

PACIFIC REGION

**INTEGRATED FISHERIES
MANAGEMENT PLAN
APRIL 1, 2019 - MARCH 31,
2020**

SALMON
TRANSBOUNDARY RIVERS



Oncorhynchus kisutch



Fisheries and Oceans
Canada

Pêches et Océans
Canada

Canada

This Integrated Fisheries Management Plan is intended for general purposes only. Where there is a discrepancy between the Plan and the Fisheries Act and Regulations, the Act and Regulations are the final authority. A description of Areas and Subareas referenced in this Plan can be found in the Pacific Fishery Management Area Regulations, 2007.

TABLE OF CONTENTS

<i>Table of Contents</i>	<i>ii</i>
<i>List of Tables</i>	<i>ix</i>
<i>List of Figures</i>	<i>x</i>
INDEX OF WEB-BASED INFORMATION	<i>xiii</i>
FOREWARD	<i>xvii</i>
NEW FOR 2019/2020	<i>xviii</i>
1 OVERVIEW	<i>1</i>
1.1 Introduction	<i>1</i>
1.2 History	<i>1</i>
1.3 Types of Fishery and Participants	<i>1</i>
1.4 Location of Fishery	<i>2</i>
1.5 Fishery Characteristics	<i>2</i>
1.6 Governance	<i>4</i>
1.6.1 Sustainable Fisheries Framework	<i>4</i>
1.6.2 Policy Framework for the Management of Pacific Salmon Fisheries	<i>4</i>
1.6.3 First Nations and Canada’s Fisheries	<i>5</i>
1.6.4 Pacific Integrated Commercial Fisheries Initiative	<i>6</i>
1.6.5 Fishery Monitoring and Catch Reporting	<i>6</i>
1.7 Consultation	<i>7</i>
1.8 Approval Process	<i>7</i>
2 STOCK ASSESSMENT, SCIENCE AND TRADITIONAL ECOLOGICAL KNOWLEDGE	<i>7</i>
2.1 Biological Synopsis	<i>7</i>
2.2 Ecosystem Interactions	<i>11</i>
2.3 Aboriginal Traditional Knowledge/Traditional Ecological Knowledge	<i>11</i>
2.4 Stock Assessment	<i>13</i>
2.5 Information Sources	<i>14</i>
2.6 Precautionary Approach	<i>15</i>
2.7 Research	<i>15</i>
3 SHARED STEWARDSHIP ARRANGEMENTS	<i>16</i>
4 ECONOMIC SOCIAL AND CULTURAL IMPORTANCE	<i>18</i>
4.1 Aboriginal Participation	<i>18</i>
4.2 Recreational Sector	<i>20</i>
4.3 Commercial Sector	<i>22</i>
4.4 Processing Sector	<i>23</i>

5	MANAGEMENT ISSUES	23
5.1	<i>Conservation</i>	23
5.1.1	Wild Salmon Policy	23
5.2	<i>International Commitments – Pacific Salmon Treaty</i>	26
5.3	<i>Oceans and Habitat Considerations</i>	27
5.3.1	Oceans Act	27
5.3.2	Pacific North Coast Integrated Management Area	28
5.3.3	Marine Protected Area Networks	28
5.3.4	Marine Protected Areas	29
5.3.5	National Marine Conservation Areas	30
5.3.6	Marine National Wildlife Areas	31
5.3.7	Terrestrial Parks and Protected Areas	31
5.3.8	Committee on the Status of Endangered Wildlife Species Assessments	32
5.3.9	Species at Risk Act	32
5.3.10	Whale, Turtle and Basking Shark Sightings	35
5.3.11	Northern and Southern Resident Killer Whales	36
5.3.12	Environment Canada Project: Assessing the Impact of Gill Nets on Seabirds	38
5.3.13	Aquaculture Management	39
5.3.14	Salmonid Enhancement Program	40
5.3.15	Fishing Vessel Safety	41
6	OBJECTIVES	42
6.1	<i>Fisheries Management Objectives for Stocks of Concern</i>	42
6.2	<i>International Objectives</i>	42
6.3	<i>Domestic Allocation Objectives</i>	43
6.3.1	First Nations Fisheries	44
6.3.2	Recreational Fisheries	44
6.3.3	Commercial Fisheries	45
6.3.4	Excess Salmon to Spawning Requirements Fisheries	45
7	DECISION GUIDELINES AND SPECIFIC MANAGEMENT MEASURES	46
7.1	<i>General Decision Guidelines</i>	46
7.1.1	Pre-season Planning	46
7.1.2	In-season Decisions	47
7.1.3	Selective Fisheries	47
7.1.4	Post-Release Mortality Rates	48
7.2	<i>Chinook – AABM/ISBM Management</i>	50
8	COMPLIANCE PLAN	51
8.1	<i>Compliance Management Objectives</i>	51
8.2	<i>Regional Compliance Program Delivery</i>	51
8.3	<i>Consultation</i>	52
8.4	<i>Compliance Strategy</i>	53
9	PERFORMANCE/EVALUATION CRITERIA	53
APPENDIX 1: ALSEK RIVER INTEGRATED SALMON FISHERIES MANAGEMENT PLAN, 2019.		54
1	INTRODUCTION	54

1.1	<i>Description of the Alsek River Salmon Resources</i>	54
1.1.1	Chinook Salmon	54
1.1.2	Sockeye Salmon	55
1.1.3	Coho Salmon	56
1.1.4	Pink and Chum Salmon	56
1.1.5	Steelhead	56
1.2	<i>Description of Alsek-Tatshenshini River Salmon Fisheries</i>	56
1.2.1	Champagne and Aishihik First Nations (CAFN) Fishery	56
1.2.2	Recreational Fishery	57
2	<i>RUN OUTLOOKS FOR ALSEK RIVER SALMON IN 2019</i>	57
2.1	<i>Chinook Salmon</i>	57
2.2	<i>Sockeye Salmon</i>	58
2.3	<i>Coho Salmon</i>	58
3	<i>SPAWNING ESCAPEMENT GOALS FOR ALSEK SALMON</i>	58
3.1	<i>Chinook Salmon</i>	58
3.2	<i>Sockeye Salmon</i>	58
3.3	<i>Coho Salmon</i>	59
4	<i>CONSULTATION PROCESSES FOR ALSEK SALMON FISHERIES</i>	59
4.1	<i>Yukon Umbrella Final Agreement and the CAFN Final Agreement</i>	59
4.2	<i>Yukon Salmon Sub-Committee (YSSC)</i>	60
4.3	<i>Transboundary Rivers Panel of the Pacific Salmon Treaty</i>	61
5	<i>ALSEK-TATSHENSHINI DECISION GUIDELINES FOR 2019</i>	61
6	<i>ALSEK-TATSHENSHINI FISHERY PLANS FOR 2019</i>	62
6.1	<i>First Nation Fishery</i>	62
6.1.1	Champagne-Aishihik First Nation Basic Needs Allocation	62
6.1.2	Alsek-Tatshenshini First Nation Controls and Monitoring of Removals	63
6.1.3	Alsek-Tatshenshini First Nation Fishery Licencing	63
6.2	<i>Alsek-Tatshenshini Recreational Fishery</i>	64
6.2.1	Alsek-Tatshenshini Recreational Fishery Control and Monitoring of Removals	64
6.2.2	Alsek-Tatshenshini Recreational Fishery Licencing	67
7	<i>ALSEK-TATSHENSHINI STOCK ASSESSMENT PLAN FOR 2019</i>	68
8	<i>ALSEK-TATSHENSHINI POST SEASON REVIEW</i>	70
8.1	<i>Conservation</i>	70
8.2	<i>First Nation Fishery</i>	70
8.1	<i>Recreational Fishery</i>	70
8.2	<i>PST Harvest Sharing Performance</i>	70
APPENDIX 2: STIKINE RIVER INTEGRATED SALMON FISHERIES MANAGEMENT PLAN, 2019		72
1 INTRODUCTION		72

1.1	<i>Description of Stikine Salmon Resources</i>	72
1.1.1	Chinook Salmon	72
1.1.2	Sockeye Salmon	73
1.1.3	Coho Salmon	74
1.1.4	Pink and Chum Salmon	74
1.1.5	Steelhead salmon	75
1.2	<i>Description of Stikine Salmon Fisheries</i>	75
1.2.1	Tahltan First Nation Fishery	75
1.2.2	Recreational Fishery	76
1.2.3	Commercial Fishery	76
1.2.4	Fisheries for Excess Salmon to Spawning Requirements (ESSR)	77
2	<i>RUN OUTLOOKS FOR STIKINE SALMON IN 2019</i>	79
2.1	<i>Chinook Salmon</i>	79
2.2	<i>Sockeye Salmon</i>	79
2.3	<i>Coho Salmon</i>	79
2.4	<i>Pink and Chum Salmon</i>	79
3	<i>SPAWNING ESCAPEMENT GOALS FOR STIKINE SALMON</i>	80
3.1	<i>Chinook salmon</i>	80
3.2	<i>Sockeye salmon</i>	80
3.3	<i>Coho salmon</i>	81
3.4	<i>Pink and Chum salmon</i>	81
4	<i>CONSULTATION PROCESSES FOR STIKINE SALMON FISHERIES</i>	81
4.1	<i>Tahltan First Nation: Aboriginal Fisheries Strategy Consultation</i>	81
4.2	<i>Stikine River Salmon Management Advisory Committee (SRSMAC)</i>	82
4.3	<i>Transboundary Rivers Panel (TRP) of the Pacific Salmon Treaty</i>	82
5	<i>DECISION GUIDELINES FOR STIKINE SALMON MANAGEMENT</i>	82
5.1	<i>Chinook Salmon</i>	82
5.2	<i>Sockeye Salmon</i>	84
5.3	<i>Coho salmon</i>	87
5.4	<i>Pink and Chum Salmon</i>	87
6	<i>STIKINE FISHERY PLANS FOR 2019</i>	87
6.1	<i>First Nation Fishery</i>	87
6.1.1	Stikine River First Nations Basic Needs Allocation (BNA)	87
6.1.2	Stikine River First Nations Control and Monitoring of Removals	87
6.1.3	Stikine River First Nations Communal Licensing	88
6.2	<i>Stikine River Salmon Recreational Fishery</i>	88
6.2.1	Stikine Recreational Control and Monitoring of Removals	88
6.2.2	Stikine River Recreational Fishery Licensing	89
6.3	<i>Stikine Commercial Salmon Fishery</i>	90
6.3.1	Stikine Commercial Chinook Fishery Controls	90
6.3.2	Stikine Commercial Sockeye Fishery Controls	91

6.3.3	Stikine Commercial Coho Fishery Controls	92
6.3.4	Stikine Commercial Pink and Chum Harvest Controls	92
6.3.5	Stikine Commercial In-Season Catch Reporting Program	92
6.3.6	Stikine Commercial Non-Retention Species	93
6.3.7	Stikine Commercial Monitoring Plan	93
6.3.8	Stikine Commercial Gill Net Construction	93
6.3.9	Stikine Commercial Licensing	94
6.4	Stikine ESSR Fisheries	95
6.4.1	Stikine ESSR Licensing	95
6.4.2	Stikine ESSR Control and Monitoring of Removals	95
7	STIKINE SOCKEYE ENHANCEMENT PLAN FOR 2019	96
7.1	Tuya River Sockeye Enhancement Review	97
8	STIKINE STOCK ASSESSMENT PLAN FOR 2019	97
8.1	Chinook Salmon	97
8.2	Sockeye Salmon	99
8.3	Coho Salmon	100
8.4	Pink and Chum Salmon	101
9	STIKINE POST SEASON REVIEW	102
9.1	Conservation	102
9.2	First Nation Fishery	103
9.3	Recreational Fishery	103
9.4	Commercial Fishery	103
9.5	PST Harvest Sharing Performance in 2018.	104
9.6	Stikine Sockeye Enhancement Activities in 2018.	105
APPENDIX 3: TAKU RIVER INTEGRATED SALMON FISHERIES MANAGEMENT PLAN, 2019.		107
1	INTRODUCTION	107
1.1	Description of the Taku River Salmon Resources	107
1.1.1	Chinook Salmon	107
1.1.2	Sockeye Salmon	108
1.1.3	Coho Salmon	108
1.1.4	Pink Salmon	109
1.1.5	Chum Salmon	109
1.1.6	Steelhead	110
1.2	Description of Taku River Salmon Fisheries	110
1.2.1	Taku River Tlingit First Nation FSC Fishery	110
1.2.2	Recreational Fishery	110
1.2.3	Commercial Fishery	111
2	RUN OUTLOOKS FOR TAKU SALMON IN 2019	112
2.1	Chinook Salmon	113
2.2	Sockeye Salmon	113
2.3	Coho Salmon	113

2.4	<i>Pink Salmon</i>	113
2.5	<i>Chum Salmon</i>	114
3	SPAWNING ESCAPEMENT GOALS FOR TAKU SALMON	114
3.1	<i>Chinook Salmon</i>	114
3.2	<i>Sockeye Salmon</i>	115
3.3	<i>Coho Salmon</i>	115
3.4	<i>Pink and Chum Salmon</i>	115
4	CONSULTATION PROCESSES FOR TAKU SALMON FISHERIES	115
4.1	<i>Taku River Tlingit First Nation: Aboriginal Fisheries Strategy Consultation</i>	116
4.2	<i>Taku River Salmon Management Advisory Committee (TRSMAC)</i>	116
4.3	<i>Transboundary Rivers Panel of the Pacific Salmon Treaty</i>	116
5	TAKU RIVER DECISION GUIDELINES FOR 2019	116
5.1	<i>Chinook Salmon</i>	117
5.2	<i>Sockeye Salmon</i>	119
5.3	<i>Coho Salmon</i>	122
5.4	<i>Pink and Chum Salmon</i>	125
6	TAKU RIVER FISHERY PLANS FOR 2019	125
6.1	<i>First Nation Fishery Plan</i>	125
6.1.1	<i>Taku River Tlingit First Nation Basic Needs Allocation</i>	125
6.1.2	<i>Taku River Tlingit First Nation Control and Monitoring of Removals</i>	126
6.1.3	<i>Taku River Tlingit First Nation Communal Licencing</i>	126
6.2	<i>Recreational Fishery</i>	126
6.2.1	<i>Taku River Recreational Control and Monitoring of Removals</i>	126
6.2.2	<i>Taku River Recreational Fishery Licensing</i>	127
6.3	<i>Taku River Commercial Fishery</i>	127
6.3.1	<i>Taku Commercial Fishery Controls</i>	128
6.3.2	<i>Taku Commercial In-Season Catch Reporting Program</i>	129
6.3.3	<i>Taku Commercial Non-Retention Species</i>	129
6.3.4	<i>Taku Commercial Monitoring Plan</i>	130
6.3.5	<i>Taku Commercial Gill Net Construction</i>	130
6.3.6	<i>Taku Commercial Licensing</i>	130
6.4	<i>ESSR Fisheries</i>	131
7	TAKU RIVER SOCKEYE ENHANCEMENT PLAN FOR 2019	131
8	TAKU SALMON STOCK ASSESSMENT PLAN FOR 2019	132
8.1	<i>Chinook Salmon</i>	132
8.2	<i>Sockeye Salmon</i>	134
8.3	<i>Coho Salmon</i>	136
8.4	<i>Pink and Chum Salmon</i>	137
9	TAKU RIVER POST SEASON REVIEW	139

9.1	<i>Conservation</i>	139
9.2	<i>First Nation Fishery</i>	139
9.3	<i>Recreational Fishery</i>	140
9.4	<i>Commercial Fishery</i>	140
9.5	<i>PST Harvest Sharing Performance</i>	140
9.6	<i>Taku Sockeye Enhancement Activities in 2018</i>	142
APPENDIX 4. CONSERVATION AND PROTECTION 2019 COMPLIANCE PLAN		
	144	
1	<i>Compliance Objectives</i>	144
2	<i>Regional Compliance Program Delivery</i>	144
3	<i>Consultation</i>	145
4	<i>Compliance Strategy</i>	146
1	<i>Important Priorities for Vessel Safety</i>	148
1.1	<i>Fishing Vessel Stability</i>	148
1.2	<i>Emergency Drill Requirements</i>	149
1.3	<i>Cold Water Immersion</i>	149
1.4	<i>Other Issues</i>	150
1.4.1	Weather	150
1.4.2	Emergency Radio Procedures	150
1.4.3	Collision Regulations	150
1.4.4	Buddy System	151
2	<i>Fish Safe BC</i>	151
3	<i>WorkSafeBC</i>	152
4	<i>Transportation Safety Board</i>	152
APPENDIX 5: GLOSSARY		154
APPENDIX 6: ACRONYMS		157

LIST OF TABLES

Table 1. Summary of life history characteristics for five Pacific salmon.....	10
Table 2. Estimated value of direct and indirect expenditures in the 2010 recreational fishery.....	20
Table 3. Recreational Fishing Direct and Package Expenditures and Investments In B.C.	21
Table 4. Conservation Units identified for the Alsek, Stikine and Taku drainages.....	25
Table 5. Allocation guidelines for Salmon in the Pacific Region	43
Table 6. Status criteria for Pacific salmon as outlined by DFO stock assessment staff.....	47
Table 7. Estimated Post-Release Mortality Rates.....	49
Table 8. Coast-wide AABM Chinook salmon abundance indices and allowable catches for 2014.....	50
Table 9. Alsek-Tatshenshini salmon management thresholds for conservation actions.	62
Table 10. Species Daily Catch limit and Possession Limit (Yukon Recreational Fisheries).....	64
Table 11. Salmon escapement through the Klukshu River weir in 2017.	70
Table 12. Tahltan sockeye escapement goals for 2018.	80
Table 13. Mainstem sockeye escapement goals for 2018.	81
Table 14. U.S. and Canadian allowable catches of Stikine Chinook salmon for directed fisheries.	Error! Bookmark not defined.
Table 15. Key Decision Points for Tahltan Lake sockeye salmon.	86
Table 16. Key Decision Points for Stikine mainstem sockeye salmon.....	87
Table 17. Stikine Enhancement Production Plan (SEPP) 2018.	96
Table 18. Escapement goals vs. observed escapement of Stikine River salmon, 2017.....	102
Table 19. First Nation harvest of Stikine River salmon, 2017.....	103
Table 20. Commercial salmon allocation and harvest on the Stikine River, 2017.	103
Table 21. Harvest sharing report card for Stikine River salmon, 2017.....	105
Table 22. Interim escapement goals for Taku River salmon in effect for 2018.....	114
Table 23. Canada/U.S. harvest sharing of the Allowable Catch of large, Taku River Chinook salmon.	Error! Bookmark not defined.
Table 24. Key Decision Points for Taku River Chinook salmon.....	118
Table 25. U.S. and Canadian harvest shares of Taku River sockeye salmon.	121
Table 26. Key Decision Points for Taku River sockeye salmon.....	122
Table 27. Key Decision Points for Taku River coho salmon, commencing statistical week 34.....	125
Table 28. Taku Enhancement Production Plan (TEPP), 2018.....	132
Table 29. Escapement goals vs. estimated escapement for Taku River salmon in 2017.....	139
Table 30. Taku First Nation FSC Harvest vs. Basic Needs Allocation, 2017.....	140
Table 31. Harvest sharing report card for Taku River salmon, 2017. [Note: obligations in bold type]..	140

LIST OF FIGURES

<i>Figure 1. Trends in escapement based on average deviations (Z-scores) for 15 Chinook stocks from Alsek River to the Fraser River, 1975-2017. Stocks include: Alsek, Taku, Stikine, Nass, Skeena, Kitsumkalum, WCVI-aggregate (includes Marble, Tahsis, Artlish, Kaouk, Tahsish), Cowichan, Fraser Spring 1.3, Fraser Spring 1.2, Nicola SP 1.2, Harrison, Fraser Summer 1.3, Fraser Summer 0.3, Lower Shuswap 0.3. Prepared by C. Parken, D. Lewis.</i>	xxi
<i>Figure 2. Typical ocean habitat of B.C. salmon in the Pacific Ocean. [from Agriculture & Agri-Food Canada, see: http://www.ats.agr.gc.ca/sea-mer/4810-eng.htm]</i>	10
<i>Figure 3. Pacific Region wild salmon harvest and landed value (2014 dollars).</i>	22
<i>Figure 4. The Alsek River and principal Canadian fishing areas.</i>	60
<i>Figure 5. Area closures and gear restrictions on the Tatshenshini River and tributaries in the Alsek drainage in the Yukon Territory.</i>	66
<i>Figure 6. Weir counts of Klukshu River Chinook salmon, 1976 to 2018 (including jacks). [Note: Annual weir counts are represented by the stacked bars which include escapement plus the First Nation catch that occurred upstream of the weir].</i>	68
<i>Figure 7. Weir counts of Klukshu River sockeye salmon, 1976 to 2018. Total weir counts are portrayed by the stacked bars which include the early (<15 August) count plus the late count (≥15 August). Escapement is the total weir count minus fish harvested upstream of the weir.</i>	69
<i>Figure 8. Weir counts of Klukshu River coho, 1976 to 2018. [Note: due to the timing of weir removal, counts do not cover the entire coho salmon run for all years].</i>	69
<i>Figure 9. The Stikine River and Canadian fishing areas.</i>	78
<i>Figure 10. Weir counts of Little Tahltan River Chinook, 1985 to 2018 (does not include jacks). A landslide impeded access to the Tahltan R. drainage Chinook salmon spawning grounds in 2014.</i>	98
<i>Figure 11. Weir counts of Tahltan Lake sockeye, 1959 to 2018. Note that annual weir count equals the sum of spawners + broodstock + ESSR catch + samples.</i>	100
<i>Figure 12. Weir counts of sockeye salmon smolt emigrating from Tahltan Lake, 1984 to 2018.</i>	100
<i>Figure 13. Aerial counts of coho salmon in Stikine R. spawning index areas: 1984-2018. Surveys are flown once annually the end of October or early November. Only years when all six index areas were surveyed are displayed. A program to estimate total system-wide coho salmon escapement was discontinued in 2012.</i>	101
<i>Figure 14. The Taku River watershed and the Canadian commercial fishing area.</i>	112
<i>Figure 15. Terminal run of large Taku Chinook (≥660 mm mid-eye to fork length), 1989 to 2018. [Note: estimates of US catch prior to 1995 are derived from an assumed harvest rate of 10% (based on 1995-1999 average). Catches for 1995-2018 based on data from CWT (troll) and GSI (sport and net)].</i>	133
<i>Figure 16. Terminal Run Size of Taku River sockeye salmon, 1984 to 2018. [Note: Escapement is determined from the mark-recapture program; US catch is based on scale pattern analyses and thermal marks; Canadian catch from inriver catch slips and monitoring]</i>	134
<i>Figure 17. Weir counts of Little Trapper Lake sockeye 1983 to 2018. [Note: Annual weir count is sum of spawning escapement and fish taken for broodstock].</i>	135
<i>Figure 18. Weir counts of Tatsamenie Lake sockeye: 1985 to 2018. [Note. Annual weir count is sum of spawning escapement and fish taken for broodstock].</i>	135
<i>Figure 19. Weir counts of Kuthai Lake sockeye, 1985 to 2018.</i>	136
<i>Figure 20. Estimated total run size of Taku River coho salmon, 1992 to 2018.</i>	137
<i>Figure 21. Pink salmon captures in the Canyon Island fish wheels, 1984 to 2018.</i>	138
<i>Figure 22. Yearly chum salmon captures in the Canyon Island fish wheels, 1984 to 2018.</i>	138

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Turn in Poachers (TIPP)	Toll Free	1-800-661-0525

INDEX OF WEB-BASED INFORMATION

FISHERIES AND OCEANS CANADA - GENERAL INFORMATION

National Main Page (<http://www.dfo-mpo.gc.ca>)

Our Vision, Latest News, Current Topics

Acts, Orders, and Regulations (<http://www.dfo-mpo.gc.ca/acts-loi-eng.htm>)

Canada Shipping Act, Coastal Fisheries Protection Act, Department of Fisheries and Oceans Act, Financial Administration Act, Fish Inspection Act, Fisheries Act, Fisheries Development Act, Fishing and Recreational Harbours Act, Freshwater Fish Marketing Act, Navigable Waters Protection Act, Oceans Act.

National On-line Licencing System (NOLS)

Web: www.dfo-mpo.gc.ca/fm-gp/sdc-cps/index-eng.htm

E-mail: SDC-CPS@dfo-mpo.gc.ca (please include postcode)

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Reports and Publications (<http://www.dfo-mpo.gc.ca/reports-rapports-eng.htm>)

Administration and Enforcement of the Fish Habitat Protection and Pollution Prevention Provisions of the *Fisheries Act*, Audit and Evaluation Reports - Audit and Evaluation Directorate Canadian Code of Conduct for Responsible Fishing Operations, Departmental Performance Reports, Fisheries Research Documents, Standing Committee's Reports and Government responses, Sustainable Development Strategy.

Waves (<http://waves-vagues.dfo-mpo.gc.ca/waves-vagues/>)

Fisheries and Oceans Canada online library catalogue

Pacific Salmon Treaty (www.psc.org)

Background information; full text of the treaty; Technical Committee Reports.

PACIFIC REGION - GENERAL

Main Page (www.pac.dfo-mpo.gc.ca/)

General information, Area information, Latest news, Current topics.

Policies, Reports and Programs

(<http://www.pac.dfo-mpo.gc.ca/fm-gp/species-especies/salmon-saumon/pol/index-eng.htm>)

Reports and Discussion Papers, New Directions Policy Series, Agreements.

Oceans Program (<http://www.pac.dfo-mpo.gc.ca/oceans/index-eng.htm>)

Integrated Coastal Management; Marine Protected Areas; Marine Environmental Quality; Oceans Outreach; Oceans Act.

PACIFIC REGION - FISHERIES MANAGEMENT

Main Page (<http://www.pac.dfo-mpo.gc.ca/fm-gp/index-eng.htm>)

Commercial Fisheries, New and Emerging Fisheries, Recreational Fisheries, Maps, Notices and Plans.

Aboriginal Fisheries Strategy (<http://www.pac.dfo-mpo.gc.ca/abor-autoc/index-eng.htm>) Aboriginal Fisheries Strategy (AFS) principles and objectives; AFS agreements; Programs; Treaty Negotiations.

Aquaculture Management (<http://www.pac.dfo-mpo.gc.ca/aquaculture/index-eng.htm>)

The new federal regulatory program for aquaculture in British Columbia. Program overview and administration, public reporting, and aquaculture science.

Recreational Fisheries (<http://www.pac.dfo-mpo.gc.ca/fm-gp/rec/index-eng.htm>)

Fishery Regulations and Notices, Fishing Information, Recreational Fishery, Policy and Management, Contacts, Current B.C. Tidal Waters Sport Fishing Guide and Freshwater Supplement; Rockfish Conservation Areas, Shellfish Contamination Closures; On-line Licensing.

Commercial Fisheries (<http://www.pac.dfo-mpo.gc.ca/fm-gp/commercial/index-eng.htm>)

Links to Groundfish, Herring, Salmon, Shellfish and New and Emerging Fisheries homepages; Selective Fishing, Test Fishing Information, Fishing Areas, Canadian Tide Tables, Fishery Management Plans, Commercial Fishery Notices (openings and closures).

Initiative to update the Commercial Salmon Allocation Framework

<http://www.pac.dfo-mpo.gc.ca/consultation/smon/saf-crrs/index-eng.html>

Links to the Departments' consultation website which provides an overview of the process to update the commercial Salmon Allocation Framework (CSAF), including links to summary reports and submissions with recommendations.

Fisheries Notices (<http://www-ops2.pac.dfo-mpo.gc.ca/xnet/content/fns/index.cfm?>)

Want to receive fishery notices by e-mail? If you are a commercial fisher, processor, recreational sport licence vendor, multiple boat owner or re-distribute fishery notices, register your name and/or company at the web-site address above. Openings and closures, updates, and other relevant information regarding your chosen fishery are sent directly to your registered email. It's quick, it's easy and it's free.

Integrated Fishery Management Plans

(<http://www-ops2.pac.dfo-mpo.gc.ca/xnet/content/MPLANS/MPlans.htm>)

Current Management Plans for Groundfish, Pelagics, Shellfish (Invertebrates), Minor Finfish, Salmon; sample Licence Conditions; Archived Management Plans.

