

Transboundary Rivers Otolith Thermal Mark Recovery 2020

PSC NF-2020-I-32
DFO CA# 58054

Final Report
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Executive Summary

The Northern Endowment Fund provided Fisheries and Oceans Canada with monies to conduct the preparation, interpretation and analysis of otolith samples collected from six stock assessment projects in the Transboundary Rivers Area in 2020. Otoliths were prepared and inspected for thermal marks to indicate whether or not the sample was from enhanced fish. These data are vital components of Transboundary Rivers stock assessment and enhancement activities, and inform fishery management programs, are used in enhancement planning and evaluation for multiple stocks, forecasting of returns, annual run reconstructions, and monitoring of fishery management performance.

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1.0 Introduction

Hatchery reared sockeye salmon fry outplanted as part of enhancement projects in the Transboundary Rivers (TBR) area have their otoliths (small bones found in the inner ear of fish) thermally marked to allow later identification. Thermal marks are applied to the otoliths of fry using a unique pattern of short term increases in hatchery water temperature when fish are in the egg stage. Marks can be customized and are unique between hatcheries and years, and are used to identify each individual fish's brood year, stock, hatchery of origin, release year, and release location.

Various TBR stock assessment and harvest monitoring projects collect otoliths from both out-migrating sockeye smolts and returning sockeye adults. This thermal mark recovery project prepares, interprets and analyzes these samples, providing critical data to stock assessment and enhancement activities including; wild/enhanced ratios, scale aging validation, fry to smolt survival rates, smolt to adult survival rates, contributions of enhanced fish to returns, straying rates, etc. These data are vital elements of TBR stock assessment, enhancement, and fishery management programs. Data are used in enhancement planning and evaluation for multiple stocks, forecasting of returns, annual run reconstructions, and monitoring of fishery management performance. All otolith samples were to be a minimum of 50% read for each project by 27 November, and all otoliths readings were completed by 18 November 2020.

2.0 Objectives

This project will allow preparation, interpretation, and reporting of marked versus unmarked otolith samples from the following annual projects:

1. Stikine River – Tahltan Lake out-migrating sockeye smolts
2. Stikine River – Tahltan Lake sockeye broodstock
3. Stikine River – Upper Stikine River Food Fishery
4. Taku River – Tatsamenie Lake out-migrating sockeye smolts
5. Taku River – Tatsamenie Lake sockeye broodstock
6. Taku River - Little Trapper Broodstock
7. Any other enhanced TBR stock that requires assessment

3.0 Methods

Otoliths are removed, prepared, and examined following established Fisheries and Oceans Canada (DFO) protocols and procedures. Samples are received by the DFO Whitehorse laboratory both as otoliths removed from heads and as heads from which the otoliths must be removed. Once removed, the gelatinous matrix is wiped from the otolith and the otolith is mounted to a glass microscope slide with thermoplastic cement and labeled with a bar code to track progress through the mark recovery process. Each otolith is polished with grinding paper until the otolith is thin enough to allow light to pass through and illuminate its growth rings and any thermal marks present. Each otolith is visually examined and interpreted by experienced technicians through a microscope, and any observed marks are compared to the database of known marks for final determination and assignment. All marks are verified by a second reader for accuracy. Data are recorded and stored in the Otomanager database and made available to relevant agencies and project partners. All samples are archived in the DFO Whitehorse laboratory.

4.0 Results and Discussion

In 2020, otolith samples from six unique projects were submitted to the DFO otolith lab for a total of 2,395 otolith samples. Fifty-two of the samples were not able to be used for a total of 2,343 otolith samples analyzed and verified.

The Tatsemenie Lake sockeye salmon smolt outmigration project submitted 675 smolt otoliths in 2020. Five samples were unreadable or were destroyed during processing and one sample had no otoliths in the vial. Of the 669 otoliths successfully analyzed, 400 were not marked and 269 (40%) were marked.

The Tahltan Lake sockeye salmon smolt outmigration project submitted 400 smolt otoliths in 2020. One sample was unreadable or destroyed during processing. Of the 399 otoliths successfully analyzed, 74 were not marked and 325 (81%) were marked.

The Little Trapper Lake sockeye salmon broodstock project submitted 349 adult otoliths in 2020. Nineteen samples were unreadable or were destroyed during processing and one sample had no otoliths in the vial. Of the 329 otoliths successfully analyzed, 315 were not marked and 14 (4%) were marked.

The Tahltan Lake sockeye salmon broodstock project submitted 98 otoliths in 2020. Of the 98 otoliths successfully analyzed, 22 were not marked and 76 (78%) were marked.

The Upper Stikine River Food Fish project submitted 513 otoliths in 2020. One sample was unreadable or destroyed during processing and 3 samples had no otoliths in the vial. Of the 509 otoliths successfully analyzed, 225 were not marked and 284 (56%) were marked.

