demonstrated that sufficient differentiation is available among baseline populations to enable mixed-stock analysis to be viable. The Molecular Genetics Lab at the Pacific Biological Station in Nanaimo has demonstrated in the literature that this differentiation has been observed among baseline sockeye populations Taku River.

3 Results and Discussion

The 2019 Taku river commercial fishery opened in statistical week (SW) 27 (ending July 6); the directed sockeye fishery ended in SW 33 (ending August 17) but there were additional sockeye harvested until SW 38 (ending September 21) in the directed coho fishery (Table 3). Through SW 35, 200 scale samples were collected per week. The limited number of sockeye harvested after this time were all sampled for scales. As such, at least 150 tissue samples per week prior to SW 36, plus additional samples after this time, are available for GSI analysis. Apportionment was made in order improve representation of the harvest/sockeye run based on consultations with Molecular Genetic Laboratory (MGL) staff in Nanaimo. At the time or report preparation analysis is under way but has not yet been completed.

Table 1. Sockeye scale samples collected for analysis in the 2019 Taku River commercial fishery by statistical week.

Statistical Week	Week Ending	Commercial Catch	Sockeye Samples Available	Sockeye Samples to be Analyzed
27	July 6	585	200	150
28	July 13	1,435	200	150
29	July 20	2,497	200	200
30	July 27	4,423	200	200
31	August 3	5,796	200	200
32	August 10	2,222	200	200
33	August 17	2,645	200	200
34	August 24	1,157	200	150
35	August 31	461	200	100
36	September 7	125	125	50
37	September 14	45	45	45
38	September 21	4	4	4
Total		**21,395**	**1,974**	**1,649**

4 Budget and Project Operations

At the time of report preparation, scale samples are being analyzed at the Molecular Genetic Laboratory in Nanaimo.

As presented in Appendix 2, the NEF financial support provided was used for lab materials and supplies. The expenditure (including obligations and estimated material costs) of NEF monies was $29,700, equal to the amount of funds previously advanced by the PSC. No additional expenses are anticipated; therefore the 10% hold back of $3,300 on the original funding is not required.

5 Conclusion

The project objectives are on track to be achieved; sockeye scale samples were collected from the Taku River commercial fishery in 2019 and are currently being analyzed at the MGL in Nanaimo. Once complete, and the stock composition of the harvest by week will be identified. Fishery managers in both Canada and the U.S. will benefit by being able to use the analysis to identify the timing and exploitation rates of sockeye as they migrate through the lower reaches of the Taku River. Improved information will benefit stakeholders in both Canada and the U.S. Though results from this project are retrospective, they have the potential to continue to lay the groundwork for the use of genetic stock identification as an inseason management tool.

6 Acknowledgements

Sean Stark managed logistics and coordinated sample collection. Teresa Bachynski, Philippe Beaulieu, and Danielle Hosick sampled the commercial fishery. Taku River commercial fishers collaborated by allowing DFO to sample their harvest. Joanne DeGroot and Brenda Ridgway of the Pacific Biological Station Sclerochronology Laboratory coordinated scale processing. Ben Sutherland of the Molecular Genetic Laboratory led the genetic analyses. Colleen Claggett and Business Management staff assisted with the financial administration and accounting for this project.

7 Literature cited

PSC (Pacific Salmon Commission). 2007. Salmon Management and Enhancement Plans for the Stikine, Taku and Alsek Rivers, 2007. Transboundary Technical Committee Report TCTR(07)-02. Pacific Salmon Commission, Vancouver, B.C.

Appendix 1: Financial Summary

Taku River Sockeye Salmon Genetic Stock Identification NF-2019-I-33

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
Manager	Salary	$ 435.00	$ 435.00					
	Benefits	$ 117.45	$ 117.45			$ -		
Biologist	Salary	$ 2,025.00	$ 2,025.00					
	Benefits	$ 546.75	$ 546.75			$ -		
Technician	Salary	$ 1,110.00	$ 1,110.00					
	Benefits	$ 299.70	$ 299.70			$ -		
	Total Expended	**$ 4,533.90**	**$ 4,533.90**	**$ -**		**$ -**	**$ -**	**$ -**

Subcontractors & Consultants

Contract		Contract Amount Expended	Inkind	PSC funding (expenses)		Approved Budget	Total PSC Funded Expenditure	Variance
Contract A		$ -						
Contract B		$ -						
Contract C		$ -						
		$ -						
		$ -						
	Total Expended	**$ -**	**$ -**	**$ -**		**$ -**	**$ -**	**$ -**
			$ 4,533.90		**Total**	**$ -**	**$ -**	**$ -**

Site / Project Costs

Item		Amount Expended	Inkind	PSC funding (expenses)		Approved Budget	Total PSC Funded Expenditure	Variance
Travel		$ -						
Small Tools & Equipment		$ -						
Site Supplies & Materials - Lab supplies for 16		$ 29,700.00		$ 29,700.00		$ 33,000.00		
Equipment Rental		$ -						
Work & Safety Gear		$ -						
Repairs & Maintenance		$ -						
Permits		$ -						
Other costs		$ -						
	Total Expended	**$ 29,700.00**	**$ -**	**$ 29,700.00**		**$ 33,000.00**	**$ 29,700.00**	**$ 3,300.00**
			$ -			**$ 33,000.00**	**$ 29,700.00**	**$ 3,300.00**

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	$ -					
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	$ -	$ -	$ -	$ -	$ -	$ -
		$ -		$ -	$ -	$ -

Capital Costs / Assets (Value > $250.00)

Item	Amount Expended		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	$ 4,533.90		$ -	$ -	$ -
Site / Project Costs	$ -		$ 33,000.00	$ 29,700.00	$ 3,300.00
Training	$ -		$ -	$ -	$ -
Overhead / Indirect Costs	$ -		$ -	$ -	$ -
Capital Costs / Assets	$ -		$ -	$ -	$ -
TOTAL			**$ 33,000.00**	**$ 29,700.00**	**$ 3,300.00**

PSC Project Funding Grant Advance Amount Received	**$ (29,700.00)**	(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	**$ -**	

Justification if Variance

Project Manager Name — **Ian Boyce**

Project Manager Signature

Date

DFO Responsibility Center Manager Name — **William Waugh**

DFO Responsibility Center Manager Signature

Waugh, William Digitally signed by Waugh, William Date: 2020.03.31 15:53:50 -07'00'

Date