Salmon Test Fishery - Pacific Region

(<http://www-ops2.pac.dfo-mpo.gc.ca/xnet/content/salmon/testfish/default.htm>)

Definition, description, location and target stocks.

Licensing (<http://www.pac.dfo-mpo.gc.ca/fm-gp/licence-permis/index-eng.htm>)

Contact information; Recreational Licensing Information, Commercial Licence Types, Commercial Licence Areas, Licence Listings, Vessel Information, Vessel Directory, Licence Statistics and Application Forms.

Salmon (<http://www.pac.dfo-mpo.gc.ca/fm-gp/species-especies/salmon-saumon/index-eng.htm>)

Salmon Facts; Salmon Fisheries; Enhancement and Conservation; Research and Assessment; Consultations; Policies, Reports and Agreements; Glossary of Salmon Terms.

Fraser River/B.C. Interior Area Resource Management and Stock Assessment (<http://www.pac.dfo-mpo.gc.ca/fraserriver/default.htm>)

Contact information; Test fishing and survey results (Albion, creel surveys, First Nations); Fraser River sockeye and pink escapement updates; Important notices; Recreational fishing information.

Salmon (<http://www.pac.dfo-mpo.gc.ca/fm-gp/species-especies/salmon-saumon/index-eng.htm>)

Salmon Facts; Salmon Fisheries; Enhancement and Conservation; Research and Assessment; Consultations; Policies, Reports and Agreements; Glossary of Salmon Terms

North Coast Resource Management (<http://www.pac.dfo-mpo.gc.ca/northcoast/default.htm>)

First Nations fisheries, Recreational fisheries; Commercial salmon and herring fisheries; Skeena Tyee test fishery; Counting facilities; Post-season Review; Contacts.

Yukon/Transboundary Rivers Area Main Page

(<http://www.pac.dfo-mpo.gc.ca/yukon/index-eng.htm>)

Fisheries Management; Recreational fisheries; Fisheries Management; Licensing; Contacts.

PACIFIC REGION – SALMONID ENHANCEMENT PROGRAM

Main Page (<http://www.pac.dfo-mpo.gc.ca/sep-pmvs/index-eng.html>)

Publications (legislation, policy, guidelines, educational resources, brochures, newsletters and bulletins, papers and abstracts, reports); GIS maps and Data (Habitat inventories, spatial data holdings, land use planning maps); Community involvement (advisors and coordinators, educational materials, Habitat Conservation and Stewardship Program, projects, Stream talk).

PACIFIC REGION - POLICY AND COMMUNICATIONS

Main Page (<http://www.dfo-mpo.gc.ca/media-eng.htm>)

Media Releases; Salmon Updates, Backgrounders, Ministers Statements, Publications; Contacts.

Consultation Secretariat

(<http://www.pac.dfo-mpo.gc.ca/consultation/index-eng.htm>)

Consultation Calendar; Policies; National; Partnerships; Fisheries Management, Oceans, Science and Habitat and Enhancement Consultations; Current and Concluded Consultations.

Publications Catalogue

(<http://www.pac.dfo-mpo.gc.ca/publications/index-eng.htm>)

Listing of information booklets and fact sheets available through Communications branch.

Species at Risk Act (SARA)

(<http://www.dfo-mpo.gc.ca/species-especies/index-eng.htm>)

SARA species; SARA permits; public registry; enforcement; Stewardship projects; Consultation; Past Consultation; First Nations; Related Sites; For Kids; News Releases.

PACIFIC REGION - SCIENCE

Main Page (<http://www.pac.dfo-mpo.gc.ca/science/index-eng.htm>)

Science divisions; Research facilities; PSARC; International Research Initiatives.

FOREWARD

The purpose of this Integrated Fisheries Management Plan (IFMP) is to identify the main objectives and requirements for the northwestern British Columbia and southwestern Yukon salmon fishery, as well as the management measures that will be used to achieve these objectives. This document also serves to communicate the basic information on the fishery and its management to Fisheries and Oceans Canada (DFO, the Department) staff, legislated co-management boards, First Nations, harvesters, and other interested parties. This IFMP provides a common understanding of the basic “rules” for the sustainable management of the fisheries resource.

This IFMP is not a legally binding instrument that can form the basis of a legal challenge. The IFMP can be modified at any time and does not fetter the Minister’s discretionary powers set out in the Fisheries Act. The Minister can, for reasons of conservation or for any other valid reasons, modify any provision of the IFMP in accordance with the powers granted pursuant to the Fisheries Act.

Where DFO is responsible for implementing obligations under land claims agreements, the IFMP will be implemented in a manner consistent with these obligations. In the event that an IFMP is inconsistent with obligations under land claims agreements, the provisions of the land claims agreements will prevail to the extent of the inconsistency.

The document is organized so that the over-arching Regional considerations are presented first, followed by specific details pertaining to the salmon management, enhancement, stock assessment and compliance plans for each of the Transboundary rivers. Since the detailed watershed-specific plans tend to change frequently, they are included as Appendices 1 to 3 to facilitate prompt updating when necessary.

Highlights/Key Changes for the 2019/20 Transboundary IFMP

- a) Alsek River:
- All salmon angling (including catch and release) prohibited effective April 1 to August 15, 2019.
 - Retention of Chinook salmon in recreational fishery prohibited for the season due to the poor preseason forecast. Modification of this management measure is contingent on in-season improvement in abundance.
- b) Stikine River:
- No directed commercial Chinook salmon fishery due to the poor preseason forecast. Retention of Chinook salmon incidentally intercepted in the directed commercial sockeye fishery prohibited.
 - Closure of the Tahltan River to recreational salmon fishing commencing June 01 to August 31. Retention of Chinook salmon in the recreational fishery prohibited.
 - Directed fisheries for sockeye and coho salmon expected however concerns over Chinook salmon conservation may necessitate further in-season management measures within the commercial sockeye salmon fishery. The poor preseason forecast of Mainstem sockeye salmon may also necessitate further in-season restrictions in the commercial sockeye salmon fishery.
 - Sockeye fry releases to Tuya Lake will not occur in 2019.
- c) Taku River:
- No directed commercial fishery for Taku Chinook due to the poor preseason forecast. Retention of Chinook salmon incidentally intercepted in the directed commercial sockeye fishery prohibited.
 - Retention of Chinook salmon in the recreational fishery prohibited.
 - Directed fisheries for sockeye and coho salmon expected with new coho management arrangements starting in 2019. Concerns over Chinook salmon will require further in-season management measures in the early component of the commercial sockeye fishery.
 - Conservation concerns for Kuthai Lake sockeye salmon due to poor brood year performance and passage issues.
- d) National Online Licensing System must be used to purchase commercial fishing licences and to identify of licence conditions.
- e) Recreational fishing licences are only available online (B.C. and Yukon).

Regional Highlights

State of the Pacific Ocean and Freshwater Environmental Conditions

Returns of most Pacific salmon stocks have been increasingly variable due to a combination of factors such as: numbers of parental spawners and changing freshwater and marine environments impacting subsequent production from these spawners at each life history stage. The 2019 outlook for salmon returns shows this variation but also suggests a period of continued reduced productivity. In 2019, returns of some salmon stocks may continue to be influenced by exposure to extremely warm water temperatures in the central NE Pacific ocean (the “warm blob”) in 2014-2015 and subsequent El Niño conditions that lasted through the first half of 2016. These conditions are often linked to resulting changes in the marine food web including zooplankton composition, density, and distribution. For Pacific salmon, the full implications of these conditions remain uncertain; in the past however, these conditions have been associated with reduced survival and/or growth for salmon. These conditions could also affect returning adults in 2019 through changes in age-at-return, fish condition, migration routes, and run timing.

DFO utilizes a range of information to manage fisheries in-season and decision making often incorporates science advice on the impact of environmental factors on in-season indicators of salmon returns, migration and fish condition. Environmental conditions and associated uncertainties may require additional adjustments to the fisheries management approaches outlined in this IFMP. For example, these adjustments could include changes to planned openings, harvest levels and timing of fisheries; management adjustments to account for adverse environmental conditions; time or area closures in specific locations to protect spawners that may be aggregating due to poor migratory conditions; additional selective fishing requirements; or other measures necessary to achieve sufficient spawner requirements. Further information on specific management actions will be communicated in-season by Fisheries Notice.

British Columbia Chinook – Additional Conservation Measures

Additional fishery management measures are proposed for 2019 fisheries to address conservation concerns for many BC Chinook Salmon populations. The requirement for additional actions is based on:

- Evidence of a regional pattern of reduced stock productivity related to reduced marine survival, younger age-at-maturity, reduced size at age and reduced fecundity across many B.C. Chinook salmon stocks. This pattern is affecting many Southeast Alaska, Washington and Oregon Chinook Salmon populations as well.
- Expectations for continued reduced productivity of Chinook Salmon populations given many chinook age-classes returning in 2019 were exposed to affects from the warm Pacific ocean “blob” and El Nino of 2016 and other anomalous ocean conditions which suggest changes in the marine food web impacts on the marine

survival of Pacific salmon. The outlook for 2019 does not show signs of improvement for many stocks, based on juvenile salmon and oceanographic surveys conducted in 2018.

- Where information is available, pre-season forecasts are for well-below average abundance of Chinook salmon, in many cases below levels required to achieve minimum spawning escapement targets.
- Management and conservation measures implemented to date have not been sufficient to rebuild many chinook populations.
- Coast-wide declines and below-average escapement among many British Columbia Chinook Salmon populations have been observed in recent years (particularly 2016 - 2018); see Figure 1 and Table 1.

Proposed 2019 Fishery Management Approach:

To address conservation concerns over B.C. Chinook salmon stocks in 2019, DFO intends to implement a precautionary reduction in fishery exploitation rates for stocks of concern to align harvest with current stock productivity, support conservation and promote rebuilding.

These additional reductions are planned to address conservation concerns for: Nass River; Skeena River; many wild chinook populations in Northern BC; and all Fraser River Chinook populations (including Spring 4₂, Spring 5₂, Summer 5₂, Summer 4₁ and Fall 4₁) in Southern BC. Vancouver Island chinook populations that are at low abundance but have shown recent signs of rebuilding are also expected to benefit from fishery measures to address stocks of concern.

The implementation of specific fishery management measures will be consistent with the Salmon Allocation Policy that assigns the highest priority to conservation, followed by First Nation access to Chinook salmon for food, social, ceremonial and Treaty obligations.

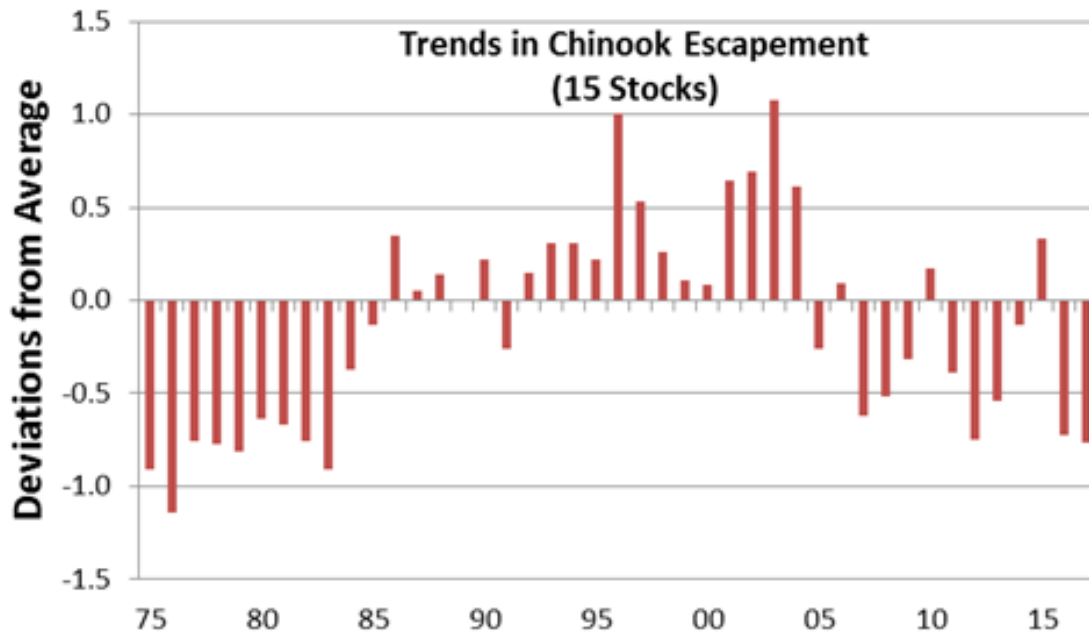


Figure 1. Trends in escapement based on average deviations (Z-scores) for 15 Chinook stocks from Alsek River to the Fraser River, 1975-2017. Stocks include: Alsek, Taku, Stikine, Nass, Skeena, Kitsumkalum, WCVI-aggregate (includes Marble, Tahsis, Artlish, Kaouk, Tahsish), Cowichan, Fraser Spring 1.3, Fraser Spring 1.2, Nicola SP 1.2, Harrison, Fraser Summer 1.3, Fraser Summer 0.3, Lower Shuswap 0.3. Prepared by C. Parken, D. Lewis.

To achieve the required reductions for BC chinook stocks of concern, fishery reductions will be implemented (to varying degrees) in major offshore (i.e. Aggregate Abundance Based Management - AABM chinook fisheries), coastal (i.e. Individual Stock Based Management - ISBM chinook fisheries) and terminal (i.e. in-river) fisheries to best meet conservation objectives.

The expected outcome is a further reduction in overall exploitation rates relative to recent years to support rebuilding of wild chinook spawner abundance. These measures are in addition to stock specific management measures already in place.

Specific objectives and fishery management measures to address Chinook conservation concerns in Alsek, Stikine, and Taku Rivers are detailed within the IFMP.

Catch Monitoring

Electronic Logbooks:

E-log pilot programs have been successfully in place in several commercial, recreational and First Nations fisheries. DFO is now advancing an initiative to expand the current e-log initiative to a national program. The vision of the project is to develop and implement, over a phased multi-year approach, a national integrated electronic catch and effort system designed to enable ongoing solutions for the fishing industry to meet their evolving data capture and traceability needs. Under a national e-log system, DFO will no longer fund

regional specific software programming. DFO will develop specific standards for e-log software in partnership with the Canadian General Standards Board (CGSB) along with a certification process to ensure that all e-log software meets these standards. Harvesters can continue to use their e-logs as long as no software changes are required to meet licence conditions. If software changes are required to meet licence conditions, harvesters can select to use paper logbooks or arrange to pay for any associated costs for software updates with a service provider.

Licencing Service Changes

Fisheries and Oceans Canada (DFO) introduced the web-based National Online Licensing System (NOLS) in the spring of 2013. This web-based system replaces in-person counter services at Pacific Fishery Licencing Units. Fish harvesters/Licence Holders/vessel owners will now use the new online system to view, pay for and print their commercial fishing licences, licence conditions and/or receipts.

Fish harvesters received a one-time use only DFO Passcode in 2013, allowing them to log into NOLS to register and activate their accounts. At that time, they created their own unique Username and Password; fish harvesters must use this Username and Password each time to access their NOLS accounts in order to pay licence fees and request issuance of a licence.

Licence renewal and payment of fees is mandatory on an annual basis prior to the expiry date of each fishery, in order to maintain the eligibility to be issued the licence in the future. Please note the licence eligibility will cease if it is not renewed annually.

Upon the Department receiving the required payment and all necessary information (i.e. logbook clearance), the licence will be issued and notification will be sent via email to advise Licence Holders/vessel owners that a change has been made to the licence holder's NOLS account. The licence documents, licence conditions and receipt will be available to be printed from NOLS at that time.

For queries, NOLS access problems or transactions that are not yet available in NOLS (e.g. vessel replacements and nominations); licencing services will continue to be available via:

Telephone: 1-877-535-7307 (ask for the 'Pacific Region')

Fax: 604-666-5855

E-mail: fishing-peche@dfo-mpo.gc.ca (specify 'Pacific Region' in the subject line)

Please visit the Pacific Region Licencing website and subscribe to fishery notices for updates on NOLS and licencing services: <http://www.pac.dfo-mpo.gc.ca/fm-gp/licence-permis/index-eng.html> . Information on NOLS may be found on the DFO internet site at: <http://www.dfo-mpo.gc.ca/fm-gp/sdc-cps/licence-permis-eng.htm>.

1 OVERVIEW

1.1 Introduction

The Transboundary Rivers Salmon Integrated Fisheries Management Plan (IFMP) covers the period of April 1, 2019 to March 31, 2020 for stocks originating in northwestern British Columbia and southwest Yukon, namely the Alsek, Stikine and Taku Rivers.

This IFMP provides a broad context to the management of the Pacific salmon fishery in the Pacific Region and the interrelationships of all fishing sectors involved in this fishery. Section 1 provides a general overview of the fisheries, governance and overarching policies, frameworks and practices that guide fisheries management. Section 2 considers stock assessment, science and traditional knowledge. Section 3 summarizes shared stewardship arrangements to ensure long term sustainability. Section 4 reviews the economic, social and cultural importance of salmon to various sectors. Section 5 provides an overview of regional management issues and significant initiatives to address them. Broader objectives for fisheries management are outlined in Section 6 including conservation, international and domestic allocation objectives. Section 7 outlines the components of decision guidelines and how they are established through preseason planning. Section 8 summarizes the compliance plan of the Conservation and Protection program. Section 9 provides some insight into performance and evaluation criteria used in the eventual review of the effectiveness of this plan.

Appendices 1 to 3 of this IFMP provide the specific integrated fishing plans for each of the Transboundary River systems in addition to providing other information such as run outlooks, spawning escapement goals, decision guidelines and a post season review.

1.2 History

For thousands of years, the history, culture and economy of Canada's west coast have been inextricably linked to Pacific salmon. These magnificent fish have been an important part of the diet, culture and economy of First Nations people. More recently, salmon have supported a vibrant commercial fishing industry, vital to the establishment and well-being of many communities. Salmon, particularly chinook and coho, also play a key role in the recreational fishery.

1.3 Types of Fishery and Participants

This plan describes the management of First Nations (FN), recreational and commercial fisheries for Pacific salmon that inhabit watersheds that originate in north-western B.C. and flow into south-eastern Alaska. Management of fisheries in this area is guided by the

Transboundary Rivers Chapter 1 of Annex IV of the Canada-U.S. Pacific Salmon Treaty (PST) and recent interim arrangements agreed to by the Transboundary Rivers Panel that have been accepted by the Parties.

The transboundary (international) distribution of salmon stocks in this area requires that a cooperative approach to management is employed by Canada and the U.S. This document is intended to facilitate cooperative management, stock assessment, research and enhancement of Transboundary salmon stocks in the Alsek, Stikine and Taku rivers conducted by Fisheries and Oceans Canada (DFO), the Tahltan First Nation (TFN), the Taku River Tlingit First Nation (TRTFN), the Champagne & Aishihik First Nation (CAFN), Alaska Department of Fish and Game (ADFG) and the United States Department of Agriculture – Forest Service.

1.4 Location of Fishery

This IFMP is designed to describe the approach to fisheries in the Alsek, Stikine and Taku River watersheds (Transboundary Rivers). Locations of respective watersheds and fisheries are described in the introductory sections of Appendices 1-3 of this document.

1.5 Fishery Characteristics

Pacific salmon species covered in the plan include sockeye, coho, pink, chum and Chinook salmon. Fisheries include those undertaken by First Nations as well as recreational and commercial fisheries.

Section 35(1) of the Constitution Act, recognizes and affirms the existing Aboriginal and treaty rights of the Aboriginal peoples in Canada; however it does not specify the nature or content of the rights that are protected. In 1990, the Supreme Court of Canada issued a landmark ruling in the *Sparrow* decision. This decision found that the Musqueam First Nation has an Aboriginal right to fish for Food, Social and Ceremonial (FSC) purposes. The Supreme Court found that where an Aboriginal group has a right to fish for FSC purposes, it takes priority, after conservation, over other uses of the resource. The Supreme Court also indicated the importance of consulting with Aboriginal groups whenever their fishing rights might be affected.

Pre-season, DFO engages in a variety of consultation and collaborative harvest planning processes with First Nations at the community level, or at broader tribal or watershed levels. Fisheries are then authorized via a Communal Licence issued by the Department under the *Aboriginal Communal Fishing Licences Regulations*. These licences are typically issued to individual bands or tribal groupings, and describe the details of authorized fisheries including dates, times, methods, and locations of fishing. Licences and Aboriginal Fisheries Strategy (AFS) agreements (where applicable) include provisions that allow First Nations' designation of individuals to fish for the group and in some cases, vessels that will participate in fisheries.

Fishing techniques used in FSC fisheries are quite varied, ranging from traditional methods such as dip nets and traps to modern commercial methods such as gill nets fished from specialized vessels.

Separate from FSC fisheries, some First Nations have communal access to commercial opportunities as follows:

- Commercial fisheries access through communal commercial licences acquired through the Allocation Transfer Program (ATP). These licences are fished in a manner that is comparable to the general commercial fishery.
- Inland demonstration fisheries (e.g. Nass River and Skeena River) to date are supported through licences relinquished from the commercial salmon fleet from the ATP and Pacific Integrated Commercial Fisheries Initiative (PICFI) programs and private business arrangements from industry.
- At some enhancement facilities/sites, surplus stocks not required for conservation or enhancement purposes are made available to First Nations for food or for sale.

Fisheries and Oceans Canada regulates recreational fishing for Pacific salmon in both tidal and non-tidal waters. Anglers wishing to retain salmon taken from either tidal or non-tidal waters in B.C. must also have an appropriate salmon conservation stamp affixed to their valid recreational fishing licence. Part of the proceeds from the sale of stamps is used to fund salmon restoration projects supported by the non-profit Pacific Salmon Foundation. In the Yukon, besides having a Yukon Angling Licence, salmon anglers are also required to have a Salmon Conservation Catch Card.

Fishing techniques used in the recreational fishery largely focus on casting with bait, lures or artificial flies. Anglers most commonly fish from shore, however boats are used to access many fishing sites. Only barbless hooks may be used when fishing for salmon in British Columbia and in many areas of the Yukon.

Commercial salmon licences in the Transboundary rivers have been issued for two gear types: gill nets and fish wheels. Salmon gill nets are rectangular nets that hang in the water and are set from shore, or drifted in the current still attached to either the stern or bow of the vessel. Fish swim headfirst into the net, entangling their gills in the mesh. Altering mesh size and the way in which nets are suspended in the water affects efficiency and is sometimes used to reduce impacts on non-target species. Fish wheels are an active fish-capture device powered by the flow of water (current) past the wheel. The wheel mechanism is outfitted with large baskets and paddles attached to a frame that rotates on an axis mounted on a floating platform. As the wheel rotates, the baskets are successively dipped into the water and capture fish traveling upstream. The fish caught in the baskets fall into a holding tank where they are usually held live until removed.

Licence conditions and commercial fishing plans lay out allowable gear characteristics such as mesh size, net dimensions and the methods by which gear may be used.

1.6 Governance

Departmental policy development related to the management of fisheries is guided by a range of considerations that include legislated mandates, judicial guidance and international and domestic commitments that promote conservation, biodiversity and a precautionary, ecosystem-based approach to the management of aquatic resources. Policies were/are developed with considerable consultation from those with an interest in salmon management. While the policies themselves are not subject to annual changes, implementation details are continually refined where there is general support.

1.6.1 Sustainable Fisheries Framework

The Sustainable Fisheries Framework (SFF) comprises two main elements: (1) conservation and sustainable use policies; and, (2) planning and monitoring tools. It is a toolbox of existing and new policies for DFO to sustainably manage Canadian fisheries by conserving fish stocks while supporting the fisheries and industries that rely on healthy fish populations as much as practicable. The SFF provides planning and operational tools that allow these goals to be achieved in a clear, predictable, transparent, and inclusive manner, and provides the foundation for new conservation policies to implement the ecosystem and precautionary approaches to fisheries management. In fact, the development of IFMP's is a key component of the SFF.

For more information on the Sustainable Fisheries Framework and its policies, please visit: <http://www.dfo-mpo.gc.ca/fm-gp/peches-fisheries/fish-ren-peche/sff-cpd/overview-cadre-eng.htm>

1.6.2 Policy Framework for the Management of Pacific Salmon Fisheries

Salmon management programs continue to be guided by the following policies: *Canada's Policy for Conservation of Wild Pacific Salmon*, *An Allocation Policy for Pacific Salmon*, *Pacific Fisheries Reform*, *A Policy for Selective Fishing*, *A Framework for Improved Decision Making in the Pacific Salmon Fishery*, and the *Pacific Region Fishery Monitoring and Reporting Framework*.

Canada's Policy for Conservation of Wild Pacific Salmon (the Wild Salmon Policy or WSP) sets out the vision regarding the importance and role of Pacific wild salmon as well as a strategy for their protection. More information on this can be found in Section 5.1.1 of this plan or at: <http://www.pac.dfo-mpo.gc.ca/publications/pdfs/wsp-eng.pdf>.

An Allocation Policy for Pacific Salmon, announced in 1999, contains principles to guide the management and allocation of the Pacific salmon resource between First Nations, commercial and recreational harvesters, and forms the basis for general allocation objectives outlined in Section 6.3 of this plan. The *Allocation Policy for Pacific Salmon* can be found on-line at: <http://www.dfo-mpo.gc.ca/Library/240366.pdf>.

Pacific Fisheries Reform, announced by the Department in April of 2005, provides a vision of a sustainable fishery where the full potential of the resource is realized, Aboriginal rights and title are respected, there is certainty and stability for all, and fishery participants share

in the responsibility of management. Future treaties with First Nations are contemplated, as is the need to be adaptive and responsive to change. This policy direction provides a framework for improving the economic viability of commercial fisheries, and to addressing First Nations' aspirations with respect to FSC and commercial access and involvement in management.

The "*Vision for Recreational Fisheries in B.C 2009-20.*" was approved January 2010 by DFO, the Sport Fishing Advisory Board (SFAB) and the Province of B.C. Guided by this vision, an action and implementation plan is being developed to build upon the collaborative process established by the Federal and Provincial governments and the SFAB. The document can be found on the DFO Pacific Region website at: <http://www.pac.dfo-mpo.gc.ca/consultation/smon/sfab-ccps/docs/rec-vision-eng.pdf>.

In May 1999, the Department released *A Policy for Selective Fishing in Canada's Pacific Fisheries*. Under the Department's selective fishing initiative, harvester groups in the Pacific Region have experimented with a variety of methods to reduce the impact of fisheries on non-target species, with a number of measures reaching implementation in various fisheries. A copy of *A Policy for Selective Fishing in Canada's Pacific Fisheries* can be downloaded at: <http://www.pac.dfo-mpo.gc.ca/fm-gp/species-especes/salmon-saumon/pol/index-eng.html>.

1.6.3 First Nations and Canada's Fisheries

The Government of Canada's legal and policy frameworks identify a special obligation to provide First Nations the opportunity to harvest fish for food, social and ceremonial purposes. The Aboriginal Fisheries Strategy (AFS) was implemented in 1992 to address several objectives related to First Nations and their access to the resource. These included:

- improving relations with First Nations;
- providing a framework for the management of First Nation fisheries in a manner that is consistent with the 1990 Supreme Court of Canada's *Sparrow* decision;
- greater involvement of First Nations in the management of fisheries; and
- increased participation by First Nations in commercial fisheries.

The AFS continues to be the principal mechanism that supports the development of relationships with First Nations including the consultation, planning and implementation of fisheries, and the development of capacity to undertake fisheries management, stock assessment, enhancement and habitat protection programs.

In addition to fishing opportunities for FSC purposes, DFO acknowledges that in *Ahousaht Indian Band et al. v. Canada and British Columbia*, the courts have found that five Nuu-chah-nulth First Nations located on the West Coast of Vancouver Island - Ahousaht, Ehattesaht, Hesquiaht, Mowachaht/Muchalaht, and Tla-o-qui-aht – have “*aboriginal rights to fish for any species of fish within their Fishing Territories and to sell that fish, with the exception of geoduck*”. The Department is working with the First Nations pursuant to the rights found by the courts, to find “the manner in which their rights can be accommodated and exercised without jeopardizing Canada's legislative objectives and societal interests in regulating the fishery.”