The Tatsamenie Lake sockeye salmon broodstock project submitted 360 otoliths in 2020. Twenty samples were unreadable or were destroyed during processing and one sample had no otoliths in the vial. Of the 339 otoliths successfully analyzed, 262 were not marked and 77 (23%) were marked.

Table 1. Transboundary Rivers otolith thermal mark recovery project results, 2020.

2020	Collected	% Read	% Verified	Not Useable	Marked	Not Marked	% Marked
Tahltan Lake Broodstock	98	100%	100%	0	76	22	78%
Upper Stikine Food Fish	513	100%	100%	4	284	225	56%
Tatsemenie Lake Smolts	675	100%	100%	6	269	400	40%
Tahltan Lake Smolts	400	100%	100%	1	325	74	81%
Little Trapper Broodstock	349	100%	100%	20	14	315	4%
Tatsemenie Lake Broodstock	360	100%	100%	21	77	262	23%
Total	2395			52	1045	1298	

4.0 Budget Summary

The total budget approved for this project by the Northern Endowment Fund was \$43,148. Project expenditures amounted to \$40,454.14, which is more than the 90% of the budget

that was previously advanced to DFO (\$38,832). The full 10% holdback will not be required from the PSC, but a partial holdback in the amount of \$1,622.14 will be anticipated from the PSC upon acceptance of this report. A budget summary of expenditures can be referenced in Appendix C.

5.0 Conclusion

All project objectives and timelines were met in 2020, and otolith reading and verification was completed by 18 November 2020.

6.0 Acknowledgments

Teresa Bachynski and Mark McFarland were efficient and again excelled in conducting all of the otolith thermal mark laboratory work, from otolith sample preparation to data entry and QA/QC of results.

7.0 Appendices

Appendix 1: Expenditures

Transboundary Rivers Otolith Thermal Mark Recovery 2020 (PSC NF-2020-I+A3:K55-32)								
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	Salary	\$ 1,620.00	\$ 1,620.00					
	Benefits	\$ 437.40	\$ 437.40		\$ -			
Technician	Salary	\$ 1,538.00	\$ 1,538.00					
	Benefits	\$ 415.26	\$ 415.26		\$ -			
Technicians	Salary	\$ 28,463.00		\$ 23,951.69	\$ 28,463.00			
	Benefits	\$ 7,685.01		\$ 6,466.96	\$ 7,685.01			
Total Expended		\$ 40,158.67	\$ 4,010.66	\$ 30,418.65	\$ 36,148.01	\$ 30,418.65	\$ 5,729.36	
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		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
			\$ 4,010.66		Total \$ 36,148.01	\$ 30,418.65	\$ 5,729.36	
Site / Project Costs								
Item		Amount Expended	Inkind	PSC funding (expenses)	Approved Budget	Total PSC Funded Expenditure	Variance	
Travel		\$ -						
Small Tools & Equipment		\$ -						
Site Supplies & Materials		\$ 10,035.49		\$ 10,035.49	\$ 7,000.00			
Equipment Rental		\$ -						
Work & Safety Gear		\$ -						
Repairs & Maintenance		\$ -						
Permits		\$ -						
Other costs - fuel		\$ -						
Total Expended		\$ 10,035.49	\$ -	\$ 10,035.49	\$ 7,000.00			
			\$ -		\$ 7,000.00	\$ 10,035.49	\$ (3,035.49)	
Training Costs								
Item		Amount Expended	Inkind	PSC funding (expenses)	Approved Budget	Total PSC Funded Expenditure	Variance	
Safety Training		\$ -						
		\$ -						
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	\$ -						
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	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	\$ 4,010.66	\$ 36,148.01	\$ 30,418.65	\$ 5,729.36
Site / Project Costs	\$ -	\$ 7,000.00	\$ 10,035.49	\$ (3,035.49)
Training	\$ -	\$ -	\$ -	\$ -
Overhead / Indirect Costs	\$ -	\$ -	\$ -	\$ -
Capital Costs / Assets	\$ -	\$ -	\$ -	\$ -
TOTAL		\$ 43,148.01	\$ 40,454.14	\$ 2,693.87

PSC Project Funding Grant Advance Amount Received	\$ (38,832.00)	(funds rec enter as negative)
PSC Project Funding Grant Amount Remaining to be Paid	\$ (1,622.14)	(positive refundable to PSC)
Difference Between Grant Amount and Project Expenditures	\$ -	

Justification if Variance

We were underspent in the labour category, but overspent in the site/project cost category. We were above proposal values in the site/project category due to storage improvements for historical otolith samples and ergonomic improvements.

Project Manager Name Aaron Foos

Project Manager Signature

Date

DFO Responsibility Center Manager Name William Waugh

DFO Responsibility Center Manager Signature

Date