Transboundary Rivers Otolith Thermal Mark Recovery 2019

PSC NF-2019-I-37
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 2019. Otoliths were 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 very young. 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 06 November, and all otoliths readings were completed by 05 December 2019.

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 adult return
3. Stikine River – Tahltan Lake sockeye broodstock
4. Stikine River – Upper Stikine River Food Fishery
5. Taku River – Tatsamenie Lake out-migrating sockeye smolts
6. Taku River – Tatsamenie Lake sockeye 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 though 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 2019, otolith samples from six unique projects were submitted to the DFO otolith lab for a total of 2,849 otolith samples. Thirty seven of the samples were not able to be used for a total of 2,812 otolith samples analyzed and verified.

The Tatsemenie Lake sockeye salmon smolt outmigration project submitted 844 smolt otoliths in 2019. Three samples were unreadable or were destroyed during processing. Of the 841 otoliths successfully analyzed, 516 were not marked and 325 (39%) were marked.

The Tahltan Lake sockeye salmon smolt outmigration project submitted 471 smolt otoliths in 2019. One sample was unreadable or destroyed during processing. Of the 470 otoliths successfully analyzed, 134 were not marked and 336 (71%) were marked.

The Tahltan Lake adult sockeye salmon project submitted 212 adult otoliths in 2019. Two samples were unreadable or were destroyed during processing. Of the 210 otoliths successfully analyzed, 94 were not marked and 116 (55%) were marked.

The Tahltan Lake sockeye salmon broodstock project submitted 400 otoliths in 2019. Four samples were unreadable or were destroyed during processing. Of the 396 otoliths successfully analyzed, 254 were not marked and 142 (36%) were marked.

The Upper Stikine Food Fish project submitted 522 otoliths in 2019. Three samples were unreadable or were destroyed during processing. Of the 519 otoliths successfully analyzed, 237 were not marked and 282 (54%) were marked.

The Tatsamenie Lake broodstock project submitted 400 otoliths in 2019. Twenty-four samples were unreadable or were destroyed during processing. Of the 376 otoliths successfully analyzed, 196 were not marked and 180 (45%) were marked.

Table 1. Transboundary Rivers otolith thermal mark recovery project results, 2019.

2019	Collected	% Read	% verified	Not Useable	Marked	Not Marked	% Marked
Tatsemenie Lake Smolts	844	100%	100%	3	325	516	39%
Tahltan Lake Smolts	471	100%	100%	1	336	134	71%
Tahltan Lake Adults	212	100%	100%	2	116	94	55%
Tahltan Lake Broodstock	400	100%	100%	4	142	254	36%
Upper Stikine Food Fish	522	100%	100%	3	282	237	54%
Tatsemenie Lake Broodstock	400	100%	100%	24	180	196	45%
Total	2849			37	1381	1431	

4.0 Budget Summary

The total budget approved for this project by the Northern Endowment Fund was $46,648. Project expenditures amounted to $42,000 which is very near ($17) the 90% of the budget that was previously advanced to DFO. The 10% holdback of $4,665 will not

be required from the PSC. A budget summary of expenditures can be referenced in Appendix C.

5.0 Conclusion

All project objectives and timelines were met in 2019, and otolith reading and verification was completed by 05 December 2019.

6.0 Acknowledgments

Teresa Bachynski and Mark McFarland were efficient and excellent 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 A: Expenditures

Transboundary Rivers Thermal Mark Recovery, 2019 (NF-2019-I-37)

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
Technician	Salary	$ 1,275.00	$ 1,275.00					
	Benefits	$ 344.25	$ 344.25			$ -		
Biologist	Salary	$ 1,620.00	$ 1,620.00					
	Benefits	$ 437.40	$ 437.40			$ -		
Technician	Salary	$ 28,000.00		$ 28,000.00		$ 28,463.00		
	Benefits	$ 7,600.00		$ 7,600.00		$ 7,685.01		
	Total Expended	**$ 39,276.65**	**$ 3,676.65**	**$ 35,600.00**		**$ 36,148.01**	**$ 35,600.00**	**$ 548.01**

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	**$ -**	**$ -**	**$ -**		**$ -**	**$ -**	**$ -**
			$ 3,676.65		**Total**	**$ 36,148.01**	**$ 35,600.00**	**$ 548.01**

Site / Project Costs

Item		Amount Expended	Inkind	PSC funding (expenses)		Approved Budget	Total PSC Funded Expenditure	Variance
Travel		$ -						
Small Tools & Equipment		$ 2,800.00		$ 2,800.00		$ 4,000.00		
Site Supplies & Materials		$ 3,600.00		$ 3,600.00		$ 6,500.00		
Equipment Rental		$ -						
Work & Safety Gear		$ -						
Repairs & Maintenance		$ -						
Permits		$ -						
Other costs		$ -						
	Total Expended	**$ 6,400.00**	**$ -**	**$ 6,400.00**		**$ 10,500.00**	**$ 6,400.00**	**$ 4,100.00**
			$ -			**$ 10,500.00**	**$ 6,400.00**	**$ 4,100.00**

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	$ 3,676.65		$ 36,148.01	$ 35,600.00	$ 548.01
Site / Project Costs	$ -		$ 10,500.00	$ 6,400.00	$ 4,100.00
Training	$ -		$ -	$ -	$ -
Overhead / Indirect Costs	$ -		$ -	$ -	$ -
Capital Costs / Assets	$ -		$ -	$ -	$ -
TOTAL			**$ 46,648.01**	**$ 42,000.00**	**$ 4,648.01**

PSC Project Funding Grant Advance Amount Received	**$ (41,983.00)**	(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	**$ (17.00)**	

Justification if Variance

Project Manager Name	**Aaron Foos**
Project Manager Signature	Foos, Aaron Digitally signed by Foos, Aaron Date: 2020.03.31 12:00:28 -07'00'
Date	
DFO Responsibility Center Manager Name	**William Waugh**
DFO Responsibility Center Manager Signature	Waugh, William Digitally signed by Waugh, William Date: 2020.03.31 15:55:18 -07'00'
Date	