As part of the reform of Pacific fisheries, DFO is looking for opportunities to increase First Nation participation in economic fisheries through an interest-driven business planning process. New planning approaches and fishing techniques may be required to ensure an economically viable fishery. In recent years, some First Nations' inland "demonstration fisheries" have occurred in order to explore the potential for inland fisheries targeting terminal runs of salmon. The Department is also working with First Nations and others with an interest in the salmon fishery to improve collaboration in the planning of fisheries and to improve fisheries monitoring, catch reporting and other accountability measures for all fish harvesters.

1.6.4 Pacific Integrated Commercial Fisheries Initiative

The Pacific Integrated Commercial Fisheries Initiative (PICFI) was announced in 2007 and is aimed at achieving environmentally sustainable and economically viable commercial fisheries, where conservation is the first priority, First Nations' aspirations to be more involved are supported and the overall management of fisheries is improved.

PICFI has supported fisheries reforms by targeting on the following outcomes:

1. greater stability of access for commercial harvesters through increasing FN participation in commercial fisheries;
2. increased compliance with fishing rules and greater confidence in catch data through: strengthened fisheries monitoring, catch reporting and enforcement; and improved collection and storage of catch information; and
3. collaborative management mechanisms for all harvest sectors, including the growing aboriginal commercial participants.

In its first 5 years, the Government of Canada committed \$175 million to implement the initiative. To continue to build on the progress achieved to date and to continue promoting the integration of commercial fisheries, Economic Action Plan 2014 announced a two year renewal, with resources of \$22.05M per year, of the Pacific Integrated Commercial Fisheries Initiative. The 2016/17 federal budget supported a one year renewal of the PIFCI program at the same funding level (\$22.05M) until March 31, 2017. Budget 2017 proposes to provide \$250 million over five years, and \$62.2 million ongoing, to Fisheries and Oceans Canada to renew and expand the successful Pacific and Atlantic integrated commercial fisheries initiatives and to augment Indigenous collaborative management programming.

1.6.5 Fishery Monitoring and Catch Reporting

A complete, accurate and verifiable fishery monitoring and catch reporting program is required to successfully achieve conservation, ecosystem and socio-economic and other management objectives. Across all fisheries, strategies are being developed to improve catch monitoring programs by clearly identifying information requirements and their supporting rationale for each specific fishery and evaluating the current monitoring programs to identify gaps. Managers and harvesters will annually work together to address those gaps. The Department finalized the "*Strategic Framework for Fisheries Monitoring and Catch Reporting in the Pacific Fisheries*" (the Framework) in the spring of 2012. The Framework outlines how consistent risk assessment criteria can be applied to each fishery

to determine the level of monitoring required, while allowing for final monitoring and reporting programs to reflect the fishery's unique characteristics.

More information is available at: http://www.pac.dfo-mpo.gc.ca/fm-gp/docs/framework_monitoring-cadre_surveillance/page-1-eng.html.

1.7 Consultation

Fisheries and Oceans Canada will continue to consult with First Nations and recreational and commercial harvesters through the Salmon Coordinating Committee (SCC) and/or other regional, Territorial (e.g. Yukon Salmon Subcommittee) and bilateral processes, to further co-ordinate fishing activities as the season unfolds.

Consultative elements of an Improved Decision Making discussion paper have been implemented through establishment of the Consultation Secretariat, which works to improve the flow of information between stakeholders and the Department. Up-to-date information pertaining to on-going consultations can be found on the Secretariat's website at: <http://www.pac.dfo-mpo.gc.ca/consultation/index-eng.htm>.

This plan incorporates the results of ongoing consultations and input from international and First Nation treaty processes, and local salmon management advisory committees. Consultation processes for Alek, Stikine and Taku salmon fisheries are described in respective Sections 4 of Appendices 1-3 of this document.

1.8 Approval Process

This plan is approved by the Pacific Region Director General of Fisheries and Oceans Canada.

2 STOCK ASSESSMENT, SCIENCE AND TRADITIONAL ECOLOGICAL KNOWLEDGE

2.1 Biological Synopsis

Pacific salmon include five species belonging to the genus *Oncorhynchus* family Salmonidae: pink (*O. gorbuscha*), chum (*O. keta*), sockeye (*O. nerka*), coho (*O. kisutch*) and Chinook (*O. tshawytscha*). The native range of Pacific salmon includes the North Pacific Ocean, Bering Strait, southwestern Beaufort Sea and surrounding fresh waters. They occur in an estimated 1300 -1500 rivers and streams in B.C. and Yukon; notably, the Yukon River, Skeena River and Nass River in the north, and the Fraser River in the south. In total, these rivers account for more than 75% of the total salmon numbers in the Region.

Pacific salmon are anadromous; salmon breed and spend varying portions of their life in fresh water, then travel to the ocean to feed until maturity before returning to freshwater to spawn. Physical characteristics, life histories and spawning habits vary from species to species. Total life spans range from two years (for pink) up to six or eight years (for some

sockeye and Chinook, respectively). Pacific salmon migrate into rivers and streams to spawn from spring to late fall; after courtship, eggs are released, fertilized and then buried in gravel. Both adults die after spawning. In mid-winter, the eggs hatch into alevins. In spring, the young emerge and stay in freshwater streams and lakes from 1 week to 2 years. Most then go to sea for 1-5 years, undertaking a large ocean-feeding migration, although sockeye have also developed a land-locked form (kokanee). In the ocean, the sockeye, pink and chum feed primarily on plankton and crustaceans such as tiny shrimp. Chinook and coho also eat smaller fish such as herring. At sea, the species attain the following average adult weights: 1-3 kg, pink; 5-7 kg, chum; 3.5-7 kg, coho; 2-4 kg, sockeye; 6-18 kg, Chinook (the largest recorded Chinook was 57.27 kg).

Pacific salmon complete their life cycle by returning to their natal stream to spawn, in many cases to the particular gravel bed where they were hatched. Homing of Pacific salmon to their natal stream is an important biological characteristic of salmon stocks. Each stock is genetically adapted to the environment in which it resides, and exhibits unique characteristics such as its life history, migration route, migration timing, and productivity. Sockeye and Chinook generally travel the farthest upstream to spawn; whereas, in B.C., chum, coho and pink salmon usually spawn closer to the sea. Chum and coho of the Yukon River undergo much longer upstream migrations.

The numbers of Pacific salmon returning to Canadian waters varies greatly from year to year and decade to decade, often with pronounced population cycles. For example, many sockeye salmon populations are very abundant every third or fourth year. This is seen most dramatically in the Fraser River, where the abundance of some populations in abundant years is many times larger than that of other years. Longer term cycles are also apparent, but less regular, and seem to be associated with changes in ocean conditions that affect survival during the feeding migration.

Chinook are the largest of the species and live the longest. Chinook migrate upstream from the spring through the fall as far as 1,500 kilometres inland in B.C., but up to 3,000 km in the Yukon. Chinook fry may go to sea soon after hatching or, after one to two years in freshwater. Chinook mature at age three to eight years. Jacks, defined as 2-year-old sexually mature adults that return to spawn, are common among Chinook, coho and sockeye salmon.

Adult coho generally return from mid to late summer and early fall. Most choose streams close to the ocean, although some journey as far as 1,500 kilometres inland in B.C. and more than 2,000 km in the Yukon. In contrast to other salmon, young coho fry remain in their spawning stream for a full year or two after emerging from the gravel. Their age at maturity is normally three to four years.

Sockeye generally spawn in streams with lakes in their watershed or in lakes. Young sockeye usually spend between one and three years in a lake before migrating to sea; whereas, fry produced from some mainstem spawning populations in the Transboundary rivers migrate to sea in the year of emergence. Juvenile sockeye move rapidly out of the estuaries and may migrate thousands of kilometres in the Gulf of Alaska and the North

Pacific where they feed. They return to their natal spawning stream at ages 3 to 6 years. Sockeye that live exclusively in fresh water are called kokanee.

In B.C., chum salmon generally spawn in the fall, usually in the lower tributaries along the coast and rarely more than 150 kilometres inland. However, some Yukon River fall chum salmon migrate well over 2,500 km to spawning grounds in the Yukon Territory, whereas very few summer chum migrate into Canadian portions of this watershed. Chum salmon generally mature at ages 3 to 5. Fry emerge in the spring and go directly to sea.

Pink salmon live only two years almost entirely in ocean feeding areas. Adults leave the ocean in the summer and early fall and usually spawn in streams not fed by lakes, a short distance from the sea. Fry migrate to the sea as soon as they emerge from the gravel.

All five Pacific salmon species are harvested in First Nations fisheries in coastal and inland areas. Coho and Chinook are the preferred species in the B.C. coastal mixed-stock recreational and commercial hook and line fisheries, and, to a lesser extent, are caught by gill and seine nets. Sockeye, pink and chum are harvested primarily by First Nations and commercial net fishers, but also in some recreational fisheries.

Salmon Life Cycle

Salmon deposit and bury their eggs in nests called redds, which are normally constructed in gravelly areas of stream/lake beds. Generally the size of gravel chosen depends on the size of the female parent. The embryos incubate and hatch within the redd and usually remain in the gravel until they have depleted their yolk supply and have become "buttoned-up". Embryo development rates and timing of fry emergence from the gravel is determined primarily by the water temperatures during incubation. Fry normally emerge in the spring and, depending on the species and the stock, can remain in streams or lakes from just a few hours up to two years prior to migrating to the ocean. Once at sea, the species undertake migrations of varying distance lasting up to several years (Figure 1). Within a species, different stocks can display markedly different migration patterns.

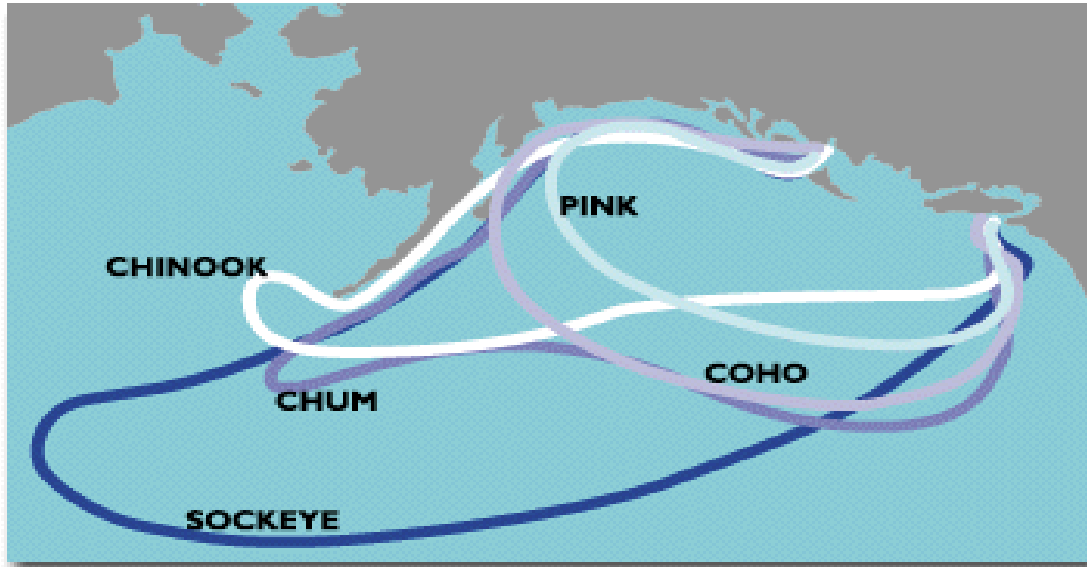


Figure 2. Typical ocean habitat of B.C. salmon in the Pacific Ocean. [from Agriculture & Agri-Food Canada, see: <http://www.ats.agr.gc.ca/sea-mer/4810-eng.htm>]

An example of the contrasts in some life history characteristics of salmon appears in Table 1 (from Haig-Brown Kingfisher Creek Restoration Project, 1998-99). Once the salmon have reached maturity in the ocean, they migrate back to their natal rivers. Only a fraction of eggs will result in adults which survive to deposit their eggs to continue the cycle.

Table 1. Summary of life history characteristics for five Pacific salmon.

	Coho <i>O. kisutch</i>	Sockeye <i>O. nerka</i>	Pink <i>O. gorbuscha</i>	Chum <i>O. keta</i>	Chinook <i>O. tsawytscha</i>
Season when eggs hatch	Spring	Spring	Spring	Spring	Spring
Length of stay in freshwater	1–2 years; 1 year is common.	1 month to 2 years.	Virtually none; often straight to ocean.	Virtually none; often straight to ocean.	1 to 2 years
Primary rearing habitat	Stream	Lake/stream	Estuary	Estuary	Stream
Size at ocean migration	10cm or more	Variable, 6.5 to 12cm	About 3.3cm	2.8 to 5.5cm	5 to 15cm
Ocean voyage	4–18 months	16–52 months	18 months	2 to 5 years	4 months to 5 years
Age at return to freshwater	During 2nd to 4th year.	During 3rd to 5th years	During 2nd year	During 3rd to 5th years.	During 2nd to 6th years.
Season/month of return	Late summer to January.	Midsummer to late autumn.	July to September	July to October	Spring to fall; some rivers support >one run.
#eggs/female	2,000–3,000	2,000–4,500	1,200–2,000	2,000–3,000	2k-17k (generally 5k-6k)
Preferred spawning area	Small streams	Near and in lake systems.	Close to ocean	Above turbulent areas or upwelling's.	Very broad tolerances

2.2 Ecosystem Interactions

As a consequence of their anadromous life history, salmon are sensitive to changes in both the marine and freshwater ecosystems. Salmon are an ecologically important species supporting vast food webs in oceanic, estuarine, freshwater and terrestrial ecosystems by providing nutrients every year during their return migration to the rivers and lakes to spawn.

DFO is moving away from management of salmon as a single species and moving towards an integrated ecosystem approach to science as called for in the *Wild Salmon Policy* (see Section 5.1.1).

For strategic planning and successful management of Pacific salmon, it will be essential to link variation in salmon production with changes in climate and ecosystems. Salmon productivity in the Pacific is clearly sensitive to climate-related changes in freshwater, estuary and ocean conditions. Historically, warm periods in the coastal ocean have coincided with relatively low abundances of salmon, while cooler ocean periods have coincided with relatively high salmon numbers. In the past century, most Pacific salmon populations have fared best in periods having high precipitation, deep mountain snowpack, cool air and water temperatures, cool coastal ocean temperatures, and abundant north-to-south “upwelling” winds in spring and summer.

The Department conducts programs to monitor and study environmental conditions. These programs include:

- the Georgia Strait Ecosystem Research Initiative:
<http://www.pac.dfo-mpo.gc.ca/science/oceans/detroit-Georgia-strait/index-eng.html>;
- the Fraser River Watershed Watch;
- monitoring of physical, biological and chemical characteristics of fresh and marine waters; and
- chlorophyll production and phytoplankton timing and abundance.

The annual State of the Oceans Report reports on changes in atmospheric and oceanic conditions which have the potential to affect Pacific salmon populations and informs science-based decision-making and DFO’s management of fisheries and marine resources in the Pacific Region (see: <http://www.dfo-mpo.gc.ca/science/coe-cde/soto/index-eng.asp>). The International Programme on the State of the Oceans (IPSO) also produces status reports, the most recent of which was in 2013. This report identifies a serious deterioration in the state of the oceans (e.g. acidification) as a result of climate change and other anthropogenic stressors (see: <http://www.stateoftheocean.org/science/state-of-the-ocean-report/>).

2.3 Aboriginal Traditional Knowledge/Traditional Ecological Knowledge

Both Aboriginal Traditional Knowledge (ATK) and Traditional Ecological Knowledge (TEK) are cumulative knowledge gathered over generations and encompass regional, local cultural and spiritual connections to ecosystems and all forms of plant and animal life.

ATK is knowledge held by Aboriginal peoples and First Nation (FN) communities, while TEK is local knowledge held by Aboriginal and non-Aboriginal people and communities, including industry, academia, and public sectors. While qualitatively they may be different, both represent cumulative knowledge that may be gathered over many generations and can be regionally and/or locally specific, and can often be utilized to inform and improve the management process, and the foundation upon which it is based.

The growing awareness of the value of ATK and TEK is reflected in the increasing requirements for both to be included in environmental assessments, co-management arrangements, species at risk recovery plans, and coastal management decision-making processes. ATK and TEK may inform and fill knowledge gaps related to the health of salmon stocks and to aid decision making related to development and resource use. Government and the scientific community acknowledge the need to access and consider ATK and TEK in meaningful and respectful ways. However, the challenge for resource managers is how to engage knowledge holders and how to ensure that the information can be accessed and considered in a mutually acceptable manner, by both knowledge holders, and the broader community of First Nations, stakeholders, managers, and policy makers involved in the fisheries.

As summarized in Section 1.6.3, the Aboriginal Fisheries Strategy supports the development of relationships with First Nations including planning of fisheries, and stock assessment, fisheries management, enhancement and habitat protection programs. Consultations associated with these activities improve information-sharing including TEK, ATK and scientific knowledge among Aboriginal communities, DFO and stakeholders.

The Wild Salmon Policy (WSP) acknowledges the importance of integrating ATK and TEK into the strategic planning process and the Department is exploring best practices to develop an approach for incorporating ATK and TEK into WSP integrated planning. The Department will also consider identifying potential partnerships with First Nation organizations to develop an approach for integrating ATK into WSP, particularly in planning initiatives.

The federal Species at Risk Act (SARA) makes a special reference to the inclusion of Traditional Knowledge in the recovery of species at risk. The Department has developed an operational guidance document for SARA practitioners (*Guidance on Considering Traditional Knowledge in Species at Risk Implementation, 2011*). Aboriginal groups have participated in the development and implementation of species recovery strategies, e.g. Interior Fraser River coho salmon, and Cultus and Sakinaw sockeye salmon.

An example of TEK utilization in the Transboundary Rivers Area was the successful location of principal salmon spawning sites on the Stikine and Taku rivers. Some of these sites now serve as key index areas for assessing the current run strength and to compare and complement historical run size estimates to these index areas. For example, enumeration weirs at Tahltan Lake and Little Tahltan River have been operated since 1959 and 1985, respectively – sites that were selected based on TEK shared with government agencies.

2.4 Stock Assessment

Salmon stock assessment is primarily concerned with providing scientific information for conservation and management of salmon resources. Stock assessment describes the past and present status of salmon stocks and forecasts future status of stocks under different scenarios. Stock assessment programs contribute information to the fisheries management process, from the setting of biologically based objectives (and policies) to providing expert advice in the implementation of management plans. Stock assessment information also supports First Nation and associated Treaty obligations, integrated ocean management planning, development of marine and freshwater protected areas, protection and recovery of species at risk, and international Treaty obligations and negotiations.

Historically, stock assessment has primarily focused on population dynamics of individual exploited stocks, the biological and population processes such as growth, reproduction, recruitment and mortality. As DFO moves to implementation of the WSP and an ecosystem approach, populations must be considered in a broader context and all activities impacting status, not just fishing, must be considered. For example, programs are required to monitor ecosystem status, species interactions, variations in conditions in freshwater and marine environments and biodiversity.

In the Pacific Region, salmon stock assessment advice is provided through the Stock Assessment Section of the Salmon and Freshwater Ecosystem Division.

In order to standardize stock monitoring, determination of status, and development of benchmarks and management strategies to achieve them, the Stock Assessment Section has championed the development of the *Salmon Stock Assessment Framework* which is shaped by the WSP. Further information about this framework and its tie to the WSP is provided in Section 5.1.1.

The vast number of stocks and the complex life cycle of salmon present substantial assessment and management challenges. Stock assessment activities are largely project based and are required on a continual basis because populations are dynamic and subject to shifts in productivity and abundance in response to environmental, biological, and human-induced factors. Responsible management requires continual updating of assessment information and advice. Scientists use a variety of techniques to generate estimates and forecasts of abundance (enumeration of juvenile “recruits”, females or adults on the spawning grounds, tagging and mark recapture studies, etc.). For most species, several methods may be used to generate the estimates and forecasts of abundance.

External partners and clients play an increasing role in delivery of the stock assessment activities. Some First Nations, community groups, recreational and commercial harvesters contribute directly through data collection and reporting. Universities and non-government organizations (NGOs) are active in the analytical and peer review elements. Stock assessment staff collaborate with other regional, national and international organizations and government agencies, and conduct numerous cooperative and/or joint programs. For example, many of the Transboundary river stock assessment programs are conducted jointly with local First Nations and ADFG.

The Centre for Science Advice Secretariat (CSAS) serves as the primary departmental forum for peer review and evaluation of scientific research and literature, including TEK, on wild Pacific salmon. CSAS fosters national standards of excellence and coordinates the peer review of scientific assessments and advice for the DFO in the Pacific region. This review body allows for participation by outside experts, First Nations, fisheries stakeholders and the public. CSAS also coordinates communication of the results of the scientific review and advisory processes. The peer review meeting schedule, reports on the status of salmon, environmental and ecosystem overviews, and research documents are available from the CSAS web site: <http://www.dfo-mpo.gc.ca/csas-sccs/index-eng.htm>.

2.5 Information Sources

DFO relies on a number of information sources in the preparation of IFMPs. Annually, DFO provides a preliminary qualitative outlook of status for salmon management units, the Salmon Outlook, for planning purposes prior to formal forecasts of abundance. The Outlook is available on the DFO website: http://www.pac.dfo-mpo.gc.ca/fm-gp/species-especies/salmon-saumon/outlook-perspective/salmon_outlook-perspective_saumon-2015-eng.html. Formal salmon abundance forecasts are generally completed by April.

DFO is continuing to implement WSP Strategy 1.2, determination of biological benchmarks and assess status. Benchmarks for Fraser Sockeye Conservation Units were developed in 2010 and their status was reviewed in 2011 both through CSAS Regional Peer Review (RPR) processes. DFO completed a CSAS RPR review of WSP benchmarks and status for Southern BC Chinook in February 2014 and an assessment of WSP benchmarks and status for Interior Fraser Coho in November 2014. The review of estimates of a biologically-based spawning goal and biological benchmarks for Taku coho salmon was also completed in November 2014: http://www.dfo-mpo.gc.ca/csas-sccs/publications/resdocs-docrech/2015/2015_048-eng.html. Work is ongoing to develop a habitat based approach to determine benchmarks for Strait of Georgia and Lower Fraser River.

Additional information about CSAS, the CSAS schedule of RPRs and publications can be found at <http://www.dfo-mpo.gc.ca/csas-sccs/index-eng.htm>.

The number of salmon returning to spawn in a river, called “escapement”, has long been an important stock assessment measure of abundance. Salmon escapement data are now available from the Government of Canada Open Data portal at: <http://open.canada.ca/data/en/dataset/c48669a3-045b-400d-b730-48aafe8c5ee6>.

In addition to the above, important sources of fishery, catch and escapement information and Canada/U.S. management and enhancement plans for Transboundary salmon stocks are reports prepared by the Transboundary Technical Committee of the Pacific Salmon Commission (see: http://www.psc.org/publications_tech_techcommitteereport.htm).

2.6 Precautionary Approach

Generally, science advice to fisheries management considers data quality and incorporates uncertainty (i.e. stock status forecasts presented as a statistical distribution rather than point estimate). WSP benchmarks of biological status will inform the continuation of the precautionary approach to management of salmon resources. Decisions on recovery and fisheries objectives will be made as part of the Strategic Planning Process described under WSP Strategy 4. To date benchmarks have been reviewed for Southern BC chinook, Interior Fraser River coho, and Fraser sockeye CUs. Until benchmarks are determined for each CU, DFO must rely on indicators of status and existing species and stock-specific constraints established for escapement goals and harvest rates by domestic (e.g. Interior Fraser Coho Conservation Strategy, Cultus Lake Sockeye Conservation Strategy) and international (e.g. Pacific Salmon Treaty) processes.

2.7 Research

An overview of the science & research in the Pacific Region is available on the regional website: <http://www.pac.dfo-mpo.gc.ca/science/index-eng.html>.

Current research projects on salmon and environmental and human induced factors affecting status include:

- Climate change impacts on Pacific salmon are being investigated by multiple sectors within DFO and in collaboration with external partners: university, other organizations and agencies. In 2011, DFO implemented a science-based climate change program focused on adaptation in decisions and activities to consider the vulnerabilities, risks, impacts, and opportunities associated with a changing climate. More information is available at: <http://www.pac.dfo-mpo.gc.ca/science/oceans-eng.html>.
- An example of this work is the Aquatic Climate Change Adaptation Services Program (ACCASP) which has an emphasis on the development of new science knowledge to support the development of adaptation tools and strategies that will enable the integration of climate change considerations into the delivery of the Department's programs and policies. More information on this program is available at: <http://www.dfo-mpo.gc.ca/science/oceanography-oceanographie/accasp/index-eng.html>.
- Salmon in Regional Ecosystems (SIRE) program investigates the mechanisms controlling recruitment variations and changes in productive capacity of salmon stocks within freshwater and/or marine ecosystems.
- Ongoing research related to improving forecasting ability for salmon stocks and CU's is being conducted by DFO Stock Assessment and the Fisheries & Oceanography Working Group. The annual State of the Pacific Ocean Report is published by the Canadian Science Advisory Secretariat (CSAS) and is available at: <http://www.dfo-mpo.gc.ca/science/coe-cde/soto/report-rapport-2012/index-eng.asp>.
- The Fraser River Environmental Watch program provides scientific advice on the impact of different environmental factors on the migration success of Pacific salmon in fresh water. For further information see: <http://www.pac.dfo-mpo.gc.ca/science/habitat/frw-rfo/index-eng.html>.

- DFO scientists in collaboration with other organizations (North Pacific Anadromous Fish Commission (NPAFC), Pacific Salmon Commission (PSC)) are studying salmon production, distribution and survival in the North Pacific.
- Annual juvenile salmon surveys monitor the distribution and survival of salmon in their early marine life history.
- On-going collaborative research between DFO and the aquaculture industry to investigate the interactions between wild and cultured salmon through the Program for Aquaculture Regulatory Research (PARR) and Aquaculture Collaborative Research and Development Program (ACRDP).
- In the sentinel stocks program, spawning escapements for natural Chinook salmon stocks in Northern B.C. (Skeena and Nass rivers), Fraser River, and West Coast of Vancouver Island are being closely monitored to provide critical information and assessment of the salmon resource as part of the 2008 Pacific Salmon Treaty Agreement.

3 SHARED STEWARDSHIP ARRANGEMENTS

Stewardship refers to the care, supervision or management of something, especially the careful and responsible management of something entrusted to one's care.¹ First Nation culture recognizes the importance of stewardship and responsibility to care for salmon, a responsibility which has been handed down over time. Part of this stewardship responsibility is to ensure that salmon are available for future generations (for example, see: <http://www.ictinc.ca/blog/seventh-generation-principle>). Through their fishing activities, First Nation communities are able to maintain a physical, spiritual and cultural linkage to the salmon and gain knowledge of the salmon stock's abundance and health. This continued awareness allows First Nation people to contribute to, and support the development of, effective management strategies through the provision of information on local and regional observations.

In the context of fisheries management, stewardship is often considered in terms of "shared stewardship", whereby First Nations, fishery participants and other interests are effectively involved in fisheries management decision-making processes at appropriate levels, contributing specialized knowledge and experience, and sharing in accountability for outcomes.

Moving toward shared stewardship is a strategic priority for DFO. This is reflected in a number of policies and initiatives, including the Wild Salmon Policy (WSP), the Resource Management Sustainable Fisheries Framework (SFF), Fisheries Reform, Aboriginal Aquatic Resource and Oceans Management (AAROM) Program and the Aboriginal Fisheries Strategy (AFS).

Also referred to as "co-management," DFO is advancing shared stewardship by promoting collaboration, participatory decision making and shared responsibility and accountability with resource users and others. Essentially, shared stewardship means that those involved

¹ As defined in the Atlantic Fisheries Policy Review (AFPR): http://www.dfo-mpo.gc.ca/afpr-rppa/home_e.htm

in fisheries management work cooperatively—in inclusive, transparent and stable processes—to achieve conservation and management goals.

