

# Taku River Coho Salmon Escapement and Adult Sampling Augmentation 2016

*(A study supported by the Northern Fund under the auspices of the Pacific Salmon Commission)*

Final Report  
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## Executive Summary

*This report documents the Taku River coho salmon escapement augmentation project, specifically, sampling of immigrating adults.*

The Northern Fund provided monies to augment the 2016 Taku River coho assessment program. This permitted the extension of the recapture effort for marked adults into October. A total of 18 adipose clips were observed and 128 spaghetti tags recovered in the commercial fishery and 22 adipose clips were observed and 20 spaghetti tags recovered in the test fishery. Twenty heads retrieved from marked fish in the test fishery were sent to Juneau, Alaska for coded-wire tag extraction.

# TABLE OF CONTENTS

1.0 INTRODUCTION .....	1
2.0 OBJECTIVES .....	1
3.0 METHODS .....	1
4.0 RESULTS AND DISCUSSION .....	2
5.0 BUDGET AND PROJECT OPERATIONS.....	3
6.0 CONCLUSION.....	4
7.0 ACKNOWLEDGEMENTS.....	4
8.0 LITERATURE CITED .....	4
9.0 APPENDICES.....	5

## List of Tables

Table 1. Total catches, Adipose clips observed and spaghetti tags recovered in 2016 by statistical week.....	3
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## List of Figures

Figure 1. The Taku River drainage and Canadian commercial fishing area.....	2
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## List of Appendices

Appendix A: Daily catches, Adipose clips observed and spaghetti tags recovered.....	6
Appendix B: Expenditures.....	9
Appendix C: Photographs .....	12

## 1.0 Introduction

The Taku River produces the largest run of coho salmon *Oncorhynchus kisutch* and Chinook salmon *Oncorhynchus tshawytscha* in British Columbia north of the Skeena River, and in Southeast Alaska (Figure 1; McPherson et al. 1998a; Yanusz et al. 1999).

Each spring since 1991, coho salmon smolts have been tagged with coded wire tags (CWTs) as they emigrate from the Taku River. Then in the following year, returning adults are sampled for these tags using fishwheels and set gillnets operated near Canyon Island in the lower Taku River. At the same time, adults are tagged as part of a two-event mark-recapture study to estimate the riverine abundance and sampled for age, sex, and length composition data. A short distance upriver, in Canada, adults are inspected in the commercial fishery. Typically, the commercial fishery ceases in late August and it is necessary to obtain tag ratio through a scientific fishing licence or a catch and release fishery. Data gathered from these efforts has provided estimates of riverine abundance and escapement since 1987, estimates of harvest, exploitation, survival, smolt abundance, and total run since 1992, and run forecasts since 1996. These combined efforts along with adult sampling programs in the various marine fisheries allow detailed stock assessment analyses including annual estimates of escapement necessary to refine escapement goals and forecast runs. Improved escapement goals and run forecasts along with in-season abundance estimates allow implementation of abundance-based management.

Coho salmon returning to the Taku River pass through an offshore troll fishery before entering inside waters where they encounter seine, drift gillnet, and recreational fisheries. After entering the river, the remaining coho salmon are harvested in a drift/set gillnet fishery in Canada.

The juvenile salmon portion of the mark-recapture experiment for estimating smolt abundance will be discussed further in the PSC funded project report "*Taku River Coho Salmon Smolt Tagging Augmentation 2016*".

## 2.0 Objectives

Department of Fisheries and Oceans Canada (DFO) personnel and/or contract personnel sampled adult coho salmon for marks (adipose clips), spaghetti tags, age and size in the commercial and test fisheries on the Taku River in Canada from July into early October. The objective of this was to boost the recapture component of the mark-recapture study which will be used to estimate the number of coho smolts which emigrated from the Taku River in 2015, and to estimate the number of adult fish returning to the Taku River to spawn in 2016.