In Pacific Region, DFO consults with and engages First Nations and other interests through a wide range of bilateral and “integrated” (multi-interest) advisory processes, management boards, technical groups and roundtable forums. For salmon, the focal point for DFO’s engagement with First Nations, the harvest sectors and environmental interests is around the development and implementation of the annual IFMP. At a broad, Province-wide level, the Integrated Harvest Planning Committee (IHPC) brings together First Nations, commercial and recreational harvesters, and environmental interests to review and provide input on the draft Southern and Northern Salmon IFMPs, as well as coordinate fishing plans and (where possible) resolve potential issues between the sectors. The IHPC also meets post-season to review information regarding stocks and fisheries, and implementation of those IFMPs. For the Transboundary IFMP, consultation and input is primarily accomplished through individual watershed-based management committees, meetings with First Nation’s and/or the Yukon Salmon Sub-committee (as described in Section 4 of Appendices 1-3).

DFO consults with Aboriginal groups when fisheries management decisions may potentially affect them in accordance with S. 35 of the *Constitution Act, 1982*, relevant case law, and with Departmental policies and considerations. In addition to supporting good governance, sound policy and effective decision-making, Canada has statutory, contractual and common law obligations to consult with Aboriginal groups. For example, The Crown has a legal duty to consult and, if appropriate, accommodate, when the Crown contemplates conduct that might adversely impact section 35 rights (established or potential). (Source: *Aboriginal Consultation and Accommodation: Interim Guidelines for Federal Officials to Fulfill the Legal Duty to Consult*, February 2008).

Consultation and engagement with First Nations takes place at a number of levels and through a variety of processes. For example, a significant amount of consultation and dialogue takes place through direct, bilateral meetings between DFO and First Nations at a local level. This can include specific engagement on a draft IFMP or other issues during the pre-season, in-season or post-season. In addition to consultations at the local level, DFO works with First Nations at the aggregate or watershed level. For example, the Aboriginal Aquatic Resource and Oceans Management (AAROM) program supports Aboriginal groups in coming together to participate effectively in advisory and decision-making processes used for aquatic resource and oceans management.

Other processes, such as the First Nations Salmon Coordinating Committee (SCC) and the Forum on Conservation and Harvest Planning, are being developed in order to facilitate dialogue between First Nations and DFO. In the case of the First Nations SCC, First Nations representatives from 13 geographical areas within B.C. meet with DFO resource management staff to discuss priority issues among B.C. First Nations as they relate to salmon. SCC priorities include advancing First Nations concerns related to salmon, access to salmon for FSC needs across the province and working to improve First Nations commercial opportunities in salmon fisheries.

In addition to integrated dialogue through the IHPC, the Department also works directly with the commercial and recreational sectors, largely through the Commercial Salmon Advisory Board (CSAB) and Sport Fishing Advisory Board (SFAB), respectively. The Department also officially consults with the Marine Conservation Caucus, an umbrella group representing eight core environment groups.

4 ECONOMIC SOCIAL AND CULTURAL IMPORTANCE

The intent of this section is to provide a socio-economic review of the salmon fishery in British Columbia. In future years, more information on the social and cultural context of the various fisheries can be added, where available. This summary addresses salmon in the context of the Aboriginal food, social, and ceremonial fishery, the Aboriginal communal commercial fishery, the recreational and commercial fishing sectors, and the processing sector. DFO recognizes the unique values of each of the fisheries described here. The overview provided in this profile is intended to help build a common understanding of the socio-economic dimensions of each fishery rather than compare the fisheries.

4.1 Aboriginal Participation

Generally, DFO manages aboriginal fisheries to provide access for both food, social, and ceremonial (FSC) and for commercial purposes. With respect to fishing for FSC purposes, DFO manages this fishery to ensure that after conservation needs are met, the FSC fishery has priority over other fisheries. DFO seeks to provide priority for the FSC fishery in order to ensure that its management is consistent with the Supreme Court of Canada decision in *R. v. Sparrow*, and subsequent case law, which specify that where there is an aboriginal right to fish for FSC purposes, this fishery must be given priority over other uses.

First Nation people in the Alsek, Taku and Stikine watersheds have depended on the salmon as a key food source for countless generations. To this day, First Nation people continue to utilize and rely on salmon as a key resource that is fundamental to their culture, lifestyle and well-being.

Fisheries chapters in modern First Nation treaties may articulate a treaty fishing right for FSC purposes that could be protected under Section 35 of the Constitution Act, 1982. Commercial access may be provided either through the general commercial fishery or a Harvest Agreement, which is negotiated at the same time as the treaty and is referenced in the treaty, but is not protected under the Constitution Act.

Four modern treaties (Nisga'a Final Agreement, Tsawwassen First Nation Final Agreement (TFA), Maa-nulth First Nations Final Agreement (MNA) Tla'amin Final Agreement) have been ratified in British Columbia. In the Yukon, the Umbrella Final Agreement (UFA) between the Government of Canada, the Council for Yukon Indians and the Government of the Yukon was signed in May 1993.

Subsequent to this, the following Final and Self-Government Agreements have been reached with 11 of the 14 Yukon First Nations:

- Champagne and Aishihik First Nations (1995);
- Teslin Tlingit Council (1995);
- First Nation of Na-Cho Nyäk Dun (1995);
- Vuntut Gwitchin First Nation (1995);
- Little Salmon/Carmacks First Nation (1997);
- Selkirk First Nation (1997);
- Tr'ondëk Hwëch'in (1998);
- Ta'an Kwäch'än Council (2002);
- Kluane First Nation (2004);
- Kwanlin Dün First Nation (2005);
- Carcross/Tagish First Nation (2006).

Besides articulating a treaty right to food, social and ceremonial harvest of fish, these agreements describe the role for First Nations in fisheries management.²

The remaining Yukon First Nations (Liard First Nation, Ross River Dena Council, and White River First Nation) have not settled land claims and remain Indian Bands under the federal *Indian Act*.

Where requests are put forward by First Nations for changes in FSC access arrangements, these are evaluated against a common set of criteria. FSC access should reflect some balance between the diversity and abundance of resources that are locally available, community needs and preferences, and operational management considerations. The department's operational approach and criteria can be found online at: <http://www.pac.dfo-mpo.gc.ca/consultation/fn-pn/fnfc-2014/docs/aboriginal-fishing-peches-autochtones-eng.pdf>.

AFS agreements serve as a guide for DFO and First Nations on the collaborative management of First Nations fisheries, and support a range of fishery co-management arrangements. Currently the Pacific Region accounts for roughly two-thirds of these agreements Canada-wide. In 2017-18 DFO administered 85 AFS agreements, representing 164 First Nations that contain provisions relating to salmon management including, but not limited to, FSC fishery arrangements in British Columbia and Yukon.

In addition to AFS, the Aboriginal Aquatic Resources and Oceans Management (AAROM) program has been implemented to fund aggregations of First Nation groups to build the capacity required to coordinate fishery planning and program initiatives. AAROM is focused on developing affiliations between First Nations to work together at a broad watershed or ecosystem level where there are common interests and where decisions and solutions can be based on integrated knowledge of several Aboriginal communities. In the conduct of their activities, AAROM bodies are working to be accountable to the communities they serve, while working to advance collaborative relationships between

² Details of the Yukon Umbrella Final Agreement and Yukon First Nation Final Agreements can be found at: <http://www.eco.gov.yk.ca/landclaims/about.html>. The Nisga'a Final Agreement can be found at <http://www.ainc-inac.gc.ca/al/lcdc/ccl/fagr/nsga/nis/nis-eng.asp>. Details of the TFA and MNA agreements can be found on the B.C. Treaty Commission website at www.bctreaty.net.

member communities, DFO and other interests in aquatic resource and oceans management.

4.2 Recreational Sector

Recreational fishing for salmon may occur to provide food for personal use, as a leisure activity, or as a combination of the two. These activities provide a range of benefits to the participants as well as contribute directly and indirectly to the economy.

In the Pacific Region, according to the 2010 Survey of Recreational Fishing in Canada (http://www.dfo-mpo.gc.ca/stats/rec/can/2010/RECFISH2010_ENG.pdf), and as summarized in Table 2 below, nearly \$1.3 billion was estimated to have been spent in direct expenditures, and major purchases or investments wholly attributable to recreational fishing in 2010.

Table 2. Estimated value of direct and indirect expenditures in the 2010 recreational fishery

Jurisdiction	Estimated value (millions\$) of direct expenditures, and major purchases/investments wholly attributable to recreational fishing by all anglers in 2010
B.C. – freshwater	\$572.2
B.C. – tidal waters	\$705.8
Yukon	\$21.2
Total for Region	\$1,299.2

[note: based on the 2010 Survey of Recreational Fishing in Canada].

The Survey of Recreational Fishing in Canada provides an estimate of individual expenditures and investment for recreational fishing. Historically, the combined tidal and freshwater fisheries of B.C. constituted the second largest recreational fishery in Canada in terms of direct and package expenditures, and third largest in terms of investments. While resident anglers have the largest expenditures, recreational fishing by non-residents contributes significantly to the Provincial and Territorial economies. In 2010, non-resident (“Canadian non-resident” plus “other non-residents”) direct expenditures, including fishing packages and investments, totalled \$143 million in B.C. (Table 3). This number understates the contribution of non-resident tidal water anglers, however, as it only includes expenditures directly attributable to their fishing experience³. Fishing opportunities in B.C.’s tidal waters draw Canadian and international tourists to the province: of 47,269 non-resident anglers surveyed in 2010, 40% reported that they would not have come to British Columbia at all if there had been no opportunities for tidal water angling⁴. A further 19% would have shortened their stay in the province.

Table 3 (below) shows the expenditures by resident and non-resident anglers from 2000 to 2010, adjusted to reflect constant 2010 dollars. Though recreational fishing continues to be

³ British Columbia’s Fisheries and Aquaculture Sector (2007) reports that non-resident participants in recreational tidal water fishing also spend money on, for example, shopping, cultural events and attractions (such as museums and the theatre), and sightseeing at locations other than where they go fishing.

⁴ This can be further broken down into Canadian non-residents and international non-residents.

Opportunities for tidal water recreational fishing are more important to international visitors: 47% of them

important to the B.C. economy, the rate of growth is slowing: total expenditures and investments grew by nearly 15% from 2000 to 2005, but by only 1.82% from 2005 to 2010. This slowdown is due mainly to a drop in visits (and therefore expenditures) to B.C. by non-resident anglers, particularly other (i.e. international) non-resident anglers whose total expenditures in B.C. dropped by 47% between 2005 and 2010. Expenditure on fishing packages by resident anglers has increased considerably over the past decade; in real terms, it increased by over 135% between 2000 and 2010 and B.C. residents are now the primary consumers of fishing trip packages in the province. North Coast salmon are a significant draw for fishing lodges and other businesses offering fishing packages, accounting for 42% of package expenditures in 2010⁵.

Table 3. Recreational Fishing Direct and Package Expenditures and Investments In B.C.

	2000			
	Direct Expenses*	Packages	Investments	Total
Resident	\$ 132,541,159.85	\$ 21,316,825	\$ 238,863,192	\$ 392,721,177
Canadian nonresident	\$ 28,954,992	\$ 24,803,927	\$ 29,504,129	\$ 83,263,048
Other nonresident	\$ 62,584,071	\$ 51,397,057	\$ 14,775,795	\$ 128,756,923
Total	\$ 224,080,223	\$ 97,517,809	\$ 283,143,116	\$ 604,741,147
	2005			
	Direct Expenses	Packages	Investments	Total
Resident	\$ 157,375,516.04	\$ 44,316,442	\$ 274,110,155	\$ 475,802,113
Canadian nonresident	\$ 35,432,857	\$ 41,459,989	\$ 13,025,827	\$ 89,918,674
Other nonresident	\$ 50,783,457	\$ 68,195,312	\$ 8,509,694	\$ 127,488,463
Total	\$ 243,591,830	\$ 153,971,744	\$ 295,645,676	\$ 693,209,250
	2010			
	Direct Expenses	Packages	Investments	Total
Resident	\$ 197,927,777	\$ 50,135,233	\$ 314,717,439	\$ 562,780,448
Canadian nonresident	\$ 32,843,079	\$ 24,942,920	\$ 18,536,662	\$ 76,322,661
Other nonresident	\$ 33,003,549	\$ 28,721,219	\$ 4,992,473	\$ 66,717,241
Total	\$ 263,774,405	\$ 103,799,372	\$ 338,246,574	\$ 705,820,350

[Source: Survey of Recreational Fishing in Canada, multiple years]

The present-day economic value of recreational salmon fisheries in the Alsek, Stikine and Taku river systems is difficult to quantify due to limited available information. Economic benefits from the recreational fishers include, but are not limited to the purchase of: angling licences, Salmon Conservation Catch Cards (in Yukon), Salmon Conservation Stamps (in British Columbia), angling and camping equipment, accommodation and travel / air charter services. In addition to economic benefits, recreational fishing also has added social and cultural benefits as it is considered a tradition and lifestyle for many people. Fishing provides people with the opportunity to interact with the natural environment and increases their awareness of salmon resources. The increased awareness is commonly associated with an enhanced sense of stewardship as well as determining the overall social value.

⁵ DFO Internal analysis

Additional information on the history and vision for recreational fisheries can be found in the document: “*A Vision for Recreational Fisheries in British Columbia 2009-2013*”: <http://www.pac.dfo-mpo.gc.ca/consultation/smon/sfab-ccps/docs/rec-vision-eng.pdf>.

4.3 Commercial Sector

In B.C., the salmon fishery is a limited access, competitive fishery⁶; however, several parts of the fishery operate under individual quotas. Since 2005, five areas using seine, troll and gill net troll gear participated in demonstration fisheries with alternative implementations of individual quotas or pooling arrangements. In addition, there have been several commercial First Nations’ Economic Opportunity and Demonstration Fisheries in inland areas. Commercially-harvested salmon supports B.C.’s seafood processing sector, much of which is ultimately exported, bringing new money into the province. The B.C. central statistics agency (BC Stats) estimates that the commercial salmon fishery directly contributed \$15.2 million to the gross domestic product (nominal) in 2011 (BC Stats, 2013⁷).

During the last decade, wild salmon contributed an average of 12% of the landed value and 10% of the volume of B.C. wild caught seafood. In 2014 dollars, the value ranged from a high of \$121 million in 2014, to a low of almost \$23.4 million in 2008 (Figure 2 below). BC-wide, sockeye salmon was the most important species in terms of landed value, followed by Chinook and then chum salmon.

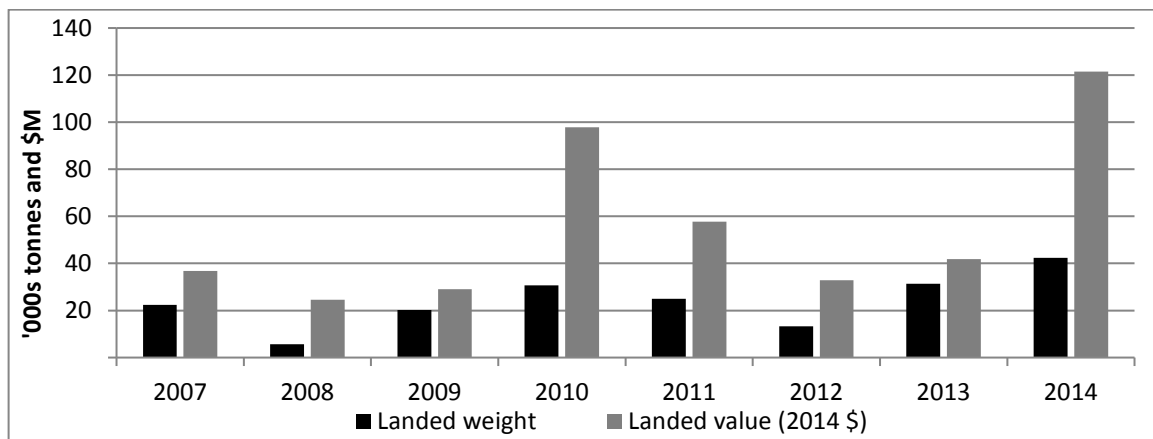


Figure 3. Pacific Region wild salmon harvest and landed value (2014 dollars).

(Source: Logbook and DFO catch estimates. Note that pre and post 2011 data is not directly comparable as from 2007 to 2011 data represents A-H fisheries and from 2012 to 2014 the data also includes test, demo and inland fisheries. DFO prices estimates are based on sale slips and BC Seafood Year in Review). Note: “wild salmon” here refers to salmon (species combined) harvested by commercial fisheries and does not include aquaculture production.

⁶ Other names for this style of fishery include derby and Olympic style fishery.

⁷ BC Stats (2013). British Columbia’s Fisheries and Aquaculture Sector, 2012 edition. Prepared for the Department of Fisheries and Oceans by BC Stats.

Commercial fishing is a significant source of income for fishers on both the Stikine and Taku rivers. More than 2.7 million salmon have been harvested through the commercial salmon fisheries on the Stikine and Taku rivers since their inception in 1975 and 1979, respectively. Many fishers choose to participate in these fisheries in pursuit of the wilderness and independent lifestyle they offer. Fishers may also derive benefits from the social aspects of the fishery, such as interactions with other fishers and fishery managers.

4.4 Processing Sector

Since 2000, salmon accounted for an average of 25% of the total wholesale value from seafood processing in B.C.⁸. Processing wild caught salmon provided about 1,400 positions in 2011, or about 30% of the B.C. total⁹. A 2008 report estimates that approximately 80% of this employment was to process domestic landings, with processing occurring primarily in the Greater Vancouver (47%) and the Skeena-Queen Charlotte (38%) regional districts.¹⁰ Primarily due to logistics (lack of ground transportation) and transportation costs, most processing of commercially harvested Transboundary salmon occurs in facilities in southeast Alaska where deliveries of fresh-caught salmon can be made via boat. However, some fresh product is either transported by aircraft or boat, and then trucked to local population centres for sale in northern B.C. and Yukon (e.g. Whitehorse, Atlin, Dease Lake).

5 MANAGEMENT ISSUES

5.1 Conservation

Given the importance of Pacific salmon to the culture and socio-economic fabric of Canada, conservation of these stocks is of utmost importance. In order to achieve this, specific actions are taken to not only ensure protection of fish stocks, but also freshwater and marine habitats. Protecting a broad range of stocks is the most prudent way of maintaining biodiversity and genetic integrity.

Management of a natural resource like salmon has a number of inherent risks. Uncertain forecasting, environmental and biological variability exacerbated by climate change, dynamic and evolving geomorphic features, as well as changes in harvester behavior, all add risks that can threaten conservation. Accordingly, management actions will be precautionary and risks will be specifically evaluated where possible.

5.1.1 Wild Salmon Policy

The goal of *Canada's Policy for Conservation of Wild Pacific Salmon (WSP)*, which was released in 2005, is to restore and maintain healthy and diverse salmon populations and

⁸ British Columbia Seafood Industry Year in Review. Various years. BC Ministry of Environment.

⁹ BC Ministry of Environment. 2011. 2008 British Columbia Seafood Processing Employment Survey Results. <http://www.env.gov.bc.ca/omfd/fishstats/proc/employ-05.html>

¹⁰ Fraser and Associates. 2008. Linkages Between the Primary Fish Production and Fish Processing Sectors in British Columbia.

their habitats for the benefit and enjoyment of the people of Canada in perpetuity. Consistent with the Policy, the Department has taken an incremental approach to WSP implementation, with the focus in the first years principally on the development of technical methods and tools to support the identification and assessment of salmon conservation units, supplemented by more modest efforts to assess habitat and ecosystems as part of integrated strategic planning pilots in key areas.

Currently, the Department is preparing a new Wild Salmon Policy Implementation Plan. This will allow better alignment with recent changes to legislation and programs such as changes to the Fisheries Act in 2012, implementation of the Fisheries Protection Program, and release of the Sustainable Fisheries Framework, as well as increased knowledge with respect to wild Pacific salmon. In addition, recommendations from the Cohen Commission of Inquiry into the Decline of Sockeye Salmon in the Fraser River (2012) and an independent review of the WSP by Gardner Pinfold (2011) will be considered. The Department's intention is to continue engaging First Nations and stakeholders on this work.

The *Salmon Stock Assessment Framework*, mentioned previously in Section 2.4 of this document, is shaped by the WSP Strategy 1 which specifies requirements for standardized monitoring, status and management predicated on benchmarks. Strategy 1 identifies three elements:

- WSP Strategy 1 provides a standardized process for organizing Pacific salmon into Conservation Units (CUs), groups of wild salmon living in an area that are sufficiently isolated from other wild salmon such that the area is unlikely to be recolonized naturally in an acceptable period of time if they are extirpated. Scientists have grouped the greater than 9,600 Pacific salmon stocks into 457 discreet Conservation Units.
- DFO has developed criteria to assess CUs and has identified a range of metrics for setting upper and lower CU benchmarks of status, dependent on data quality and availability (Holt et al 2009)¹¹. For each metric, lower and upper benchmarks will delimit three status zones of a CU. Management actions will be determined based on a CU's biological status relative to these benchmarks. Management will focus on conservation measures for CUs in the red zone (below the lower benchmark), shift to cautionary management in the amber zone (between the lower and upper benchmark), and emphasize sustainable use in the green zone (above the upper benchmark).
- A key requirement of the WSP is ongoing monitoring and assessment of the status of wild salmon CUs. Monitoring wild salmon status in a cost-effective manner poses a challenge. It is not practical or cost effective to monitor all salmon demes. (A deme, as defined in the WSP, is a term for a local population of organisms of one species that actively interbreed with one another and share a distinct gene pool.) When groups of CUs are exposed to common threats, the approach will be to monitor a subset of these units. Annually, the assessment monitoring plans are

¹¹ Holt, C., Cass, A., Holtby, B., and Riddell, B. 2009. Indicators of status and benchmarks for conservation units in Canada's Wild Salmon Policy. DFO Can. Sci. Advis. Sec. Res. Doc. 2009/058. viii + 74 p.

updated by the SACC based on CU status determination and risks. The CU status will generally determine the frequency and intensity of the assessment effort. For example, when a CU falls within the Red Zone, ongoing annual assessment of its status including fishery and habitat impacts may be required. The SACC is developing a database that describes benchmarks, status, major risk factors, resource management objectives, and assessment requirements. Assessment procedures will build on existing programs and local partnerships.

Table 4 summarizes the number of CUs identified to date for the Alsek, Stikine and Taku drainages. With the establishment of the CUs, over time DFO will monitor and assess their status, develop benchmarks and complete identification of habitat and ecosystem indicators. Currently however, CU's are utilized for management purposes only on a broad scale as baseline data are still being collected, or only very recently analyzed.

Table 4. Conservation Units identified for the Alsek, Stikine and Taku drainages.

Species	Drainage	Number of CUs
Chinook	Stikine	2
	Taku	3
	Alsek	1
River Type Sockeye	Stikine & Taku	1
	Alsek	1
Lake Type Sockeye	Lower Stikine	3
	Taku	4
	Alsek	3
Coho	Lower Stikine	1
	Taku	1 (potentially 3)
	Alsek	1
Chum	Lower Stikine	1
	Taku	1
Odd- Year Pink	Transboundary	1
Even-Year Pink	Transboundary	1

Strategy 3 of the Wild Salmon Policy (WSP), “*Inclusion of Ecosystem Values and Monitoring*”, states the Department’s intent to progressively incorporate ecosystem values in salmon management. Strategy 3 further identifies the actions required to incorporate ecosystem values such as:

- identifying indicators (biological, physical and chemical characteristics) to use in monitoring the status of freshwater ecosystems; and
- monitoring annual variation in climate and ocean conditions, integrating the monitoring with assessments of marine survival of Pacific salmon, and incorporating this knowledge into the annual forecasts of salmon abundance and management processes.

One of the greatest challenges in implementation of the WSP is balancing the goals of maintaining and restoring healthy and diverse salmon populations and their habitats, with social and economic objectives that reflect people's values and preferences. Standardized monitoring and assessment of wild salmon populations, habitat and eventually ecosystem status will facilitate the development of comprehensive integrated strategic plans (as per WSP Strategy 4) that will address the goals of the WSP while considering the needs of people. Outcomes of these plans will include biological objectives for salmon production from Conservation Units and, where appropriate, anticipated timeframes for rebuilding, as well as management plans for fisheries and watersheds, which reflect open, transparent, and inclusive decision processes involving First Nations, communities, environmental organizations, fishers and governments.

Additional details regarding WSP and its implementation can be found at: <http://www.pac.dfo-mpo.gc.ca/fm-gp/species-especies/salmon-saumon/wsp-pss/index-eng.html>.

5.2 International Commitments – Pacific Salmon Treaty

In March 1985, the United States and Canada agreed to co-operate in the management, research and enhancement of Pacific salmon stocks of mutual concern by ratifying the Pacific Salmon Treaty (PST). Various chapters in Annex IV of the Treaty have been renegotiated and ratified since 1985, including Chapter 1: Transboundary Rivers.

The Pacific Salmon Commission (PSC), established under the PST, provides regulatory and policy advice as well as recommendations to Canada and the U.S. with respect to interception salmon fisheries. Under the terms of the PST, the responsibility for in-season management of all species rests with the Parties to the agreement. One exception is the in-season management of Fraser River sockeye and pink salmon, which is specifically delegated to the Fraser River Panel with assistance from the PSC.

To properly account for the full coast-wide impact of fishing on Chinook and coho stocks, the PST specifies that all parties develop programs to monitor all sources of fishing related mortality on Chinook and coho. Catch monitoring programs are being modified to include estimates of encounters of all legal and sub-legal Chinook and coho, as well as other salmon species, in all fisheries.

Coded-wire tag (CWT) data are essential to the coast-wide management of Chinook and coho salmon stocks under the Pacific Salmon Treaty. On August 13, 1985, the Canada and the United States entered into a Memorandum of Understanding in which “the Parties agree to maintain a coded-wire tagging and recapture program designed to provide statistically reliable data for stock assessments and fishery evaluations”. Both countries have recognized the importance of the coded-wire tag program to provide the data required to evaluate the effectiveness of bilateral conservation and fishing agreements. In addition, alternatives to CWT data have been explored by the PSC, including the feasibility of parentage-based genetic tagging. Results of this work may be found at: <http://www.psc.org/pubs/pbt/pbtreport.pdf>.

The chapters in Annex IV outline the joint conservation and harvest sharing arrangements between Canada and the U.S. for key stocks and fisheries subject to the Treaty. On xxxxx, 2019, Canada and the U.S. ratified new provisions for five chapters, including the Transboundary Rivers chapter. The new provisions in these chapters came into effect on January 1, 2019 and are in effect through December 31, 2028. Chapter 4, which covers Fraser River sockeye and pink salmon, is anticipated to be renegotiated in 2019, with formal ratification by both Parties occurring on xxxxx. The provisions contained within Chapter 4 are in effect through xxxxx. The chapters currently awaiting formal ratification are:

- Chapter 1: Transboundary Rivers (including Canadian-origin salmon stocks from the Alsek, Stikine and Taku Rivers)
- Chapter 2: Northern British Columbia and South Eastern Alaska (Stocks originating from rivers with mouths between Cape Suckling, Alaska and Cape Caution, British Columbia);
- Chapter 3: Chinook Salmon (coast-wide Chinook salmon);
- Chapter 5: Coho Salmon (southern and northern stocks);
- Chapter 6: Southern British Columbia and Washington State Chum Salmon (Southern chum salmon);

~~The Parties are working to complete renewal negotiations, and subsequent domestic and international ratification, by December 2018. On this track, renewed and/or new provisions pertaining to PST fisheries will take effect in the 2019 fishing season.~~

PST “Chapter 1: Transboundary Rivers”, outlines the conservation, harvest sharing, management and enhancement arrangements for Alsek, Stikine and Taku River Chinook, sockeye and coho salmon. This Chapter, and/or modifications subsequently recommended to the Parties by the Transboundary Panel in implementing the Chapter, governs Canadian salmon fisheries covered in this Transboundary Rivers Integrated Fisheries Management Plan.

All management regimes under Annex IV continue to be implemented by Fisheries and Oceans Canada and U.S. agencies for the 2019 season.

5.3 Oceans and Habitat Considerations

The following subsections describe the major marine and habitat considerations and initiatives that have an influence on management of the salmon resources of the Pacific Region.

5.3.1 Oceans Act

In 1997, the Government of Canada enacted the *Oceans Act*. This legislation provides a foundation for an integrated and balanced national oceans policy framework supported by regional management and implementation strategies. In 2002, Canada’s Oceans Strategy was released to provide the policy framework and strategic approach for modern oceans management in estuarine, coastal, and marine ecosystems. As set out in the *Oceans Act*, the strategy is based on the three principles of sustainable development, integrated

management, and the precautionary approach. For more information on the *Oceans Act*, please visit: <http://www.dfo-mpo.gc.ca/oceans/oceans-eng.htm>.

The *Oceans Act*, the *Canada Wildlife Act*, and the *National Marine Conservation Areas Act* have given rise to several initiatives on the BC coast, some of which are discussed below. As goals, objectives, and management plans are finalized for these initiatives, the Department's management of fisheries will be adapted as appropriate, in consultation with interested parties through Integrated Fisheries Management processes.

5.3.2 Pacific North Coast Integrated Management Area

An integrated management plan for the Pacific North Coast Integrated Management Area (PNCIMA) has been developed to help coordinate various ocean management processes and to complement and link existing processes and tools including IFMPs. The PNCIMA is one of five national Large Ocean Management Areas identified in Canada's 2005 Oceans Action Plan. The plan is the product of a collaborative process led through an oceans governance agreement between the Government of Canada, British Columbia and First Nations, and contributed to by a diverse group of organizations, stakeholders and interested parties. High level and strategic, the plan provides direction on, and commitment to, integrated, ecosystem-based and adaptive management of marine activities and resources in the planning area as opposed to detailed operational direction for management.

The plan outlines a framework for ecosystem-based management (EBM) for PNCIMA that includes assumptions, principles, goals, objectives and strategies. This EBM framework has been developed to be broadly applicable to managers, decision-makers, regulators, community members and resource users alike, as federal, provincial and First Nations governments, along with stakeholders, move together towards a more holistic and integrated approach to ocean use in the planning area.

Implementation of the plan is the shared responsibility of all signatories to the planning process and will be undertaken within existing programs and resources.

An electronic copy of a draft of the plan is available at: <http://www.pncima.org/>.

5.3.3 Marine Protected Area Networks

The *Oceans Act* mandates the Minister of Fisheries and Oceans Canada to lead and coordinate the development and implementation of a national system (or network) of marine protected areas (MPAs). The *National Framework for Canada's Network of Marine Protected Areas (National Framework)* provides strategic direction for the design of a national network of MPAs that will be composed of a number of bioregional networks. This is an important step towards meeting Canada's domestic and international commitments to establish a national network of marine protected areas. Regionally, the draft *Canada-British Columbia Marine Protected Area Network Strategy* has been developed jointly by federal and provincial agencies and reflects the need for governments to work together to achieve common marine protection and conservation goals. Bioregional marine protected area network planning will identify new areas of interest for

protection by DFO, Parks Canada, Environment Canada, the Province of B.C., and any other agencies with a mandate for protecting marine spaces. Future networks of MPA's may overlap and/or include salmon fishing areas, depending on the type and nature of the MPA.

More information on the Canada-BC MPA Network Strategy can be found at: <http://www.dfo-mpo.gc.ca/oceans/publications/bc-mpa/page07-eng.html>.

5.3.4 Marine Protected Areas

DFO is also responsible for designating Marine Protected Areas (MPAs) under Canada's *Oceans Act*. Under this authority, DFO has designated two MPAs in the Pacific Region. The "*Endeavour Hydrothermal Vents*", designated in 2003, lie in waters 2,250m deep 250 km southeast of Vancouver Island. The "*SGaan Kinghlas-Bowie Seamount Marine Protected Area*" (SK-B MPA), designated in 2008, is 180 km west of Haida Gwaii (formerly known as the Queen Charlotte Islands). MPA regulations and management plans articulate any restrictions on activities taking place within the MPA, where applicable. At this time, all fisheries are restricted within the Endeavour and SK-B MPAs, except for a limited sablefish trap fishery within the SK-B MPA.

The SK-B MPA has been established to conserve and protect the unique biodiversity and biological productivity of the area's marine ecosystem. The Government of Canada and the Council of the Haida Nation signed a MOU in April 2007 which established the SK-B Management Board to facilitate the cooperative management and planning of the proposed MPA. As a result, DFO and the Council of the Haida Nation are collaboratively developing a management plan for the SK-B MPA which will consider advice from an advisory committee, stakeholders through existing processes, and the public. This management plan will elaborate on the regulations to implement the conservation and management objectives for the MPA and will address matters such as monitoring, enforcement and compliance.

Commercial fishing activities within the SK-B MPA are managed through the Integrated Fisheries Management process. Three zones are identified, some of which involve fisheries closures which are used to manage the sablefish fishery (see the Groundfish IFMP for details). All other commercial fisheries are not permitted to occur in any zones of the MPA.

Work is ongoing to consider MPA designations for other areas along the Pacific Coast, including the Race Rocks area off Rocky Point south of Victoria (currently designated as a Provincial Ecological Reserve) and the Hecate Strait / Queen Charlotte Sound Glass Sponge Reefs Area of Interest. The protection of coral and sponge reefs is a key component to a number of international commitments made by Canada through the United Nations Convention on Biological Diversity and the United Nations Food and Agriculture Organization (FAO) Code of Conduct for Responsible Fisheries. Changes to existing IFMPs with respect to fishing activities may be required upon designation of these MPAs. In addition, alignment of relevant IFMPs and MPA Management Plans will be necessary.

More information on integrated management planning, Pacific Region MPAs and Pacific MPA planning under Canada's *Oceans Act* can be found at: www.pac.dfo-mpo.gc.ca/oceans/index-eng.htm.

5.3.5 National Marine Conservation Areas

Gwaii Haanas

Gwaii Haanas National Park Reserve, National Marine Conservation Area Reserve (NMCAR), and Haida Heritage Site is a 5000 km² land-and-sea protected area in the southern portion of Haida Gwaii (formerly the Queen Charlotte Islands), approximately 100 kilometres off the north coast of British Columbia. The Haida Nation declared the area a Haida Heritage Site in 1985. The terrestrial part of Gwaii Haanas was designated a National Park Reserve by the Government of Canada soon after, and the two parties have been managing the area cooperatively since 1993. In 2010, following an extensive public consultation process, the marine area of Gwaii Haanas was given the designation of National Marine Conservation Area Reserve.

Gwaii Haanas is managed by the Archipelago Management Board, a cooperative body made up of equal representation from the Government of Canada (represented by Fisheries and Oceans Canada and Parks Canada) and the Council of the Haida Nation. The Gwaii Haanas marine area is currently managed under the Interim Management Plan and Zoning Plan, which includes “*balancing protection and ecologically sustainable use*” in its guiding principles. The Zoning Plan identifies six areas that are closed to commercial and recreational fishing.

Development of a long-term management plan for the Gwaii Haanas marine area is underway. This process will take place in consultation with the commercial and recreational fishing sectors through Fisheries and Oceans's established integrated fisheries planning and advisory processes. Annual fishing plans will be developed in consultation with stakeholders.

Users of the Gwaii Haanas marine area should be aware that adjacent land is managed under the authority of the *Canada National Parks Act* and its regulations and, as specified in the *Gwaii Haanas Agreement* (1993), there is “*no extraction or harvesting by anyone of the resources of the lands and non-tidal waters of the Archipelago for, or in support of, commercial enterprise*” (s3.3). There are specific requirements for visiting the terrestrial portion of Gwaii Haanas, and advanced planning is necessary. For further information, please contact the Gwaii Haanas administration office at: 1-877-559-8818.

Southern Strait of Georgia

Parks Canada, in partnership with the Government of British Columbia, launched a feasibility assessment for an NMCAR in the southern Strait of Georgia in 2004. Since then, consultations with First Nations, key stakeholders, communities and the public have occurred. Informed by those discussions, a proposed boundary for consultation was announced by the provincial and federal Ministers of Environment in 2011.

Since 2011, the two governments have been consulting with First Nations, local governments and industry. A preliminary concept is currently being developed to help advance consultations on the feasibility assessment. If the results of the feasibility assessment indicate that establishment of an NMCAR is practical and feasible, an establishment agreement between the Governments of Canada and British Columbia will be negotiated and an interim management plan developed. If the development of the reserve is determined to be feasible, further consultations related to establishment agreements and Aboriginal rights will also take place with First Nations. Commercial and recreational fishing sectors, communities, landowners, recreation and environmental organizations and other stakeholders will also have opportunities to provide input to the development of the interim management plan. More information on the proposed National Marine Conservation Area Reserve in the Southern Strait of Georgia is available on the internet at: www.pc.gc.ca/eng/progs/amnc-nmca/dgs-ssg/index.aspx.

DFO is also working with other federal and provincial agencies to coordinate efforts towards establishing a national system of Marine Protected Areas to fulfil Canada's commitments to the UN Convention on Biological Diversity.

More information on integrated management planning and Pacific MPAs under Canada's *Oceans Act* can be found at: <http://www.pac.dfo-mpo.gc.ca/oceans/index-eng.htm>.

5.3.6 Marine National Wildlife Areas

Under the *Canada Wildlife Act*, Environment Canada may establish marine National Wildlife Areas (NWAs). The Scott Islands marine NWA, located off the northern tip of Vancouver Island, has been proposed for designation through amendments to the *Wildlife Area Regulations*. Fisheries and Oceans Canada would continue to regulate and administer fisheries within the proposed area. Environment Canada and Fisheries and Oceans will develop a collaborative approach and agreement regarding management of fisheries in the area. More information on NWAs can be found at: <http://www.ec.gc.ca/ap-pa/default.asp?lang=En&n=2BD71B33-1>.

5.3.7 Terrestrial Parks and Protected Areas

A relatively high degree of protection is currently provided to the land within the geographic extent of the Alsek River drainage. In Canada, the majority of the drainage is located in the Tatshenshini-Alsek Provincial Park and Kluane National Park, while in Alaska, the entire portion of the drainage is located in Glacier Bay National Preserve.

The Stikine River has several parks and protected areas within its drainage. In British Columbia these include Stikine River Provincial Park (PP), Tuya Mountain PP, Mt. Edziza PP and Recreation Area, as well as a number of smaller protected areas such as Craig Headwaters Protected Area, Ningunsaw PP, Great Glacier PP and Choquette Hot Springs PP.

A portion of the Taku River headwater area is encompassed within Atlin Provincial Park and Recreation Area. Other protected and ecologically sensitive areas are described in the

Atlin Taku Land Use Plan, 2011 (see: <http://www.for.gov.bc.ca/tasb/SLRP/plan5.html>). In Alaska, the lower portion of the watershed is encompassed within the Tongass National Forest.

5.3.8 Committee on the Status of Endangered Wildlife Species Assessments

The Committee On the Status of Endangered Wildlife Species In Canada (COSEWIC) was formed in 1977 to provide Canadians with a single, scientifically sound classification of wildlife species at risk of extinction. COSEWIC began its assessments in 1978 and has met each year since then to assess wildlife species.

With the implementation of SARA, COSEWIC has been established as an independent body of experts responsible for identifying and assessing wildlife species considered being at risk. This is the first step towards protecting wildlife species at risk. Subsequent steps include COSEWIC reporting its results to the Canadian government and the public, and the Minister of the Environment providing an official response to the assessment results. Wildlife species that have been designated by COSEWIC may then qualify for legal protection and recovery under SARA. For a full list of species identified and assessed by COSEWIC, please visit:

http://www.cosewic.gc.ca/rpts/Detailed_Species_Assessments_e.html.

5.3.9 Species at Risk Act

The *Species at Risk Act* (SARA) came into force in 2003. The purposes of the *Act* are: “to prevent wildlife species from being extirpated or becoming extinct, and to provide for the recovery of a wildlife species that are extirpated, endangered or threatened as a result of human activity and to manage species of special concern to prevent them from becoming endangered or threatened”. More information on SARA can be found at <http://www.sararegistry.gc.ca>.

In addition to the existing prohibitions under the *Fisheries Act*, under SARA, it is illegal to kill, harm, harass, capture, take, possess, collect, buy, sell or trade any listed endangered or threatened animal, or any part or derivative of an individual. These prohibitions apply unless a person is authorized, by a permit, licence or other similar document issued in accordance with SARA, to engage in an activity affecting the listed species or the residences of its individuals. Species listed as special concern are not included in these prohibitions.

Endangered, threatened, and special concern marine species in Pacific Region currently listed under SARA can be found at: <http://www.dfo-mpo.gc.ca/species-especes/listing-eng.htm>.

In the Pacific Region, the following SARA-listed species may be encountered in marine and/or coastal areas:

Birds

- Ancient Murrelet – Special Concern
- Marbled Murrelet – Threatened

Fish

- Basking Shark - Endangered
- Green sturgeon – Special Concern
- Longspine Thornyhead Rockfish – Special Concern
- Rougheye Rockfishes Types I & II – Special Concern
- Sixgill Shark – Special Concern
- Soupfin Shark (Tope) – Special Concern
- White Sturgeon – Upper Fraser Designatable Unit – Endangered
- White Sturgeon – Upper Columbia Designatable Unit – Endangered
- White Sturgeon – Nechako Designatable Unit – Endangered
- White Sturgeon – Kootenay River Designatable Unit – Endangered
- Yelloweye Rockfish, onside and outside populations – Special Concern

Mammals

- Blue Whale – Endangered
- Fin Whale – Threatened
- Grey Whale – Special Concern
- Harbour porpoise – Special Concern
- Humpback Whale – Threatened
- Killer Whale – Northern Resident Population – Threatened
- Killer Whale – Southern Resident Population – Endangered
- Killer Whale – Offshore Population – Threatened
- Killer Whale – Transient Population – Threatened
- North Pacific Right Whale – Endangered
- Sea Otter – Special Concern
- Sei Whale – Endangered
- Stellar Sea Lion – Special Concern

Reptiles

- Leatherback Sea Turtle – Endangered

Shellfish

- Northern Abalone – Endangered
- Olympia Oyster – Special Concern

Some marine or anadromous species of fish designated by COSEWIC that are currently under consideration for listing under SARA include:

Fish

- Bocaccio Rockfish – assessed as Threatened
- Canary Rockfish – assessed as Threatened
- Darkblotched Rockfish – assessed as Special Concern
- Quillback Rockfish – assessed as Threatened
- Yellowmouth Rockfish – assessed as Threatened
- Eulachon – Fraser River Designated Unit – assessed as Endangered

- Eulachon - Central Pacific Coast Designated Unit– assessed as Endangered
- Eulachon - Nass/Skeena Rivers Designated Unit - assessed as Special Concern
- North Pacific Spiny dogfish – assessed as Special Concern

Mammals

- Northern Fur Seal – assessed as Threatened

Salmon and SARA

Three populations of salmon have been designated as Endangered by COSEWIC: Cultus Lake sockeye (2003), Sakinaw Lake sockeye (2003), and Interior Fraser River coho (2002). In addition, one has been designated as Threatened, i.e. Okanagan Chinook (2006). Following extensive public and stakeholder consultation processes for each population, the Government of Canada did *not* list these populations on Schedule I of SARA (Cultus Lake sockeye (2005), Sakinaw Lake sockeye (2005), Interior Fraser River coho (2006) and Okanagan Chinook (2010)). However, recovery efforts are continuing for each population.

DFO, in cooperation with the Interior Fraser Coho Recovery Team, have developed the *Conservation Strategy for Coho Salmon, Interior Fraser River Populations*. This strategy is an integral tool in effecting recovery of these unique coho populations. It is a science-based document that describes the species' biology, habitats and threats. The strategy also identifies a recovery goal, with accompanying principles and objectives designed to guide activities to achieve recovery. To view the conservation strategy, please visit: <http://www.dfo-mpo.gc.ca/Library/329140.pdf>.

Conservation Strategies for Sakinaw and Cultus Lake sockeye have also been finalized, and can be viewed at: http://www.pac.dfo-mpo.gc.ca/fm-gp/species-especies/salmon-saumon/conservation/docs/Sakinaw_conservation_jan08-eng.pdf; and, <http://www.pac.dfo-mpo.gc.ca/science/habitat/cultus/conservstrat.pdf>.

Shark Codes of Conduct

Out of the fourteen shark species in Canadian Pacific waters, three species are listed under SARA. The Basking Shark (*Cetorhinus maximus*) is listed as Endangered, and the Bluntnose Sixgill Shark (*Hexanchus griseus*) and Tope Shark (*Galeorhinus galeus*) are listed as Species of Special Concern. The primary threats to shark species have been identified as by-catch and entanglement. In order to address the conservation concerns with shark species, it is important that measures are taken to reduce the mortality of sharks resulting from these primary threats. As such, coastal commercial fishing licences have been amended to include a Condition of Licence for Basking Sharks that specify mitigation measures in accordance with SARA permit requirements. Additionally, two 'Code of Conduct for Shark Encounters' documents have been developed to reduce the mortality of Basking Shark, as well as other Canadian Pacific shark species such as Bluntnose Sixgill and Tope Shark resulting from entanglement and bycatch in commercial, aquaculture and recreational fisheries. These guidelines include boat handling procedures during visual

encounters with Basking Sharks as well as best practices for handling Canadian Pacific shark species during entanglement encounters.

These documents have been posted online and can be found at the following URL links:

Code of conduct for sharks: http://www.pac.dfo-mpo.gc.ca/fm-gp/species-especes/shark-requin/conduct_shark-conduite_requin-eng.html;

Code of conduct for Basking Sharks: http://www.pac.dfo-mpo.gc.ca/fm-gp/species-especes/shark-requin/conduct_basking-conduite_pelerin-eng.html.

5.3.10 Whale, Turtle and Basking Shark Sightings

The Department welcomes assistance in the reporting of any whale, turtle, or Basking Shark sightings or entanglement. Sightings for Basking Shark, Leatherback and other turtle species, as well as many whale species, are infrequent in Pacific Canadian waters. The collection of sightings data is very useful to scientists in determining population size and distribution. Establishing this information can in turn help in the recovery planning under SARA.

To report a whale sighting, contact the B.C. Cetacean Sighting Network:

Toll free: 1-866-I-SAW-ONE (1-866-472-9663)

Fax: (604) 659-3599

Email: sightings@vanaqua.org

Internet: <http://wildwhales.org/sightings/>

To report a turtle sighting, contact the Sea turtle Sighting Network:

Toll free: 1-866-I-SAW-ONE (1-866-472-9663)

Fax (604) 659-3599

Email: turtles@vanaqua.org

<http://www.bcreptiles.ca/reportsightings.htm#1>

To report sick, injured, distressed or dead marine mammals and sea turtles contact the Marine Mammal Incident Reporting Hotline:

Toll free: 1-800-465-4336

To report a Basking Shark contact the Basking Shark Sightings Network:

Toll free: 1-877-50-SHARK

Email: BaskingShark@dfo-mpo.gc.ca

<http://www.pac.dfo-mpo.gc.ca/science/species-especes/elasmobranch/sightings-signalaz-eng.htm>

5.3.11 Northern and Southern Resident Killer Whales

Two distinct populations of killer whales, known as the northern and southern residents, occupy the waters off the west coast of British Columbia. Northern resident killer whales are listed as Threatened and southern resident killer whales are listed as Endangered in Schedule 1 of the *Species at Risk Act*. A Recovery Strategy for Northern and Southern Resident Killer Whales in Canada was finalized in March 2008, and amended in 2011. It can be viewed at:

http://www.sararegistry.gc.ca/document/default_e.cfm?documentID=1341.

Critical habitat and its associated features have been identified for both populations in the recovery strategy, and are protected from destruction under SARA Section 58 through the issuance of an order. The recovery strategy also identifies current threats as environmental contaminants, reduced prey availability, disturbance, noise pollution and mortality in fishing gear.

Prey:

Northern and southern resident killer whales are dietary specialists and feed primarily on salmon. DFO and other researchers continue to advance new scientific information and analyses regarding the ecology of resident killer whales. Much of this new information focuses on their feeding habits and preference for Chinook salmon. Fisheries that occur within the range of the resident killer whales as well as fisheries outside their range that affect Chinook abundance within their range are both potentially implicated.

Because Southern Residents also are listed as Endangered pursuant to the *United States Endangered Species Act*, DFO has joined with the National Oceanic and Atmospheric Administration (NOAA) to collaboratively evaluate the status of the relevant science and analyses. The two agencies designed a series of three scientific workshops to undertake a transparent, collaborative and scientifically rigorous review of the available information about resident killer whales, their feeding habits, and the potential effects of salmon fisheries on the whales through prey reduction. A panel of independent scientists was selected to oversee and participate in the process and produce a report documenting its findings. The final report of the *Independent Science Panel of the Bilateral Scientific Workshop Process to evaluate the effects of salmon fisheries on Southern Resident Killer Whales* is available at: <http://www.nwr.noaa.gov/Marine-Mammals/Whales-Dolphins-Porpoise/Killer-Whales/ESA-Status/KW-Chnk-final-rpt.cfm>.

Contaminants:

There are numerous chemical and biological pollutants that may directly or indirectly impact resident killer whales, ranging from persistent organic pollutants to antibiotic resistant bacteria and exotic species. Recent studies indicate resident killer whales have high levels of some contaminants with males having the highest levels. PCBs and certain fire-retardant persistent organic pollutants have been banned in Canada. Canada and U.S. researchers continue to monitor resident killer whale populations.

Disturbance:

All cetaceans, including resident killer whales, are being subjected to increasing amounts of disturbance from vessels, aircraft and other anthropogenic noise. Industrial activities such as: dredging, pile driving, construction, seismic testing, military sonar and other vessel use of low and mid-frequency sonars impact the acoustic environment. The means by which physical and/or acoustic disturbance can affect resident killer whales at both the individual and population levels are not well understood, but may depend on whether the disturbance is chronic or acute.

The *Marine Mammals Regulations* under the *Fisheries Act* and prohibitions under *SARA* specifically prohibit the disturbance and harm of killer whales. Guidelines for marine mammal viewing have also been developed. To avoid disturbing killer whales and other marine mammals, fish harvesters are advised to follow the advice in: *Be Whale Wise (BWW)*; and, *Marine Wildlife Guidelines for Boaters, Paddlers and Viewers*. These are available from local Fishery Offices or on-line at: <http://www.pac.dfo-mpo.gc.ca/fm-gp/species-especies/mammals-mammiferes/view-observer-eng.html>.

Non-compliance with the BWW Guidelines may lead to charges under the *Marine Mammal Regulations* and/or *SARA*.

Critical Habitat:

Critical habitat for the northern and southern resident killer whales was defined in the March 2008 Recovery Strategy. On February 23, 2009, a Species at Risk Act Section 58(4) Order by the Ministers of Fisheries and Oceans, and Environment was posted to protect that critical habitat from destruction. The Recovery Strategy identifies the following specific actions intended to protect killer whale critical habitat and its attributes: enforcement, protection, management, research, stewardship and public education. These actions are undertaken by multiple DFO sectors and the outcomes will inform further actions.

Fisheries Depredation:

Depredation (the removal of fish from fishing gear) by killer whales has been reported by groundfish longline, salmon troll, and recreational harvesters in B.C.. Depredation is a learned behaviour that can spread throughout whale social groups and, once established, is impossible to eliminate. It is critical that B.C. harvesters do not encourage this learning by allowing whales to associate obtaining fish with human fishing activity. Encouraging this behaviour will quickly lead to significant losses for harvesters.

The most important approach to prevent this from spreading is by NOT feeding whales directly or indirectly and not hauling gear in the vicinity of killer whales and sperm whales. Typically, killer whales pass quickly through an area allowing fishing to resume. It is also recommended that you advise other fish harvesters in the area if you encounter depredation. Additional tips on avoiding depredation events can be found in the DFO Marine Mammal Bulletin #2.

(see: <http://www.pac.dfo-mpo.gc.ca/publications/marinemammals/depredation-4-2010-eng.pdf>).

If you experience depredation by whales, please report the incident by email to: MarineMammals@pac.dfo-mpo.gc.ca; or by calling (250) 756-7253. Reporting all incidents will assist DFO and fish harvesters in understanding this problem and help in developing strategies to avoid it.

Marine Mammal Incident Response Program and Marine Mammal Sightings Network:

Incidents with marine mammals comprise a range of occurrences which may include: live stranding's, dead, sick or injured animals, entanglements or potential violations (disturbance, harm or harassment).

To report a marine mammal incident, including violations, call DFO's *Observe, Record, Report* phone-in line at: 1-800-465-4336. Current log book/reporting requirements specify that all entanglement or by-catch of marine mammals must be reported.

Observations of orphaned seal pups may be reported to the Vancouver Aquarium Marine Mammal Rescue and Rehabilitation line at: (604) 258-SEAL (7325). In many cases, seal pups are not truly orphaned, and staff at these facilities will assess the circumstances.

To report sightings of cetaceans (whale, dolphin, or porpoise) or sea turtles, contact the B.C. Cetacean Sightings Network as soon as possible by phone at 1-866-I SAW ONE (472-9663) or www.vanaqua.org. You may also participate in a formalized logbook program by calling or contacting the Network.

Contacts for marine mammal inquiries:

Fisheries and Oceans Canada Contacts:
MarineMammals@pac.dfo-mpo.gc.ca
Paul Cottrell (604) 666-9965
John Ford (250) 729-8375

5.3.12 Environment Canada Project: Assessing the Impact of Gill Nets on Seabirds

A number of seabird species around the world have declined in recent years; seabird by-catch is a part of the reason. Seabird by-catch has been reported in all types of fisheries in B.C. and in fisheries in Alaska and Washington states. However, the number of local seabirds getting entangled in gill nets as a result of the B.C. salmon gill net fishery is not well known. Environment Canada is looking for your help to measure the impact of fishing for salmon with gill nets on local seabird populations.

Environment Canada (EC) wants to know how, when and where gill net fishing may impact local seabirds and to find ways to reduce impacts. Environment Canada, with the Department of Fisheries and Oceans, fishers, First Nations, non-government organizations, and other coastal communities, has started a program to answer these questions. Without this information, it will be difficult to determine if there is a significant impact. Should impacts be determined, this information helps support solutions that will benefit both the fishery and healthy bird populations.

To help out, EC would like to be informed about any birds found, or reported, in gill nets and/or found floating dead on fishing grounds. Please report all incidents to EC's 24-hour reporting line: 1-866-431-BIRD (2473).

For additional information, please contact:

Laurie Wilson, Wildlife Toxicologist, Environment Canada – Canadian Wildlife Service, Delta, B.C. Tel: (604) 940-4679; or, email: laurie.wilson@ec.gc.ca.

5.3.13 Aquaculture Management

Regulatory Regime:

In December 2010, the *Pacific Aquaculture Regulations* came into effect giving DFO the authority to govern the management and regulation of the aquaculture industry in BC, including marine finfish, shellfish, freshwater and enhancement facilities. The Province of British Columbia continues to have authority over land tenures and workplace safety related to aquaculture in BC. New applications, amendments and related referrals are coordinated through Front Counter BC. More information is available on the BC government's website: <http://www.frontcounterbc.gov.bc.ca/>.

DFO requires comprehensive environmental monitoring to be undertaken by the marine finfish aquaculture industry, and the Department also conducts additional monitoring, audits and investigations (where warranted). Public reporting is undertaken to ensure the transparency and accountability of the management of aquaculture in BC. Associated reporting can be found on the DFO web pages: <http://www.pac.dfo-mpo.gc.ca/aquaculture/reporting-rapports/index-eng.html>.

Within the BC Aquaculture Regulatory Program there is a Compliance and Enforcement Unit, dedicated to aquaculture compliance, as well as an Aquaculture Environmental Operations Unit which monitors the activities of industry on an on-going basis. The Program provides oversight and works to ensure the orderly management of the industry, including planning and licencing, linkages with national and regional policy, as well as consultation and communications.

Integrated Management of Aquaculture Plans:

Integrated Management of Aquaculture Plans (IMAPs) provide an overview of each aquaculture sector and associated management and regulation. IMAPs are available at: <http://www.pac.dfo-mpo.gc.ca/consultation/aquaculture/index-eng.html>. IMAPs complement IFMPs and the two are reviewed periodically to ensure consistency of management approaches.

Aquaculture Management Advisory Committees:

Aquaculture Management Advisory Committee meetings (AMACs) engage the aquaculture industry, First Nations and other stakeholders in the development of IMAPs and on-going feedback relevant to the management of aquaculture. Information relating to

AMAC meetings is posted on the DFO Consultations web pages: <http://www.pac.dfo-mpo.gc.ca/consultation/aquaculture/index-eng.htm>. Meetings are open to the public.