## 3.0 Methods

Mark-recapture methodology was used to estimate the abundance of coho salmon smolt emigrating from Taku River upstream of Canyon Island in 2015 (Figure 1). Smolt were injected with coded wire tags and marked with adipose fin-clips in the spring of the year as part of Event I of a two-event mark-recapture experiment. Returning adult coho salmon were inspected for marks in riverine fisheries in 2016 as part of Event II.

Coho salmon that had been marked as smolts in 2015 were recaptured as adults as they returned to the Taku River to spawn. This was "Event II" of the mark-recapture experiment for estimating smolt abundance. Adult coho salmon caught in the riverine commercial fishery were inspected for missing adipose fins (July to mid - September).

The marked fraction (number of fish missing adipose fins / total inspected) of coho salmon captured in gillnets will contribute to the estimation of the number of smolts that emigrated from the Taku River in 2015. Likewise, adult coho returning in 2017 will be inspected for marks applied in 2016.

To estimate escapement of adult coho salmon, spaghetti tags are applied to returning adults at the ADF&G Fishwheel project at Canyon Island. As part of “Event II” of the mark-recapture study, the return of spaghetti tags was stipulated in licence conditions for both the commercial fishery and the test fishery.

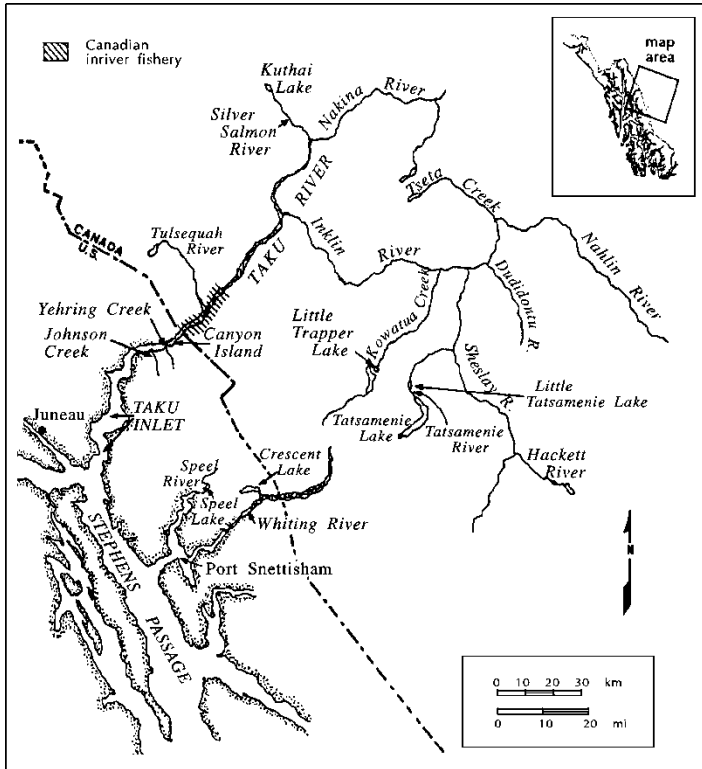


Figure 1. The Taku River drainage and Canadian commercial fishing area.

## 4.0 Results and Discussion

Adult coho were sampled in the commercial fishery which commenced in June, targeting sockeye and then coho. A total of 9,466 coho were caught; 3,669 (39%) were examined for marks (adipose clips) denoting presence of a CWT. Eighteen marks were observed; as anticipated, CWT recovery was not possible since commercial fish were headed prior to being landed. Based on the commercial licence conditions it is assumed that the entire catch was examined for spaghetti tags. A total of 128 spaghetti tags were recovered in the commercial fishery.

In the coho test fishery which took place from September 11 to October 8, a total of 2,007 fish were caught/examined with 22 marks observed. Heads were recovered from 20 of the marked fish and sent to Juneau via float plane for CWT extraction. As with CWT release data, the recovery data will be stored in the ADF&G coded wire tag website ([www.taglab.org](http://www.taglab.org)). Once this data set is verified, it will be forwarded to and inputted into the

Regional Mark Processing Centre website ([www.rmpec.com](http://www.rmpec.com)). A total of 20 spaghetti tags were recovered in the test fishery.