5.3.14 Salmonid Enhancement Program

The Salmonid Enhancement Program (SEP) is comprised of nearly 300 projects across British Columbia and the Yukon and includes hatcheries, fishways, spawning and rearing channels, and small classroom incubators. Projects range in size from spawning channels producing nearly 100 million juvenile salmon annually, to school classroom incubators releasing fewer than one hundred juveniles.

SEP enhances Chinook, chum, coho, pink, and sockeye salmon at the population level throughout the Pacific Region, supporting sustainable fisheries through fish production that provides harvest opportunities. Fish production from the program also supports stock assessment, restoration and conservation, which enables and/or contributes to harvest management as well as community involvement and public education.

The program is delivered through three components:

- Major Operations: SEP facilities that rebuild stocks and provide harvest opportunities through hatcheries and spawning channels;
- The Community Involvement Program: includes the Community Economic Development Program that operates contracted SEP facility operations with local community groups and First Nations; and the Public Involvement Program (PIP) projects that are divided into designated and non-designated categories. The latter are smaller projects that focus on outreach, stewardship and educational activities, and which do not produce large numbers of fish.
- The Resource Restoration Unit: supports habitat improvements, stock assessment, effectiveness monitoring, watershed planning, and partnerships related to habitat initiatives.

Steelhead and cutthroat trout are produced at some SEP facilities in partnership with the province of British Columbia; however, targets and release numbers are not included in SEP production planning as the Province is responsible for management of these species.

SEP facilities are subject to the *Pacific Aquaculture Regulations* (PAR) under the *Fisheries Act*. PAR licences for all SEP facilities include a production plan, which is developed within a formal integrated planning process. This production planning process operates within the consultative framework of an integrated harvest planning process that is used to develop the IFMP.

Production planning meetings involve most DFO sectors (SEP, Science, and Fisheries Management), and external consultation and involvement is achieved through the IFMP process. The outcome of production planning is a draft production plan that takes into account production priorities and the results of post-season reviews. This process operates on an annual planning cycle, while at the same time planning for the longer-term. Priorities

are established annually based on the national and regional departmental priorities using a consistent approach across the program.

The production planning cycle establishes maximum numbers of eggs to be collected and juveniles to be released, using strategies that will produce the number of adults desired to meet specific objectives while considering species interactions, effects on existing stocks, harvest, habitat capacity, project capacity and overall conservation unit (CU) objectives. Operationally, SEP production targets for a given facility are set for individual populations or stocks. Each individual stock or population together with its run timing, release site, life-history stage and the associated release numbers, is known as a production group and has a specific production objective. A single regional production plan is produced, that comprises donor stocks, release sites, egg-take and juvenile salmon release targets, and stages at release for each SEP facility. Production targets are considered upper limits and will be documented as such in each Facility Pacific Aquaculture Regulation licence.

Production targets for the joint Canada/U.S. Stikine sockeye enhancement program are summarized in Appendix 2, Section 7 of this document; the Taku program is summarized in Appendix 3, Section 7.

The risks of salmon enhancement to wild populations include undesirable genetic effects, disease implications, ecological interactions, harvest impacts and marine carrying capacity. DFO is aware of potential interaction of enhanced fish with wild stocks, and has developed an array of risk mitigation and management procedures, guidelines and practices. Hatchery programs are designed to avoid or minimize these risks.

The information available at the link below addresses production from major DFO Operations (OPS) facilities, contracted Community Economic Development Program hatcheries (CEDP), larger or more complex Public Involvement Projects (Designated Public Involvement or DPI) operated by volunteers, and Aboriginal Fisheries Strategy (AFS). Not included are smaller Public Involvement Projects (PIPs) that are focused toward stewardship, stock rebuilding or educational activities and do not release large numbers of fish that would affect fisheries. Facilities may also enhance steelhead and cutthroat trout; however, targets are not included as management of these species is under the authority of the Province of British Columbia.

There are two datasets available: **Post-Season Production** from the 2017 brood year (i.e. 2018 releases, and numbers on hand for 2018 release) and the **Production Plan** which includes proposed targets for the upcoming 2019 brood year. The Production Plan dataset is preliminary, and the final version will be available by June 1. <http://www.pac.dfo-mpo.gc.ca/sep-pmvs/ifmp-pgip-eng.html>.

5.3.15 Fishing Vessel Safety

Commercial fishing is recognized as a very dangerous activity. Concerns over fishing related injuries and deaths have prompted DFO to proactively work with Transport Canada and WorkSafe B.C. to ensure coordinated approaches to improving fishermen's safety. See Appendix 5 of this plan for more information.

6 OBJECTIVES

6.1 Fisheries Management Objectives for Stocks of Concern

Conservation of Pacific salmon is the primary objective and will take precedence in managing the resource.

The primary fisheries management objective of DFO is the conservation of Canada's fish stocks for current and future generations through sustainable and responsible fisheries management that is science based, applies the precautionary approach, addresses ecosystem considerations and uses a risk based approach. Accordingly, the attainment of escapement targets and maintenance of fish habitat are of primary importance in managing for the optimum production of salmon stocks.

In the Transboundary rivers area, management plans are focused on Chinook, sockeye and coho salmon in the Stikine and Taku rivers and Chinook and sockeye salmon in the Alsek-Tatshenshini rivers. These stocks all are managed under provisions of the PST. Spawning escapement goals for these stocks have been established as ranges which reflect biological data and professional judgment regarding stock productivity, the ability of existing management systems to deliver established goals, the accuracy and precision of estimates of escapement generated by stock assessment programs and the degree of risk considered acceptable. Specific goals and conservation targets for Alsek, Stikine and Taku salmon stocks are described in Section 3 of Appendices 1-3, respectively.

When returns decline below sustainable levels, management actions are taken which may include reducing the impact of fisheries on specific stocks, strategic enhancement and habitat restoration. Stocks of concern in 2019 include: Stikine and Little Tahltan Chinook salmon (Stikine); Stikine mainstem sockeye salmon (Stikine); Alsek and Klukshu Chinook salmon (Alsek); Taku River Chinook salmon; and Kuthai Lake sockeye salmon (Taku). Details on how these stocks will be managed are provided in Appendices 1-3 (Sections 5 and 6) of this plan.

6.2 International Objectives

The objective is to manage Canadian treaty fisheries to ensure that obligations within the PST are achieved.

Details on specific obligations contained in the PST can be found at the Pacific Salmon Commission (PSC) website at: <http://www.psc.org/Index.htm>.

Reviews of the performance of fisheries relative to PST provisions are prepared annually by the Transboundary Technical Committee and reviewed at post-season meetings of the Transboundary Panel; associated technical reports are published by the PSC. Summaries of Transboundary treaty performance for 2018 appear in the post season review sections of Appendix 1 (Section 8), Appendix 2 (Section 9) and Appendix 3 (Section 9).

6.3 Domestic Allocation Objectives

The objective is to manage fisheries in a manner that is consistent with the *Allocation Policy for Pacific Salmon*. The Policy can be found on-line at: <http://www.dfo-mpo.gc.ca/Library/240366.pdf>

The Allocation Policy for Pacific Salmon reaffirms the priority of FSC fisheries and sets out principals for allocation between the recreational and commercial sectors and also identifies sharing arrangements for each of the three commercial fishing gear groups in the Pacific Region. The Minister can, for reasons of conservation or for any other valid reasons, modify access, allocations, and sharing arrangements as outlined in this IFMP in accordance with the powers granted pursuant to the *Fisheries Act*.

Table 5 below describes a generalized framework by which fishing opportunities are allocated to different fishing sectors at different abundance levels.

Table 5. Allocation guidelines for Salmon in the Pacific Region

	Low Abundance		High Abundance		
First Nations FSC	Non-retention / closed	By-catch Retention	Directed	Directed	Directed
Recreational	Non-retention / closed	Non-retention	Limited Retention	Directed	Directed
Commercial	Non-retention / closed	Non-retention	By-catch Retention	By-catch Retention	Directed

[note: This table describes conceptually how First Nations, recreational and commercial fisheries might be undertaken across a range of returns. It does not imply that specific management actions for all stocks exactly follow these guidelines, but rather is an attempt to depict the broad approach].

The allocation guidelines above refer to target stocks. The application of the *Allocation Policy for Pacific Salmon* for non-target species or stocks is case specific. The inadvertent harvest of different species of concern is referred to as *by-catch*. The inadvertent harvest of stocks of concern within the same species (i.e. Cultus Lake sockeye when harvesting Summer Run sockeye) is referred to as *incidental harvest*. Both *by-catch* and *incidental harvest* are factored into the calculation of exploitation rates on various stocks, and therefore, fishing plans are designed to be consistent with existing policies and to keep exploitation rates on stocks of concern within the limits described in the fishery management objectives.

Many harvest groups have recommended that the Department consult on by-catch/incidental harvest allocations. However, the Department does not generally allocate by-catch or portions of the acceptable exploitation rate on stocks of concern. The Department considers a number of fishing plan options and attempts to address a range of objectives including minimizing by-catch and incidental catch.

6.3.1 First Nations Fisheries

The objective is to manage fisheries to ensure that, after requirements for conservation, the first priority in salmon allocation is to FSC for harvest opportunities under communal FSC licences issued to First Nations, and to treaty rights for harvest opportunities for domestic purposes (consistent with Treaty Final Agreements).

While these opportunities will be provided on a priority basis, it does not necessarily mean that fishery targets for First Nations will be fully achieved before other fisheries can proceed. For example, many First Nations conduct their FSC fisheries in terminal areas while other fisheries are undertaken in, or in close proximity to, river mouths, or in marine areas or approach areas. The general guideline is that the fishing plan must adequately provide for the First Nations' FSC and/or domestic Treaty harvests that will occur further along the migration route over a reasonable range of potential run sizes.

In addition to fishing opportunities for FSC purposes, DFO acknowledges that in *Ahousaht Indian Band et al. v. Canada and British Columbia* the courts found that five Nuu-chah-nulth First Nations located on the West Coast of Vancouver Island - Ahousaht, Ehattesaht, Hesquiaht, Mowachaht/Muchalaht, and Tla-o-qui-aht – have “*aboriginal rights to fish for any species of fish within their Fishing Territories and to sell that fish, with the exception of geoduck*”. The Department is actively working with the First Nations to accommodate their rights without jeopardizing Canada’s legislative objectives and societal interests in regulating the fishery.

DFO consults with Aboriginal groups when allocation decisions may potentially affect them in accordance with S. 35 of the *Constitution Act, 1982*, relevant case law, and consistent with Departmental policies and considerations.

Feedback from consultation sessions is relied on to measure the performance of providing first priority to First Nations for opportunities to catch fish for FSC purposes and any treaty obligations. The Department is working with First Nations to develop information summaries to inform specific performance measures for incorporation in the future.

6.3.2 Recreational Fisheries

A primary objective in the recreational fishery is to manage fisheries for sustainable benefits and striving to maintain a predictable opportunity to fish with the expectation of catch.

Under the Department’s *Allocation Policy for Pacific Salmon*, after FSC fisheries, the recreational sector has priority for directed fisheries for Chinook and coho salmon. For sockeye, pink and chum salmon, the policy states that recreational harvesters be provided predictable and stable fishing opportunities. Recreational harvest of sockeye, pink, and chum will be limited to a maximum of 5% of the combined recreational and commercial harvest of each species on a coast-wide basis averaged over a rolling 5 year period. In the Transboundary Rivers, retention of sockeye, pink and chum salmon in the recreational fishery is only permitted in the Alsek River system (noting that neither pink nor chum salmon migrate into recreational fishery areas in the Alsek River system).

If stock abundance information suggests that conservation objectives cannot be attained, closures or non-retention regulations will generally be applied. In some cases, recreational fisheries with a non-retention restriction in place may remain open provided the recreational fishery is not directed on any stocks of concern, nor is the impact on any stocks of concern significant in accordance with the *Selective Fishing Policy*.

Prior to the initiation of a directed commercial fishery on specific Chinook and coho salmon stocks, recreational fisheries within the geographic area/ watershed will be provided full daily and possession limits for those stocks. Decision guidelines may also identify considerations for changing the area of the fishery, modifying dates or changing daily limits.

6.3.3 Commercial Fisheries

The objective is to sustain and/or improve the economic performance of fisheries, to provide certainty to participants, and to optimize harvest opportunities in accordance with conservation and allocation policies. However, stocks of concern and allocation priorities may frequently constrain commercial fishing resulting in less than optimal opportunities.

The *Allocation Policy for Pacific Salmon* provides for a commercial harvest of sockeye, pink, and chum of at least 95% of the combined recreational and commercial harvest of each species on a coast-wide basis over time. Commercial harvest of Chinook and coho salmon will occur when abundance permits and First Nations' FSC, and recreational priorities are considered to have been addressed.

The ability to achieve specific sector target allocations is often compromised by conservation constraints and other factors. Allocation targets are not catch targets for each sector. While the Department will usually plan and implement fisheries to harvest fish in accordance with allocation targets, opportunities may be provided that are inconsistent with the allocation targets. When one commercial gear type is unlikely to achieve its allocation, the usual approach will be that options to harvest the uncaught balance by that gear type will be examined in a different area.

Low impact fisheries (limited number of vessels) generally occur prior to those having a higher impact (full fleet), particularly at low run sizes, at the start of the run when run sizes are uncertain or when stocks of concern have peaked but continue to migrate through an area.

6.3.4 Excess Salmon to Spawning Requirements Fisheries

Salmon fisheries are managed with the objective of reaching escapement targets or harvesting a certain proportion of the run. Uncertain forecasts, inaccurate in-season run size estimates and mixed-stock concerns can result in escapements to terminal areas that are in excess of the spawning habitat and/or hatchery capacity. In these cases, Excess Salmon to Spawning Requirements (ESSR) fisheries may occur.

The Department will attempt, wherever practical, to eliminate or minimize ESSRs by harvesting in the FSC, recreational, and commercial fisheries. It is not the intention of the Department to establish new ESSR fisheries to displace existing fisheries.

First priority will be to use identified surpluses to meet outstanding FSC requirements which cannot be met through approved FSC fisheries. This may be done under a communal licence. As a second priority, the local band or Tribal Council may be offered the opportunity to harvest all or part of the surplus under an ESSR licence.

7 DECISION GUIDELINES AND SPECIFIC MANAGEMENT MEASURES

Comprehensive decision guidelines outline management responses that will be invoked under a range of pre-season and in-season circumstances, and the general rationale to be applied in making management decisions.

Decision guidelines are meant to capture general management approaches with the intention of working towards multi-year management plans.

Specific fishing plans and decision guidelines for the Transboundary rivers are described in respective Sections 5 of Appendices 1 to 3.

7.1 General Decision Guidelines

7.1.1 Pre-season Planning

Development of decision guidelines is part of the pre-season planning process. Development is guided by relevant departmental policies, scientific advice, international considerations and obligations, consultation with First Nations, commercial and recreational harvesters, advisory groups and the experience of fishery managers.

Pre-season decisions include the development of run forecasts, escapement targets, exploitation rate limits, sector allocations and enforcement objectives. Generally the stock status provides the background for the types of decisions to contemplate with regards to prosecuting directed fisheries as summarized in Table 6 below.

Table 6. Status criteria for Pacific salmon as outlined by DFO stock assessment staff.

Outlook Category	Category Definition	Criteria	General Fisheries Expectations/Consequences
1	Stock of concern	Stock is (or is forecast to be) less than 25% of target or is declining rapidly.	Fisheries opportunities highly restricted including non-retention, closures or other measures. Likely requirement for management measures in fisheries targeting co-migrating stocks to minimize by-catch or incidental impacts.
2	Low	Stock is (or is forecast to be) well below target or below target and declining.	Directed fisheries opportunities unlikely or very limited (subject to allocation policy considerations). Potential requirements for management measures in fisheries targeting co-migrating stocks to minimize by-catch or incidental impacts.
3	Near Target	Stock is (or is forecast to be) within 25% of target and stable or increasing.	Directed fisheries possible subject to allocation policy and other considerations laid out in IFMPs, including measures to address weak stocks that may be present during fisheries.
4	Abundant	Stock is (or is forecast to be) well above target.	Directed fisheries are likely for all harvesters subject to allocation policy and other considerations laid out in IFMPs, including measures to address weak stocks that may be present during fisheries.

7.1.2 In-season Decisions

In-season decision trigger points vary from fishery to fishery depending on type, availability and quality of in-season information and the established advisory, consultation and decision-making processes. Decisions include opening and closure of fisheries, level of effort deemed acceptable, gear type restrictions, deployment of special projects, etc. Where possible, in-season decisions will be consistent with pre-season plans; however, the implementation and applicability of decision guidelines and pre-season plans can be influenced in-season by a number of factors. These include: unanticipated differences between pre-season forecasts and in-season run size estimates; unexpected differences in the strength and timing of co-migrating stocks; unusual migratory conditions; the availability and timeliness of in-season information; and unexpected environmental conditions.

7.1.3 Selective Fisheries

Selective fishing is defined as the ability to avoid non-target fish, invertebrates, seabirds, and marine mammals or, if encountered, to release them alive and unharmed (see *Policy for Selective Fishing in Canada's Pacific Fisheries*). Selective fishing technology and practices will be adopted where appropriate in all fisheries in the Pacific Region, and there will be attempts to continually improve harvesting gear and related practices.

All sectors have responded positively to the growing conservation consciousness. First Nations have embraced the principles of selective fishing by adopting more selective fishing gear, as often these types of gear reflect a traditional way of fishing. The Canadian commercial fishing sector has developed its own Canadian Code of Conduct for Responsible Fishing Operations. Over 80% of Canada's fishing organizations have signed on and ratified the Code that is overseen by a Responsible Fishing Board. Similarly, the

recreational fishery in the Pacific Region developed a Code of Conduct. In addition, DFO has worked with the Sport Fishing Institute (SFI) on a Tidal Angling Guide certification program. The SFI (see: <http://www.sportfishing.bc.ca/>) and 'go2HR', the resource for people in B.C. Tourism (see: <https://www.go2hr.ca/>), have developed an Industry Training Authority approved Tidal Angling Guide certification program. The first of its kind in North America, this program encompasses Transport Canada requirements including the Small Vessel Operator Proficiency certification (SVOP). The SVOP and other certificates address federal requirements for non-pleasure, passenger carrying vessels operating on the B.C. coast.

7.1.4 Post-Release Mortality Rates

The salmon conservation and fisheries management measures in this IFMP are based on many considerations, including estimates of the mortality rates of salmon that are released from the various types of fishing gear that are used in commercial, recreational and First Nations fisheries. Post-release mortality rates can vary substantially and depend on many factors, including the location of the fishery, the unique characteristics of each type of fishing gear and method, and the species of salmon that is captured and released. In April 2001, DFO announced revisions to the post-release mortality rates that had been used by DFO in previous years. The mortality rates applied by DFO to each gear type and fishery prior to 2001, and the revised rates announced by DFO in 2001 with some more recent revisions are summarized in Table 7. The revised rates reflect the results of additional research on post-release mortality rates that were available at that time. DFO has generally continued to use these post-release mortality rates each year in the development of annual fishing plans.

Table 7. Estimated Post-Release Mortality Rates

Fishery	Pre 2001 Post-Release Rates (for historical comparison)	2001 Post Release Rates
First Nations Fisheries	When using the same gear and methods identified below the same mortality rates were applied.	Various – Depending on gear used and fishery. Gill net – 60% Beach seine – 5% for sockeye and coho in river Fraser. Modified Shallow Seine – 10% for sockeye and coho in-river Fraser. Fishwheel – 5% for sockeye and coho in-river Fraser.
Recreational troll gear – sockeye, coho, pink and chum.	10%	10% except 3% for sockeye in-river Fraser.
Recreational troll gear – Chinook	15%	15%
Recreational mooching gear – coho and Chinook.	10% for coho, 15% for Chinook.	20% for coho in Areas 1&2; 16% for coho in Areas 3 to 10; 10% for coho in other areas; 15% for Chinook in all areas.
Commercial Gillnet	60% to 70%	60% with provision for rates as low as 26%* where selective techniques warrant.
Commercial Seine – North Coast (Areas 1 to 10)	10% to 25%; 5% in Area 4 special seine fishery.	15% all areas, except 10% in the Area 4 special seine fishery.
Commercial Seine – South Coast (Areas 11 to 29)	15% to 25%	25% Johnstone Strait; 70% Area 20 – coho; 25% all areas for sockeye.
Commercial Troll – All Areas	26%	10% sockeye, 15% coho and Chinook.
Commercial tangletooth net 3.5” mesh	n/a	10% sockeye, 15% coho

*Revised from 40% to 26% for 2011 based on a study done specific to the Skeena in the North Coast

DFO will review the post-release mortality rates currently used for salmon fisheries in Canadian waters and update Table 7 as new information becomes available. Since 2001, additional research has been conducted on post-release mortality rates of salmon, and additional fishing methods and gear types have been implemented (e.g. beach seining, recreational catch and release study for Fraser sockeye salmon) in some salmon fisheries. The pre-2001 post-release mortality rates are included for historical comparison indicating which fisheries rates have changed. The 2001 post-release mortality rates currently applied by DFO for salmon fisheries, in some cases, are not the same as the rates that are currently applied by the bi-lateral Chinook Technical Committee under the Pacific Salmon Treaty. The results from the DFO review of mortality rates will be used to inform any additional revisions to the post-release mortality rates that are required to address these issues in the development of salmon IFMPs in future years.

7.2 Chinook – AABM/ISBM Management

Chinook salmon fisheries in B.C. are managed under the umbrella of the PST, with domestic considerations for stocks of concern, allocation between sectors of the fishery, and application of selective fishing practices.

With the exception of the Transboundary rivers, which have separate provisions for Chinook salmon management (PST, Chapter 1, Annex IV), the basis for managing fisheries impacting Chinook salmon from Alaska to Oregon is the Chinook abundance-based management system outlined in Chapter 3 of the PST. This management system was adopted in 1999 and defined harvests of Chinook through 2008. Chapter 3 of the PST, revised for implementation in 2009, maintains the abundance-based management framework established under the 1999 Agreement.

Two types of Chinook salmon fisheries are identified in the PST, Chapter 3: Aggregate Abundance Based Management (AABM) fisheries; and, Individual Stock Based Management (ISBM) fisheries. Three mixed-stock aggregate fisheries make up the AABM fisheries identified by the PST including: 1) Southeast Alaska (SEAK) sport, net and troll fisheries; 2) Northern British Columbia troll and Haida Gwaii (Queen Charlotte Islands) sport fisheries; and 3) West Coast of Vancouver Island (WCVI) troll and WCVI outside sport fisheries. These fisheries are managed to an annual total allowable catch based on the forecast abundance of the aggregate of stocks that contribute to each fishery. Accounting of Chinook salmon fisheries for the PST occurs from October 1 in one calendar year, to September 30 in the next calendar year. For more detailed information on the management of B.C. Chinook salmon fisheries under the PST, Chapter 3 arrangements, please see the IFMP for Salmon in Northern BC.

Further explanation and the text of the Chinook salmon agreements can be found on the PSC website at: www.psc.org/Index.htm. Specific details of the arrangements for Stikine and Taku Chinook salmon management appear in Appendix 2, Section 5.1 (Stikine) and Appendix 3, Section 5.1 (Taku) of this document.

The Chinook Technical Committee (CTC) is responsible for completing a review of how AABM fisheries performed relative to preseason indices and to complete the final calibration of the Chinook Model for the upcoming fishing season. The preliminary calibration provides the Abundance Indices (AI) that are required for determining the preseason estimated allowable catches for the three AABM fisheries described above. To illustrate, the AIs and the associated allowable catches for 2014 are shown in Table 8.

Table 8. Coast-wide AABM Chinook salmon abundance indices and allowable catches for 2014.

			SEAK	NBC	WCVI
Abundance Index	2014	Pre-season	2.57	1.99	1.20
		Actual	2.13	1.68	1.03
Allowable Catch	2014	Pre-season	439,415	290,326	205,356
		Actual	367,095	245,099	176,264

The remaining Canadian Chinook salmon fisheries identified in the PST Chapter 3 agreements are considered ISBM fisheries. For Canadian ISBM fisheries, the agreement identifies a general obligation that limits the total adult equivalent mortality rate for individual stock groups to 63.5% of that which occurred in the 1979 to 1982 base period.

8 COMPLIANCE PLAN

8.1 Compliance Management Objectives

Conservation and Protection (C&P) is mandated to protect fisheries, waterways, aquatic ecosystems and resources from unlawful exploitation and interference. Fishery officers provide compliance promotion and enforcement services in support of legislation, regulations and management measures implemented to achieve the conservation and sustainable use of Canada's aquatic resources, the protection of species at risk, fish habitat and oceans.

In carrying out activities associated with the compliance and enforcement of Pacific salmon fisheries, outlined in this management plan, C&P will utilize intelligence-led and principle-based approaches and practices consistent with the *Three Pillars of the C&P National Compliance Framework and the DFO Compliance Model*:

- I. Voluntary compliance promotion through education, shared stewardship and user engagement;
- II. Intelligence-led monitoring, control and surveillance activities;
- III. Management of major cases /special investigations in relation to complex compliance issues.

8.2 Regional Compliance Program Delivery

C&P utilizes a broad scope of activities to deliver compliance and enforcement services within Pacific Region salmon fisheries. The main activities of C&P include:

- Prioritizing compliance and enforcement measures that support DFO management objectives which aim to sustain the salmon stocks and fisheries;
- Developing and maintaining positive relationships with First Nations communities, recreational groups and commercial interests through dialogue, education and shared stewardship;
- Ensuring the development and supporting of a fishery officer complement that is skilled, well-equipped, well-informed, safe and effective;
- Ensuring that salmon fisheries participants are aware of their obligations to comply with licence conditions;
- Monitoring and supporting at-sea observers and dockside monitors to ensure accurate catch monitoring and reporting;
- Inspecting fish processors, cold storage facilities, restaurants and retail outlets to verify compliant product;
- Conducting high-profile fishery officer presence during patrols by vehicle, vessel and aircraft to detect and deter violations;

- Maintaining a violation reporting 24-hour hotline to facilitate the reporting of violations;
- Supporting traceability initiatives within the salmon fishery for enhanced accountability, e.g., monitoring and verifying salmon catches and offloads to ensure accurate and timely catch reporting and accounting, including coverage of dual-fishing opportunities;
- Collecting and utilizing intelligence to identify and target repeat and more serious offenders for enforcement effort, including laundering and illegal sales of salmon;
- Utilization of enhanced surveillance techniques, technology and covert surveillance techniques as a means to detect violations and gather evidence in salmon fisheries-of-concern;
- Responding to the most serious habitat violations identified by the DFO Fisheries Protection Program;
- Continue to utilize restorative justice forums to reduce harm to fisheries, species-at-risk, and fisheries habitat.

Appendix 4, Section 2 describes how the regional compliance program will be delivered in the Transboundary area.

8.3 Consultation

Education, information and shared stewardship activities are the foundation for achieving voluntary compliance. C&P fishery officers regularly participate in consultations with resource users and the general public. C&P participates in all levels of the advisory process and is committed to including local fishery officers to provide users and the community-at-large with specific information related to compliance and enforcement perspectives. C&P will continue to meet with individual First Nations at the local level through the First Nations Liaison Program and with First Nations planning committee meetings where many First Nations gather.

C&P works closely with the Fisheries and Aquaculture Management sector to ensure that fishery management measures are enforceable and implemented in a controlled and fair manner. Fishery officers participate in local fishery management roundtables, sport fishery recreational advisory committees and participate at Sport Fishery Advisory Board meetings.

On a day-to-day basis, fishery officers are often the most visible faces of the Department. When the fishing community and general public provide comments, they are shared with C&P managers, fisheries managers and fisheries protection staff. Public feedback is critical in identifying issues of concern and providing accurate feedback on emerging issues. C&P encourages the timely reporting of suspicious behavior and violations to a local office or the Observe, Record, Report hotline.

Consultation initiatives undertaken by C&P in the Transboundary area are described in Appendix 4, Section 3.

8.4 Compliance Strategy

In 2018 specific objectives for the salmon fishery will be to focus compliance management efforts on:

- Monitoring for compliance of implementation of Chinook salmon conservation measures and restrictions in Transboundary Rivers fisheries.
- Supporting the development and implementation of the Strategic Framework for Fishery Monitoring and Catch Reporting in Pacific Fisheries.
- Monitoring in-river and marine approach waters using intelligence to target priority fisheries and compliance issues.
- Working with stakeholders to improve regulatory compliance.

Salmon fishery compliance and enforcement continues to be a significant priority for C&P. Concurrent to the salmon season, compliance and enforcement attention may be required to address violations related to fisheries habitat, shellfish harvest in contaminated areas, and the protection of species at risk. In order to balance multiple program demands, C&P applies a risk-based integrated work planning process at the Regional- and Area levels. This process identifies priorities so that resources are allocated to the areas of greatest need. Conservation and Protection cannot be effective without the commitment of all salmon harvesters and the salmon industry to the conservation of this valuable resource.

The Compliance Strategy for the Transboundary Rivers in 2019 is summarized in Appendix 4, Section 4.

9 PERFORMANCE/EVALUATION CRITERIA

This section is intended to outline measurable indicators to determine whether or not those management issues outlined in IFMP Section 4 are being addressed and those objectives outlined in IFMP Section 5 are being achieved. These indicators may include those specifically developed for the IFMP, as well as from existing evaluation processes.

Potential performance indicators will be required for: assessing conservation and fishery sustainability; Wild Salmon Policy objectives; domestic and international objectives; First Nations, commercial and recreational objectives; allocation objectives; enhancement objectives, as well as, other indicators of interest.

The Department intends to work collaboratively with First Nations and stakeholders to review existing and/or develop new performance indicators that should be included as part of the performance/evaluation criteria.

The results of the previous year's annual review (e.g. 2018 season) for the Transboundary Rivers are provided in: Appendix 1, Section 8 (for the Alsek); Appendix 2, Section 9 (for the Stikine); and, Appendix 3, Section 9 (for the Taku) of this document.

APPENDIX 1: ALSEK RIVER INTEGRATED SALMON FISHERIES MANAGEMENT PLAN, 2019.

1 INTRODUCTION

The Alsek River originates in the Yukon Territory and northwestern British Columbia and flows into the Gulf of Alaska via Dry Bay, which is located approximately 80 km southeast of Yakutat, Alaska (Figure 3). Much of the watershed lies within the national parks and protected areas of the International Kluane/Wrangell-St. Elias/Glacier Bay/Tatshenshini-Alsek World Heritage Site (see: <http://whc.unesco.org/en/list/72>). Three ecoregions are represented in the area including the Yukon-Stikine Highland, Ruby Ranges and the St. Elias Mountain ecoregions. Coastal portions lie within the Pacific Maritime ecozone (Smith, *et al.* 2004¹²). The topography is diverse, from dynamic braided river valley flats, to extensive icefields bounded by the highest mountains in Canada, to the drier and highly variable temperatures of the interior highlands.

1.1 Description of the Alsek River Salmon Resources

The Alsek River drainage is a moderate producer of Chinook, sockeye and coho salmon most of which spawn in the Canadian portion; limited spawning activity has been observed and documented in U.S. tributaries in the lower river. Only low numbers of pink and chum salmon generally occur in this drainage. Salmon access to headwaters of the Alsek River proper is denied by a major velocity barrier at Turnback Canyon which is located roughly 130 km upstream from the Canada/U.S. border. As a result, most spawning areas in Canada occur in the Tatshenshini River drainage and its headwater tributaries in the Yukon and northwestern B.C. and along the margins of lower Alsek River.

Salmon stocks returning to the Alsek River (also referred to as Alsek/Tatshenshini River) drainage are jointly managed by DFO, the Champagne-Aishihik First Nation (CAFN) and ADFG through the Transboundary Rivers Technical Committee (TTC) of the PSC.

1.1.1 Chinook Salmon

From 1997 to 2004, mark-recapture estimates of the total inriver run size of Alsek drainage adult Chinook salmon averaged approximately 9,900 fish (range: 5,580-15,856 fish). Although the tagging program terminated in 2004, total run size estimates have been made intermittently since that time using a combination of expanded Klukshu weir and genetic stock identification results. Estimates based on these data have ranged from 2,400 to 4,400

¹² Smith, C.A.S., Meikle, J.C., and Roots, C.F. (editors). 2004. Ecoregions of the Yukon Territory: Biophysical properties of Yukon landscapes. Agriculture and Agri-Food Canada, PARC Technical Bulletin No. 04-01, Summerland, British Columbia, 313 p.

large Chinook salmon. The run generally enters the river mouth in early May, peaks early June and has vacated the lower river by early July.

Although several spawning sites have been located throughout the Tatshenshini drainage, these populations have been aggregated into one Chinook CU (ALSEK) based on ecotypic and timing characteristics. Primary Chinook salmon spawning stocks include: Klukshu River; Blanchard River; Takhanne River; Goat Creek; and the mainstem Tatshenshini River.

The Klukshu River is the largest Chinook producing tributary of the Tatshenshini River. During years when system-wide population estimates were calculated from mark-recapture studies (1997-2004), Klukshu Chinook accounted for an average of 21.5% of the total Alsek Chinook escapement (range = 14.0% to 32.2%). However, since 2007, the Klukshu weir count on average has accounted for roughly 48% of the total escapement, as calculated from genetic stock identification (GSI) data. Based on weir counts, the spawning escapement in the Klukshu River over the past decade (2009-2018) has averaged approximately 1,200 Chinook salmon (historical range since 1976: 443 in 2017, to 5,394 in 1995). Since 1976, the escapement has displayed a declining trend with current cycle averages roughly one-half those of the late 1970's, and 1980's and 1990's.

1.1.2 Sockeye Salmon

Estimates of the total in-river run size of Alsek sockeye salmon have averaged approximately 64,000 fish over the past decade. Since 2011 the estimates have been based on a combination of weir and GSI data. The run generally enters the river mouth in early June, peaks early July and by early August has moved on to upstream spawning areas.

One River-type and three Lake-type sockeye Conservation Units have been identified for the Alsek River based on genetic and ecotypic attributes. The River-type CU is broadly distributed in the drainage from spawning populations in side-slough areas in the lower mainstem Alsek River to river spawning populations of the Takhanne, Blanchard and upper Tatshenshini River. The Lake-type CU's include: Klukshu, Blanchard and Nesketahin. Some populations exhibit bi-modal timing characteristics. For example, there is an early and late run into the Klukshu River with the early run peaking in mid-July, and the generally more abundant late run peaking early-to-mid September.

The status of Alsek sockeye salmon is monitored primarily through the operation of the Klukshu River weir where the recent 10-year (2009-2018) average escapement is approximately 10,747 sockeye salmon (historical range since 1976: 2,741 in 2008, to, 32,120 in 2003). On average (2000-2017), Klukshu sockeye escapement accounts for approximately 18% of the above border drainage escapement (determined by mark-recapture or GSI programs). Smoothed weir counts (10-year moving averages) indicate a waning trend in the total count with early time series 10-year averages declining by 45% to current levels. The early run component exhibits a more stable trend over the long term. Both early and late run inter-annual counts are highly cyclic characterized by unsustained highs and deep lows.

1.1.3 Coho Salmon

System-wide population estimates for Alek coho salmon are not available. For management purposes, Alek coho salmon are treated as one stock. One coho CU has been identified (Alek) based on ecotypic characteristics. Information regarding coho spawning distribution in the Alek-Tatshenshini drainage is incomplete and not nearly as extensive as that for Chinook and sockeye salmon, which have the benefit of radio-tagging data and GSI baselines. Some of the known coho spawning locations include: Klukshu River, Takhanne River and Village Creek.

Counts of coho salmon through the Klukshu weir have averaged 1,977 fish over the (2009-2018) period and have ranged from 30 (1978) to 9,921 (2002) since enumeration commenced in 1976. Unfortunately, the coho salmon counts constitute an incomplete record of total abundance into the Klukshu River since the weir is pulled due to inclement weather conditions before the migration has finished. Nevertheless, since 1976, there is an overall increasing trend in the count and the current 10-year average exceeds those in the early 1980's by a factor of roughly 2.2.

1.1.4 Pink and Chum Salmon

Little information exists for Alek pink and chum salmon. Based on very low and intermittent catches in the U.S. fishery in Dry Bay at the river mouth, combined with the lack of observations of these species in the Canadian section of the drainage, suggests production is low. No Alek pink or chum salmon CU's have been identified.

1.1.5 Steelhead

Steelhead have been observed very infrequently and in low numbers in the upper Tatshenshini (Village Creek and Klukshu River). Information regarding this species in the Alek River drainage is limited.

1.2 Description of Alek-Tatshenshini River Salmon Fisheries

There are two fisheries that target salmon in the Canadian section of the Alek River: the First Nation (FSC) fishery and the recreational fishery (Figure 3). The principal U.S. fishery that targets Alek stocks is a commercial set gillnet fishery that operates in Dry Bay, Alaska at the mouth of the Alek River. A small subsistence fishery also operates in Dry Bay. Alek River salmon stocks are incidentally harvested (in unknown quantities) in Yakutat area marine and coastal areas, contributing to recreational, subsistence and commercial gillnet and troll fisheries.

1.2.1 Champagne and Aishihik First Nations (CAFN) Fishery

The longest standing fishery within the Alek River drainage in Canada is the CAFN fishery, which has relied on the salmon resources from the watershed since pre-European contact. In years of unrestricted fishing opportunity, approximately 100-150 members of the CAFN harvest primarily Chinook and sockeye salmon in the upper Tatshenshini

drainage (Figure 3). Recent 10-year average (2009-2018) catches include 61 Chinook salmon, 1,034 sockeye and 16 coho salmon. Catches have generally declined over the past 3-4 decades. Although catches have been low, traditionally the preferred run is the early sockeye run due to its good condition and early timing which makes it most suitable for drying. The later, but more abundant late summer Klukshu run occurs when the weather is generally becoming wetter and less suitable for drying. The main fishing locations include the Klukshu River (60 km south of Haines Junction, Yukon) at Klukshu Village, and near the mouths of Vand and Motherall creeks, Village Creek and to a lesser extent Goat Creek and Blanchard River.

Fishing generally commences in late June and continues until October. Traditional fish traps have been used to harvest salmon at the outlet of Klukshu Lake and gaffs are used in many other fishing areas. Set nets and angling have become more popular over time. In some years of low returns, special fishing arrangements for elders have occurred at the Klukshu weir.

1.2.2 Recreational Fishery

Recreational fisheries in the Alsek River occur both in British Columbia and in Yukon with the majority of the effort occurring in Yukon on the Tatshenshini River near the abandoned settlement of Dalton Post (Figure 3). The number of anglers participating in the Alsek River recreational fisheries varies considerably from year to year, and is influenced by a number of factors such as run strength, river conditions and weather. For example, in 2014 only 33 recreational anglers participated in the Alsek River recreational fishery in the Yukon portion of watershed due to the weak Chinook salmon run; this was down considerably from 2012 when 280 anglers reported fishing there.

2 RUN OUTLOOKS FOR ALSEK RIVER SALMON IN 2019

It is recognized that there is much uncertainty with pre-season forecasting in the Alsek River. Recent survivals of Chinook and sockeye have been highly variable which has created significant challenges in forecasting with any certainty. Hence, the pre-season outlook serves to guide the pre-season planning and early in-season management stages, eventually giving way to in-season run projections when they become available.

2.1 Chinook Salmon

The Klukshu River Chinook escapements in 2013 and 2014, the two principal brood years that will contribute to the 2019 run, were 1,227 and 832 Chinook salmon, respectively. These were below the previous 10-year average (2003-2012) of approximately 1,286 Chinook salmon. They were above and within, respectively, the escapement goal range of 800 to 1,200 Chinook salmon as determined by the Transboundary Technical Committee. Based on these primary brood year escapements, the traditional pre-season stock-recruit outlook for Klukshu River Chinook salmon in 2019 is 1,127 fish. This includes a 48% adjustment to account for the recent 5 year forecast

model error. This forecast is slightly below the recent 10-year average (2009-2018) run size of approximately 1,200 Chinook salmon and just above the escapement goal range.

2.2 Sockeye Salmon

The 2019 overall Alsek River drainage sockeye salmon run is expected to be approximately 44,951 fish; this is below the recent 10-year average (2009-2018) run size of approximately 63,861 sockeye salmon. The outlook for 2019 is based on a predicted run of 10,339 Klukshu River sockeye salmon derived from a Klukshu River stock-recruitment model (2011 Eggers et al.) and an assumed Klukshu River contribution to the total run of approximately 23%, which is based on mark-recapture results (2000-2004) and run size estimates using GSI (2005-2006, 2011-2014). The model output was corrected with the recent 3-year model error of 53% to reflect recent variability in marine survival of sockeye salmon. Principal contributing brood years were 2014 (Klukshu River escapement of 12,148 sockeye salmon) and 2015 (Klukshu River escapement of 11,363 sockeye salmon); the previous 10-year average (2004-2013) Klukshu River sockeye salmon escapement was approximately 10,665 fish. Based on the current stock-recruitment model, the range of Klukshu River escapements that appears most likely to produce optimum yields is 7,500 to 11,000 sockeye salmon.

2.3 Coho Salmon

The coho salmon primary brood year escapements through the Klukshu River weir in 2015 (1,810 fish) and 2016 (2,141 fish) suggest that the 2019 run will be above average. The recent 10-year average (2009-2018) weir count is approximately 1,961 coho salmon.

3 SPAWNING ESCAPEMENT GOALS FOR ALSEK SALMON

3.1 Chinook Salmon

In February 2013, the TRP recommended the escapement target range for the Klukshu River Chinook stock be revised from a range of 1,100 to 2,300 fish, to a new range of 800 to 1,200 fish, with an S_{MSY} point target of 1,000 fish. An overall escapement goal for the Alsek River was also identified, with a range of 3,500 to 5,300 and a S_{MSY} point target of 4,700 fish. The analyses and rationale for this goal had been peer-reviewed and accepted by the Centre for Scientific Advice Pacific (CSAP) in October 2010. Based on a recommendation by the PSC, the Parties adopted the recommendations effective 2013.

3.2 Sockeye Salmon

In February 2013, the TRP recommended the escapement target range for the Klukshu sockeye stock be revised from a range of 7,500 - 15,000 fish, to a range of 7,500 - 11,000 fish, with a S_{MSY} point target of 9,700 fish. In addition, an overall escapement goal range of 24,000 - 33,500 and a S_{MSY} point target of 29,700 fish for Alsek River sockeye were recommended as a result of the comprehensive review conducted by the Transboundary Technical Committee. This goal had also undergone CSAP peer-review. Based on a

recommendation by the PSC, the Parties adopted the recommended approach effective 2013.

3.3 Coho Salmon

An escapement goal for coho salmon in the Alsek River has not yet been established.

4 CONSULTATION PROCESSES FOR ALSEK SALMON FISHERIES

The development of decision guidelines and specific fishery management plans for Alsek fisheries involves consultation with the YSSC, CAFN as well as consideration of DFO policies, deliberations of the Transboundary Rivers Panel, scientific advice and the experience of fishery managers. In Yukon, the First Nation consultative process is guided by individual First Nation Final Agreements.

4.1 Yukon Umbrella Final Agreement and the CAFN Final Agreement

The Yukon First Nation Umbrella Final Agreement (UFA) was approved in 1993 by the Government of Canada, Government of Yukon and Yukon First Nations as represented by the Council of Yukon First Nations (CYFN). The UFA served as a framework for the establishment of individual Yukon First Nation Final Agreements. The Champagne-Aishihik FN (CAFN) Final Agreement was signed May 29, 1993 and ratified in 1995 (<https://www.aadnc-aandc.gc.ca/eng/1100100030683/1100100030691>). Yukon First Nation Final Agreements represent an exchange of undefined aboriginal rights for defined treaty rights. Specifically, a Yukon First Nation Final Agreement, which is a considered a modern-day treaty, sets out specific rights for the particular First Nation and its citizens.

The UFA and CAFN Final Agreement also clarify the roles and responsibilities of Governments, First Nations and the committees, sub-committees and councils created to implement the UFA and Final Agreement including protocols for consultation. “Consultation” means to provide:

- to the party to be consulted, notice of a matter to be decided in sufficient form and detail to allow that party to prepare its views on the matter;
- a reasonable period of time in which the party to be consulted may prepare its views on the matter, and an opportunity to present such views to the party obliged to consult; and
- full and fair consideration by the party obliged to consult of any views presented.

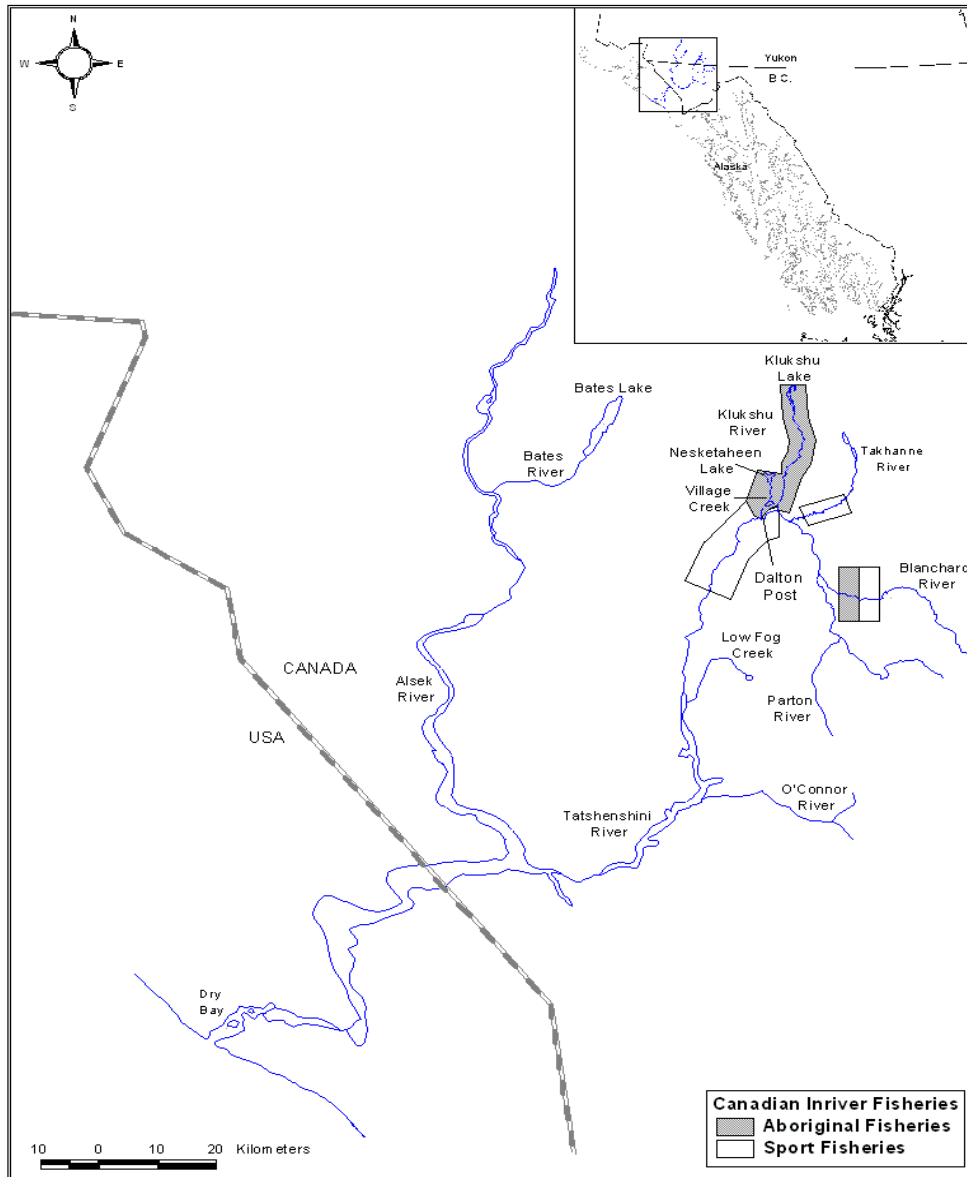


Figure 4. The Asek River and principal Canadian fishing areas.

4.2 Yukon Salmon Sub-Committee (YSSC)

The YSSC, a public advisory body (a sub-committee) of the Yukon Fish and Wildlife Management Board, was established under the UFA as... “*the main instrument of salmon management in the Yukon*”. The mandate of the YSSC is to garner public input into matters related to salmon through its authority to make official recommendations to the Minister of DFO and to Yukon First Nations. These recommendations may apply to all matters related to salmon, their habitats and management including legislation, research, policies, and programs but tend to focus on salmon harvest management. In particular, the UFA specifies that the YSSC consult with First Nations on allocations and seek input from the public, and local Renewable Resource Councils (RRC) which were also established under

the UFA, on salmon management plans. For example, the Alsek RRC can make recommendations to the YSSC on the timing and content of salmon management plans, allocation of commercial and other uses of salmon, and on other matters pertaining to the purview of the YSSC. Specific protocols including response options and timeframes for the Minister are outlined in the UFA and Final Agreements with respect to how the recommendations received from the YSSC are handled.

The members of the YSSC come from all regions of the Yukon and represent both First Nation and non-First Nation populations. The composition of the ten-member Committee is laid out in the UFA and is carefully structured to ensure diversity and balance. YSSC members consist of Yukon Fish and Wildlife Management Board appointees and nominees from Canada and the Yukon First Nations from the Alsek and Yukon River (including Porcupine) drainage basins. The YSSC has two seats allocated to provide input on matters affecting salmon in the Alsek River drainage.

For the 2019 season, the YSSC has recommended that angling for salmon be prohibited in the Alsek River watershed prior to August 16. This recommendation was prompted by the series of poor returns and failure to achieve minimum spawning escapement requirements for both Chinook and sockeye salmon in the Klukshu river. The Minister of Fisheries and Oceans Canada has accepted the YSSC's recommendation.

4.3 Transboundary Rivers Panel of the Pacific Salmon Treaty

Canada/U.S. arrangements for the coordinated conservation and abundance-based management of salmon stocks originating in the Canadian portion of the Alsek River are specified in Chapter 1, paragraph 3(c), of Annex IV of the PST. The Transboundary Rivers Panel oversees the implementation of these arrangements with technical support from the joint Transboundary Technical Committee. Fishery management, conservation, enhancement and stock assessment plans are reviewed and discussed annually by the Panel and/or the Committee. Recommendations ensuing from the deliberations of the Panel can be made to the Pacific Salmon Commission which, upon review, may make recommendations to respective national governments.

The obligations and provisions contained in Chapter 1 of the PST and subsequent recommendations from the PSC adopted by the Parties provide the back-drop for the development of this IFMP. Management regimes under Annex IV will be implemented by Fisheries and Oceans Canada and U.S. agencies for the 2019 season.

5 ALSEK-TATSHENSHINI DECISION GUIDELINES FOR 2019

Although Canada/U.S. harvest sharing arrangements for Alsek Chinook and coho salmon have yet to be negotiated, interim arrangements for sockeye salmon through 2028 are outlined in Chapter 1, Annex IV of the PST which states... *“the interim management intent of the United States is to pass sufficient sockeye salmon into Canada to achieve the agreed Klukshu River spawning escapement goal range plus 3,000 sockeye salmon”*.

Because of the uncertainty associated with pre-season outlooks; in-season data takes priority in supporting domestic management decisions. In-season management primarily

focuses on the projections of abundance of salmon into the Klukshu River derived from Klukshu counts expanded by historical and/or in-season timing data. The following Table 9 (below) summarizes management thresholds, i.e. trigger points, for implementation of more stringent conservation actions. Trigger points refer to the projected season total counts below which additional restrictions, including closures, in the specified fishery can be expected. Dates reflect when in-season projections are expected to be used.

Table 9. Alsek-Tatshenshini salmon management thresholds for conservation actions.

Run Component	First Nation Triggers	Recreational Triggers	Date	Potential First Nation Harvest
Chinook	800	1,000	>July 18	10% of Klukshu count
Early Sockeye	1,500	4,500	>July 18	10% of Klukshu count
Total Sockeye	7,500	10,500	>Sept.06	10% of Klukshu count

[note: Trigger points are based on projected Klukshu counts; dates indicate when in-season information is expected to be available].

The trigger points outlined above are based on escapement requirements and Basic Needs Allocation (BNA) obligations. The general approach is to consider FN restrictions whenever it appears the lower end of respective biological escapement goal ranges will not be achieved. The triggers for the recreational fishery are intentionally set higher than the First Nation fishery to reflect the priority for the First Nation fishery. They are derived from the low end of the escapement goal range plus the BNA established in the CAFN Final Agreement. For example, the recreational trigger of 10,500 for overall sockeye management, is the sum of 7,500 (lower bound of the escapement goal range) plus the BNA for CAFN of 3,000 sockeye.

In addition to constraints that may be imposed on fisheries to achieve escapement targets, several additional factors may influence the prosecution of salmon fisheries on the Alsek River. These factors may include environmental, stock abundance and fishery assessment program needs.

Fishery decisions are made by DFO based on the trigger points identified above and recommendations from the YSSC and the CAFN Government. Emergency actions will involve consultation with the YSSC and CAFN as per the protocol established in the CAFN Final Agreement.

6 ALSEK-TATSHENSHINI FISHERY PLANS FOR 2019

6.1 First Nation Fishery

6.1.1 Champagne-Aishihik First Nation Basic Needs Allocation

The CAFN Basic Needs Allocation (BNA) is defined as 200 Chinook salmon and 3,000 sockeye salmon. A BNA has not been established for coho salmon, although occasional harvest of this species by the CAFN does occur.

6.1.2 Alsek-Tatshenshini First Nation Controls and Monitoring of Removals

Based on the pre-season run outlooks, reducing or avoiding Chinook salmon harvest in the FSC fishery is recommended for 2019. Subject to conservation concerns, CAFN fishing activities are permitted 7 days a week. Any changes to the fishery management strategy will occur in accordance with the Alsek River Decision Guidelines and engagement of the Yukon Salmon Sub-Committee. Action triggers and subsequent management actions for CAFN FSC fisheries include:

- a) In-season projections of Chinook salmon into the Klukshu River will be made after July 18. If the projection is less than 800 Chinook salmon, Chinook non-targeting restrictions, fishing time restrictions and or area closures will be recommended. In the event of low abundance, and contingent on the operation of the Klukshu assessment program, up to 10% of the in-season count of Chinook salmon may be harvested for CAFN Elders. As in past years, the harvest of Chinook salmon on the Parton River, Goat and Stanley creeks will be limited by the CAFN to CAFN Elders;
- b) In-season projections of the early sockeye run into the Klukshu River will also be made after July 18. If the projection is less than 1,500 sockeye, similar restrictions as described for Chinook may be required. In the event of a closure, consideration will be given to allowing up to 10% of the Klukshu count of sockeye salmon to be harvested for Elders;
- c) In-season projections of the total sockeye run into the Klukshu River will be made after September 6. In this case, a projection of less than 7,500 sockeye would result in restrictions in the First Nation fishery being considered. In the event of a closure, consideration will be given to allowing up to 10% of the Klukshu count of sockeye salmon to be harvested for CAFN Elders.

In the event that in-season restrictions in the FSC fishery are required, management actions will only be implemented after consultation with the CAFN. In most cases, such actions will be precluded with additional limitations imposed on the recreational fishery. If CAFN harvesting at the Klukshu assessment site is necessitated due to low returns, cooperative attempts to collect biological data and samples from the catch may be contemplated.

Harvest monitoring in the FSC fishery is conducted by CAFN, and is reported through the Yukon Salmon Sub-Committee as per Paragraph 16.7.20 of the CAFN Final Agreement. This is an important function that informs the YSSC and DFO as to whether BNA and conservation requirements are being achieved.

6.1.3 Alsek-Tatshenshini First Nation Fishery Licencing

The CAFN has a communal fishing license for FSC purposes which authorizes persons designated by the First Nation to fish for Chinook, sockeye and coho salmon.

6.2 Alsek-Tatshenshini Recreational Fishery

Since portions of the Alsek River drainage occur in the Yukon and British Columbia, both the *British Columbia Sport Fishing Regulations* and *Yukon Territory Fishery Regulations*, which were created under the federal *Fisheries Act*, apply to recreational angling in respective areas of the Alsek-Tatshenshini watershed.