Based on spaghetti tag data, it is estimated that approximately 100,000 adult coho had migrated into Canada by the end of the fishing season in 2016 (PSC 2017). Subtracting the fishery catches, approximately 90,000 of these fish escaped to spawning areas. Mark/CWT data from the fisheries will be analyzed in the winter of 2016-17; an estimate of the number of smolts that emigrated in 2016 will be generated for future publication.

**Table 1. Total catches, Adipose clips observed and spaghetti tags recovered in 2016 by statistical week.**

Statistical Weeks	Week Ending	Commercial Catch	Test Catch	Adipose Clips Observed	CW Tags Recovered	Spaghetti Tags Recovered
23	04-Jun					
24	11-Jun					
25	18-Jun					
26	25-Jun					
27	02-Jul	3				
28	09-Jul	37				3
29	16-Jul	114				
30	23-Jul	136				3
31	30-Jul	210				6
32	06-Aug	747		1		17
33	13-Aug	736		2		7
34	20-Aug	813		1		14
35	27-Aug	1,238		2		24
36	03-Sep	2,072		8		26
37	10-Sep	1,424		4		9
38	17-Sep	275	339	1		7
39	24-Sep	653	664	7	6	12
40	01-Oct	778	504	9	9	13
41	08-Oct	230	500	5	5	7
Total		9,466	2,007	40	20	148

## 5.0 Budget and Project Operations

Scheduling and operations went as planned.

As presented in Appendix B, the expenditures of Northern Funds amounted to \$64,800. The 10% holdback of \$6,480 is anticipated once the final project report is accepted by the Pacific Salmon Commission.

A summary of PSC Fund expenditures in relation to budgeted amounts is as follows:

Description	Budget	Expenditure	Balance
Labour Costs-Contract	64,800	64,800	0
Site/Project Costs	0	0	-

Training Costs	0	0	-
Overhead Costs	0	0	-
Capital Costs	0	0	-
<b>Grand Total</b>	<b>64,800</b>	<b>64,800</b>	<b>0</b>

The total contract cost was \$73,000; the difference of \$8,200 was covered by DFO as an in-kind contribution.

## 6.0 Conclusion

The planned and actual deliverables of the project were as follows:

1. Sampling adult coho returns for adipose clips and spaghetti tags on the Taku River upstream of the Canada/U.S. border from mid-August through to early October; estimated minimum sample 3,000 fish.

*From July 14 to September 13, a total of 3,669 coho were examined in the commercial fishery with 18 marks observed and 128 spaghetti tags recovered. From September 13 to October 9, a total of 2,007 coho were caught /examined in a test fishery with 22 marks observed and 20 spaghetti tags recovered.*

The activities supported by this project will contribute to the assessment of current productivity, abundance, and exploitation of Taku River coho salmon.

## 7.0 Acknowledgements

Kirstie Falkevitch, Tori Knutson and Mathieu Ducharme of DFO sampled the commercial fishery and monitored the contract supported by this funding. Individuals fishing commercially and/or for Taku Wild captured coho and recovered tags. Colleen Claggett and Julie Bradford (DFO) assisted with the financial administration and accounting for this project.

## 8.0 Literature Cited

- McPherson, S. A., D. R. Bernard, S. K. Kelley, P. A. Milligan, and P. Timpany. 1998a. Abundance of Chinook salmon in the Taku River in 1997. Alaska Department of Fish and Game, Division of Sport Fish, Fishery Data Series Report 98-41, Anchorage.
- Yanusz, R. J., McPherson, S. A., and D. R. Bernard. 1999. Production of coho salmon from the Taku River, 1997-1998. Alaska Department of Fish and Game, Division of Sport Fish, Fishery Data Series Report 99-34, Anchorage.
- PSC (Pacific Salmon Commission). 2017. Preliminary estimates of transboundary river salmon production, harvest, and escapement and a review of joint enhancement activities in 2016. Transboundary Technical Committee Report.

# 9.0 Appendices



**Appendix A:  
Daily catches, Adipose clips observed and spaghetti tags recovered.**

Statistical Weeks	Date	Commercial Catch	Test Catch	Adipose Clips Observed	CW Tags Recovered	Spaghetti Tags Recovered
27	26-Jun	1				
27	27-Jun					
27	28-Jun	2				
27	29-Jun					
27	30-Jun					
27	01-Jul					
27	02-Jul					
28	03-Jul	15				
28	04-Jul	13				
28	05-Jul	0				3
28	06-Jul	9				
28	07-Jul					
28	08-Jul					
28	09-Jul					
29	10-Jul	34				
29	11-Jul	47				
29	12-Jul	33				
29	13-Jul					
29	14-Jul					
29	15-Jul					
29	16-Jul					
30	17-Jul	53				
30	18-Jul	41				2
30	19-Jul	42				1
30	20-Jul					
30	21-Jul					
30	22-Jul					
30	23-Jul					
31	24-Jul	49				1
31	25-Jul	63				1
31	26-Jul	98				4
31	27-Jul					
31	28-Jul					
31	29-Jul					
31	30-Jul					
32	31-Jul	183				6
32	01-Aug	179		1		5
32	02-Aug	186				1
32	03-Aug	199				5
32	04-Aug					
32	05-Aug					
32	06-Aug					
33	07-Aug	278				2
33	08-Aug	164		1		1
33	09-Aug	166				3
33	10-Aug	128		1		1
33	11-Aug					
33	12-Aug					
33	13-Aug					
34	14-Aug	245				2
34	15-Aug	37				
34	16-Aug	62				4
34	17-Aug	203				4
34	18-Aug	266		1		4

34	19-Aug					
34	20-Aug					
35	21-Aug	364				7
35	22-Aug	309		1		5
35	23-Aug	266		1		4
35	24-Aug	299				8
35	25-Aug					
35	26-Aug					
35	27-Aug					
36	28-Aug	207				4
36	29-Aug	383		3		7
36	30-Aug	414		3		6
36	31-Aug	522		1		9
36	01-Sep	546		1		
36	02-Sep					
36	03-Sep					
37	04-Sep	664		2		4
37	05-Sep	406		2		2
37	06-Sep	176				3
37	07-Sep	101				
37	08-Sep	77				
37	09-Sep					
37	10-Sep					
38	11-Sep	87	64			2
38	12-Sep	115	77			1
38	13-Sep	30	63	1		1
38	14-Sep	40	40			2
38	15-Sep	3	23			1
38	16-Sep		17			
38	17-Sep		55			
39	18-Sep	205	129			2
39	19-Sep	195	163			4
39	20-Sep	172	111	1		3
39	21-Sep	81	124			2
39	22-Sep		74	4	4	1
39	23-Sep		63	2	2	
39	24-Sep					
40	25-Sep	207	111	1	1	2
40	26-Sep	131	143	2	2	2
40	27-Sep	194	124	1	1	1
40	28-Sep	174	77	4	4	3
40	29-Sep	72	49	1	1	5
40	30-Sep					
40	01-Oct					
41	02-Oct	201	79	4	4	4
41	03-Oct	29	96			
41	04-Oct		85			2
41	05-Oct		57			
41	06-Oct		62			
41	07-Oct		58	1	1	
41	08-Oct		63			1
42	09-Oct					
42	10-Oct					
42	11-Oct					
42	12-Oct					
<b>Total</b>		<b>9,466</b>	<b>2,007</b>	<b>40</b>	<b>20</b>	<b>148</b>

## **Appendix B: Expenditures**

## Project Budget Form - DFO

Page 1 of 2

**Name of Project:** Taku River Coho Adult Augmentation 2016

**ELIGIBLE COSTS**

**BUDGET**

**OTHER CONTRIBUTION FUNDING FUNDING**

**Labour**

**Wages & Salaries**

Position	# of crew	# of work days	hrs per day	rate per hour	Total (PSC + In-kind + cash)	In-Kind & Cash	PSC Amount	Actual Expenditures	Variance
DFO Stock Assessment Biologist Bi-3	1	7	7.5	47	2,468	2,468			
DFO Stock Assessment Biologist Bi-2	1	7	7.5	36	1,890	1,890			
DFO Fishery Technician EG 3 (includes OT)	2	35	7.5	29	22,838	22,838			
Person Days (# of crew x work days)		49		<b>sub total</b>	27,195	27,195	-	-	-

**Labour - Employer Costs ( percent of wages subtotal amount )**

	rate	20%		<b>sub total</b>	5,439	5,439	-		
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**Subcontractors & Consultants**

	# of crew	# of work days	hrs per day	rate per hour					
Adult tag recovery (Event II)	6	30	8	\$45	64,800		64,800	64,800	-
Insurance if applicable		rate	0%						
	114			<b>sub total</b>	64,800	-	64,800	64,800	-

**Volunteer Labour**

	# of crew	# of work days	hrs per day						
Skilled									
Un-skilled									
Insurance if applicable		rate	0%						
				<b>sub total</b>					

**Total Labour Costs**

97,434

32,634

64,800

64,800

-

**Site / Project Costs**

**Detail (use additional page for details if needed )**

Travel (do not include to & from work)							-		
Small Tools & Equipment							-		
Site Supplies & Materials							-		
Equipment Rental									
Work & Safety Gear							-		
Repairs & Maintenance							-		
Permits									
Technical Monitoring									
Other site costs							-		
				<b>Total Site / Project Costs</b>	-		-	-	-

Project Budget Form - DFO (continued)

ELIGIBLE COSTS				BUDGET	OTHER FUNDING	CONTRIBUTION FUNDING	Actual Expenditures	Variance
				Total (PSC + In-kind + cash)	In-Kind & Cash	PSC Amount		
<b>Training (e.g Swiftwater, bear aware, electrofishing, etc).</b>								
Name of course	# of crew	# of days		-	-			
<b>Total Training Costs</b>				-	-	-	-	-
<b>Overhead / Indirect Costs (not to exceed 20% of PSC Amount)</b>								
Office space; including utilities, etc.								
Insurance								
Office supplies								
Telephone & long Distance					-			
Photocopies & printing								
Other overhead costs	Admin Overhead @ 3%			2,923	2,923			
<b>Total Overhead Costs</b>				2,923	2,923	-	-	-
<b>Capital Costs / Assets</b>								
<b>Detail (use additional page for details if needed)</b>								
Assets are things of value that have an initial cost of \$250 CAN or more and which can be readily misappropriated for personal use or gain or which are not, or will not be, fully consumed during the term of the project.								
				-				
				-				
				-				
				-				
<b>Total Capital Costs</b>				-		-	-	-
<b>Project Total Costs Cdn\$</b>				100,357	35,557	64,800	64,800	-
DFO Budget Summary (PSC + in-kind + cash)							Balance	\$ -
							1st payment	\$ 58,320.00
							10% holdback	\$ 6,480.00
							<b>Total</b>	<b>\$ 64,800.00</b>
<b>Total Labour Costs</b>		Total	97,434					
<b>Total Site / Project Costs</b>			-					
<b>Total Training Costs</b>			-					
<b>Total Overhead Costs</b>			2,923					
<b>Total Capital Costs</b>			-					
	<b>Project Total</b>		100,357					

## **Appendix C: Photographs**



**Photograph 1. Fishery catches at landing station.**



**Photograph 2. Catch sampling at landing station.**