Recreational angling restrictions and requirements are subject to change in-season if additional conservation concerns arise, or if additional recreational opportunities become available. Changes are communicated through Fishery Notices, media reports, telephone information lines and/or postings on the Pacific Region Fisheries and Oceans Canada website at: <http://www.pac.dfo-mpo.gc.ca/fm-gp/rec/index-eng.htm>.

6.2.1 Alsek-Tatshenshini Recreational Fishery Control and Monitoring of Removals

Controls for the Alsek-Tatshenshini recreational salmon fishery include daily and possession limits, hook restrictions, area closures, catch record keeping requirements, catch reporting requirements and licencing requirements. Since the regulations governing the fishery differ by jurisdiction, the following sub-sections outline the main features for the Yukon and British Columbia portions of the drainage; generally most of the fishing effort occurs in the former.

Controls and Monitoring in those portions of the drainage located in the Yukon

Notwithstanding in-season variation orders, information on recreational fisheries for salmon in the Yukon, including possession limits, gear and area restrictions are outlined in the *Yukon Fishing Regulations Summary: 2019-2020*, which is available from: Fisheries and Oceans Canada, Whitehorse; Environment Yukon, Fish and Wildlife Branch of the Yukon Government, Whitehorse and district offices; and many outlets in Yukon (see: <http://www.env.gov.yk.ca/hunting-fishing-trapping/fishingregulations.php>). Unless specified through in-season variation order, the daily catch and possession limits for the recreational fishery in the Yukon portion of the Alsek watershed are summarized in Table 10.

Table 10. Species Daily Catch limit and Possession Limit (Yukon Recreational Fisheries).

Species	Daily Catch Limit	Possession Limit
Chinook	1	2
Sockeye	0 prior to Aug. 15 / 2 after	0 prior to Aug. 15 / 4 after
Coho	2	4
Aggregate (species combined)	2	4

In addition to specific provisions for Chinook and sockeye salmon, the gear, catch and area restrictions outlined in the 2019-2020 Yukon Fishing Regulations Summary booklet will apply to the recreational fishery unless in-season projections fall below the trigger points as outlined in the Decision Guidelines for 2019 as described previously.

The following specific provisions apply to recreational Chinook and sockeye salmon fisheries in the Alsek River watershed (Yukon portion) in 2019:

- a) A salmon angling (including catch and release) closure will be in effect April 1 through to August 15, 2019;**
- b) Due to a sustained period of poor returns, the daily catch and possession limits for Chinook salmon will be varied to 0 at the start of the season. Further management actions will be informed by in-season abundance;**
- c) The pre-season outlook projects a poor return of sockeye salmon in 2019. The daily catch and possession limits will be varied to 0 for the duration of the season unless in-season abundance estimates exceed management triggers (>4,500 by August 15 or >10,500 by September 6);**

Although angling for, retention or possession of Chinook and sockeye salmon will not be permitted in the recreational fishery prior to August 16, 2019, opportunities to retain sockeye salmon may be provided if in-season assessment programs identify that both spawning escapement and First Nation BNA harvests are likely to be exceeded after this date. Similarly, recreational harvest opportunities may be liberalized for coho salmon should a strong return materialize. Factors that will influence liberalization of recreational coho salmon harvest limits include:

- the status of the sockeye run and potential impacts of by-catch of sockeye during a directed coho recreational fishery.
- the status of the coho run and overall projected weir count.

In the recreational salmon fishery, the following closed/open times will be in effect for 2019:

- the closed times (all angling) for Klukshu River, Nesketahin Lake and Village Creek will be from June 15 to November 30. This includes the area downstream of the assessment program site (weir) on the lower Klukshu River and the side-channel of the Tatshenshini River in the vicinity of the Klukshu-Tatshenshini confluence down to Dalton Post;
- the salmon non-retention periods on the Takhanne and Blanchard rivers will be from July 24 to August 31;
- salmon non-retention in Klukshu Lake will be in effect year round; and

The above-noted closed areas are highlighted in Figure 4 which also draws attention to single hook and artificial fly only restrictions in specific waters.

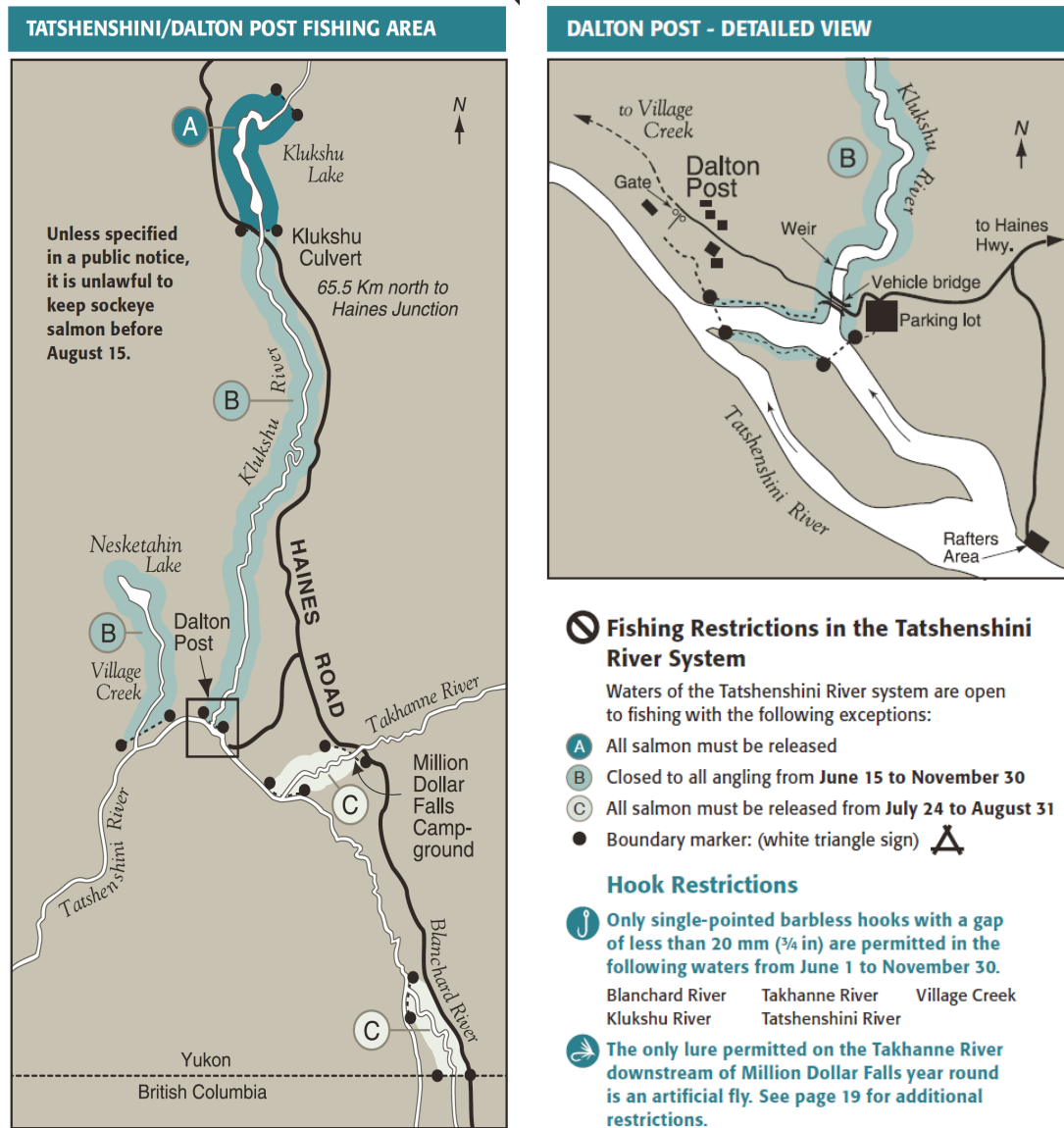


Figure 5. Area closures and gear restrictions on the Tatshenshini River and tributaries in the Asek drainage in the Yukon Territory.

[see: <http://www.environmentyukon.gov.yk.ca/fishing/fishingregulations.php>].

In-season recreational fishery monitoring will be conducted by DFO personnel through the conduct of a creel census in the Dalton Post area. Fishery Officers and other partnering government enforcement personnel (e.g. Yukon Government Conservation Officers) will conduct enforcement patrols in the recreational fishery. Post-season catch estimates will be derived from information collected through the submission of Yukon Salmon Conservation Catch Card (mandatory) and in-season creel census.

Controls and Monitoring in those portions of the Alsek River drainage located in B.C.

Hook restrictions, catch record keeping requirements, catch reporting requirements and licencing requirements in the B.C. portions of the Alsek-Tatshenshini drainage can be found in the *British Columbia Sport Fishing Guide* published by Fisheries and Oceans Canada. Specific daily and possession limits and area closures can be found in the *2017-2019 B.C. Freshwater Fishing Regulations Synopsis* or online (see: http://www.env.gov.bc.ca/fw/fish/regulations/docs/1719/fishing_synopsis_2017-19.pdf), and in the Fisheries and Oceans Sport Fishing Guide for Region 6 (<http://www.pac.dfo-mpo.gc.ca/fm-gp/rec/fresh-douce/region6-eng.html>).

Notable considerations for the Alsek River watershed (B.C.) portion in 2019 include:

- **Retention of Chinook and sockeye salmon in the recreational fishery is prohibited effective April 1 (until further notice);**
- The daily limit for coho salmon is 2 per day;
- The maximum number of salmon (species combined) that can be retained in any one day is 4;
- The possession limit is 8 salmon (in the aggregate, species combined);
- All retained salmon must measure 30 cm or more;
- It is illegal to catch or attempt to catch salmon by willfully foul hooking. Any accidentally foul-hooked salmon must be released;
- Only single barbless hooks are allowed;
- All steelhead must be released;
- Annual fishing closures include:
 - Kwatini Creek, Stanley Creek and Goat Creek are closed to Chinook, sockeye and coho fishing.

If in-season conservation concerns arise, additional limitations such as reduced catch limits and area closures may be required. Increases in the possession limits could be considered if conservation and FSC objectives will be exceeded.

Compliance monitoring and enforcement will be undertaken by enforcement personnel of DFO and/or the province of BC.

6.2.2 Alsek-Tatshenshini Recreational Fishery Licencing

All anglers (except as noted in the either British Columbia or Yukon regulations) must obtain a valid Angling Licence for the jurisdiction they plan to fish in. In addition, all recreational anglers fishing for salmon in the Yukon Territory must also possess a Yukon Salmon Conservation Catch Card. The card requires the angler to record and report the number, sex, size, date and location of any salmon caught and retained or released.

When fishing for salmon in British Columbia portions of the Alsek drainage, anglers are required to have a B.C. Non-Tidal Angling Licence. This licence must be validated with a Salmon Conservation Surcharge Stamp if any salmon are, or expected to be, retained. In order to fish for steelhead, a Steelhead Conservation Surcharge Stamp is required.

7 ALSEK-TATSHENSHINI STOCK ASSESSMENT PLAN FOR 2019

The Alsek stock assessment program planned for 2019 includes the enumeration of Chinook, sockeye, and coho salmon at the Klukshu River assessment site located just upstream from the confluence of the Tatshenshini River near Dalton Post (Figure 4 – detailed view). The assessment program operated as an enumeration weir (between 1976 and 2015) and subsequently (since 2016) as a video monitoring / assessment site. The Klukshu River assessment site is the principal salmon escapement monitoring tool in the Alsek drainage. Annual abundance of Chinook, sockeye and coho are displayed in Figures 5, 6 and 7. The assessment program includes the collection of baseline biological data, e.g. age, gender, size. Sockeye salmon will also be enumerated (using a video counter) at Village Creek, another Tatshenshini River tributary, which drains Nesketahin Lake (Figure 4). Additionally, plans to conduct pilot salmon assessment projects on the Takhanne (snorkel surveys) and the Blanchard (sonar) rivers are anticipated for 2019. Recreational and FSC fishery monitoring will occur in the Klukshu River area in order to estimate catch and harvest of salmon and to collect biological data.

The PST (Alsek River provisions) require the Transboundary Technical Committee (TTC) to produce an annual estimate of the in-river abundance of Chinook salmon. To achieve this, subject to TTC considerations, the U.S. collects GSI and biological information on Chinook salmon. Due to low forecast abundance and overall conservation concerns, the (U.S.) commercial salmon fishery will be conducted in such a fashion as to avoid Chinook salmon harvest in 2019 so an adequate GSI sample is not anticipated to estimate in-river abundance. An estimate of the total Alsek River sockeye salmon run will be made using GSI analysis of samples collected from U.S. commercial fisheries and an expansion of the Klukshu River run reconstruction.

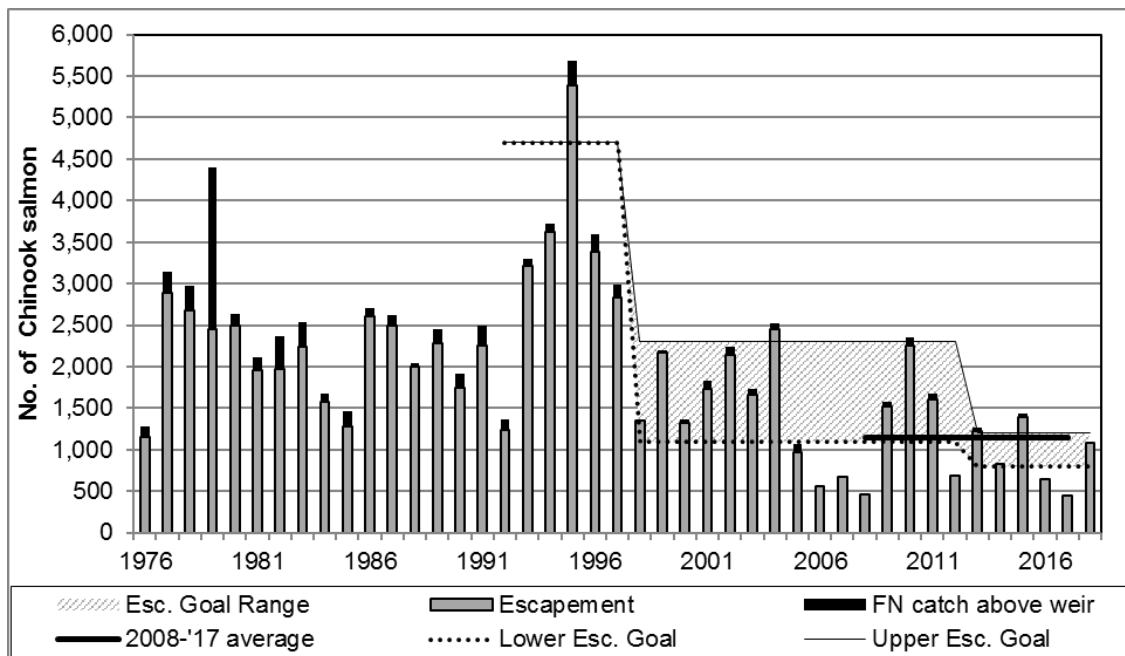


Figure 6. Weir counts of Klukshu River Chinook salmon, 1976 to 2018 (including jacks). [Note: Annual weir counts are represented by the stacked bars which include escapement plus the First Nation catch that occurred upstream of the weir].

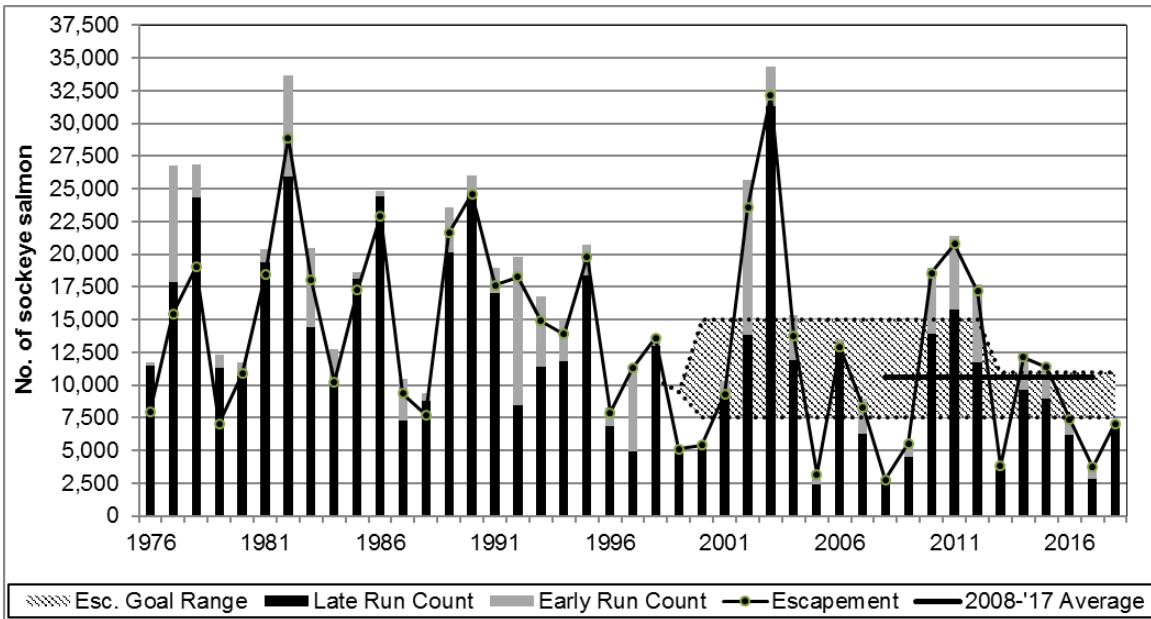


Figure 7. Weir counts of Klukshu River sockeye salmon, 1976 to 2018. Total weir counts are portrayed by the stacked bars which include the early (<15 August) count plus the late count (≥15 August). Escapement is the total weir count minus fish harvested upstream of the weir.

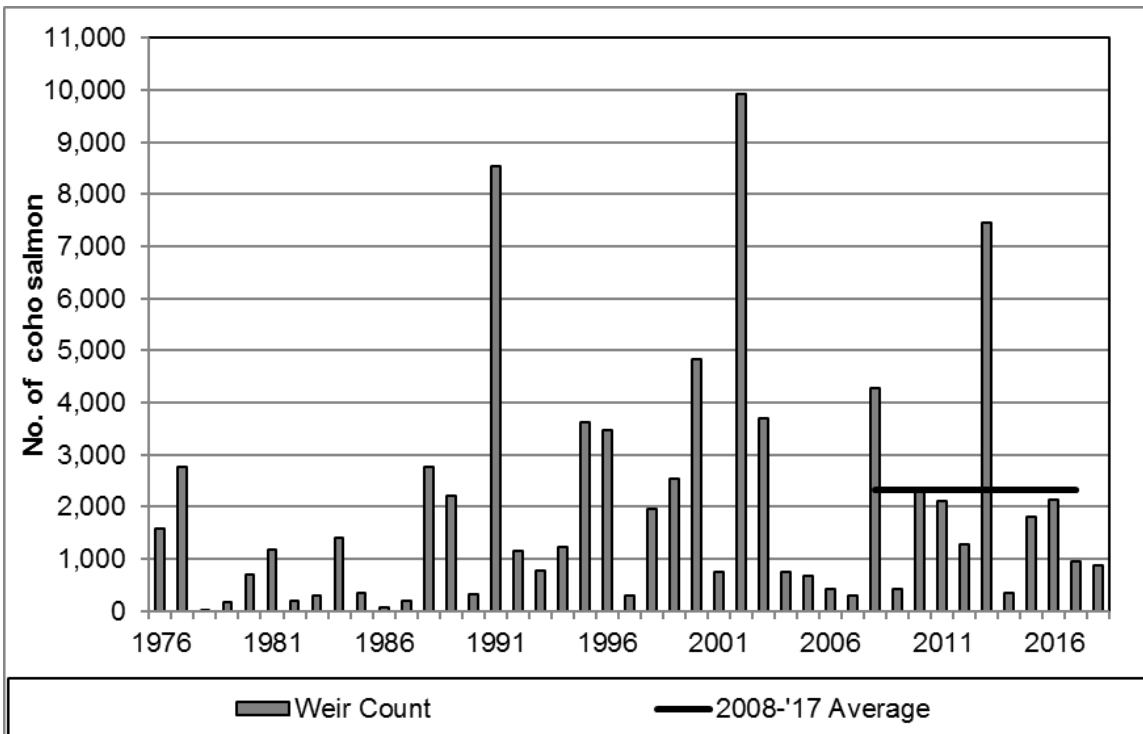


Figure 8. Weir counts of Klukshu River coho, 1976 to 2018. [Note: due to the timing of weir removal, counts do not cover the entire coho salmon run for all years].

8 ALSEK-TATSHENSHINI POST SEASON REVIEW

8.1 Conservation

The 2018 Klukshu Chinook salmon weir count of 1,078 fish was within the Klukshu escapement goal range of 800 - 1,200 fish (Table 11). Below average weir counts of early (91 fish) and late (6,944 fish) run sockeye salmon resulted in the overall Klukshu sockeye escapement being below the lower end of the escapement goal range of 7,500 - 11,000 (Figure 6). The Klukshu coho salmon weir count of 870 was below average (Figure 7).

Table 11. Salmon escapement through the Klukshu River weir in 2018.

Species	2018 Pre-season Outlook	Weir Count (Total)		Estimated Spawners (Total)		Escapement Goal Range	Esc./Management Target Achieved?
		2018	2008-17 Avg.	2018	2008-17 Avg.		
Chinook	<average	1,078	1,139	1,078	1,108	800 – 1,200	No
Sockeye	<average	7,035	10,587	7,035	10,318	7,500 - 11,000	No
Coho	NA	870	2,318	NA	NA	NA	NA

8.2 First Nation Fishery

The CAFN harvested 0 Chinook, sockeye, and coho salmon in 2018. The BNA’s of 200 Chinook and 3,000 sockeye salmon were not accessible as the CAFN prohibited the harvest of Chinook and sockeye salmon in 2018 due to conservation concerns. Ultimately, Klukshu River Chinook and sockeye abundance was insufficient to provide for a BNA harvest of these species.

8.1 Recreational Fishery

In 2018, as per the management plan, non-retention of Chinook and sockeye salmon was maintained throughout the season. Therefore, the recreational fishery harvest of Chinook and sockeye salmon was 0. Preliminary information suggests that the coho salmon harvest was negligible in 2018.

8.2 PST Harvest Sharing Performance

There are no specific harvest sharing arrangements in the PST for Alsek salmon although the U.S. management intent for sockeye salmon as specified in the PST is “*to achieve the agreed Klukshu River spawning escapement goal range plus 3,000 sockeye salmon*”. With a total count of 7,035 sockeye salmon past the Klukshu assessment site in 2018, there was an insufficient number of fish to achieve a BNA harvest of 3,000 and achieve a spawning escapement within the target range of 7,500 - 11,000 Klukshu River sockeye salmon.

In 2018 a well below average catch of 1,363 sockeye salmon was harvested in the U.S. Alaskan Dry Bay commercial fishery (2008-2017 average = 13,966) while 90 sockeye were harvested in the U.S. subsistence fishery (2008-2017 average = 146). The U.S. harvest

of Alsek River Chinook salmon totaled 88 fish, all of which were captured within the Dry Bay commercial fishery (well below the previous decadal average of 410 Chinook salmon).

The 2018 Canadian salmon harvest was limited in both the First Nation and recreational fisheries. Combined fishery catches of 0 Chinook and 0 sockeye salmon were below respective 2008-2017 averages of 111 Chinook and 1,050 sockeye salmon.

APPENDIX 2: STIKINE RIVER INTEGRATED SALMON FISHERIES MANAGEMENT PLAN, 2019

1 INTRODUCTION

The headwaters of the Stikine River are located in northern British Columbia with the river flowing southwesterly and terminating about 20 km north of the town of Wrangell in southeast Alaska (the Gulf of Alaska). There are three main population centres in this watershed in B.C.: Telegraph Creek, Dease Lake and Iskut. The drainage covers an area of approximately 52,000 km² of which roughly 97% lies in Canada and is characterized by two main ecoregions: the moist, rugged, mountainous and glacier-rich (e.g. Great Glacier Boundary Ranges Ecoregion; and the drier, continental climate of the sub-Arctic Yukon–Stikine Highlands Ecoregion which includes the Spatsizi Plateau. There are numerous protected areas within the watershed, e.g. Stikine Provincial Park which includes the Grand Canyon of the Stikine, Spatsizi Plateau Wilderness Provincial Park, Mt. Edziza Provincial Park (<http://www.env.gov.bc.ca/ecology/ecoregions/index.html>).

1.1 Description of Stikine Salmon Resources

The Stikine River is a major producer of Transboundary Chinook, sockeye and coho salmon and steelhead. Due to velocity barriers in the Grand Canyon of the Stikine River and in Forrest Kerr Canyon on the Iskut River, salmon access is limited to approximately the lower 40% of the drainage (Figure 8).

Salmon stocks returning to the Stikine River drainage are jointly managed by DFO, the Tahltan First Nation (TFN) and the Alaska Department of Fish and Game (ADFG) through the joint Transboundary Technical Committee (TTC) of the Transboundary Rivers Panel (TRP) which were both established pursuant to the Pacific Salmon Treaty (PST).

1.1.1 Chinook Salmon

In the southeast Alaska/ northwestern British Columbia context, the Stikine River is considered to be a major producer of Chinook salmon. Over the past decade (2009-2018), the annual terminal run size¹³ has averaged approximately 19,500 large Chinook salmon (i.e., fish with a mid-eye to fork length measuring ≥ 660 mm) with a historical run size range since 2002 of 8,100 (2017) to 87,800 fish (2005). The run generally enters the river mouth in early May, peaks mid-June, and has vacated the lower river by mid-July.

Pursuant to Canada's Wild Salmon Policy two Chinook salmon Conservation Units have been identified in the Stikine River based on timing and habitat characteristics: Stikine-early (LSTK-early) and Stikine-late (LSTIK-late). Primary Chinook salmon spawning locations include: Little Tahltan River, Tahltan River, mainstem Stikine River, Iskut River and tributaries (Verrett and Craig rivers), Christina Creek, Tuya River, Chutine River, and Shakes Creek.

¹³ Terminal run size excludes U.S. marine catches outside Districts 106 and 108.

The longest time series of Stikine Chinook salmon escapement data is from the Little Tahltan River with weir counts dating back to 1985. Five-year moving averages increased from roughly 4,600 large Chinook in the late 1980's to a peak 5-year average of approximately 9,500 fish in the 2001-2005 period. Since that time, the stock has been in a noticeable decline with the current 5-year average (2014-18) escapement having dropped to approximately 484 large Chinook salmon. This trend has been exacerbated by a major landslide on the Tahltan River located just upstream from the mouth which occurred in 2014. It drastically reduced the number of adult Chinook salmon reaching spawning areas in the Tahltan River watershed in 2014, including the Little Tahltan River. As a result, the lowest Little Tahltan weir count occurred in 2014 (169 large fish). The slide has had minimal impacts on recent year's returns as naturally low water levels and remediation work on the slide has enabled fish passage.

Although the time series of total run estimates of Stikine Chinook salmon is shorter than for Little Tahltan River Chinook salmon, declining overall abundance is also apparent in this dataset. Since 2002, the terminal run sizes of large Chinook have decreased from a range of 54,000 – 88,000 during the 2002-2006 period, to a range of 8,100 to 29,000 fish during the 2014-2018 period. Prior to 1999, directed terminal gillnet fisheries of Stikine Chinook salmon had been curtailed for a couple of decades to allow stocks to rebuild. Arrangements for directed harvest, if/when warranted by abundance, commenced in 2005 and have been updated for 2019-28 following re-negotiation of the Transboundary Chapter of the PST.

1.1.2 Sockeye Salmon

The Stikine River is also considered to be a major producer of Transboundary sockeye salmon. Over the past decade (2009-2018), the annual total run size has averaged approximately 152,500 adult sockeye salmon (historical range since 1979: 43,300 in 1987 to 372,800 in 1996). The run generally enters the river mouth in early June, peaks mid-July and has migrated upstream beyond the lower river by late August.

One River-type and three Lake-type sockeye Conservation Units have been identified for the Stikine River based on genetic attributes. The River-type CU is part of the broadly distributed Northern Transboundary Fjord CU; the Lake-type CU's include the Tahltan, Chutine and Christina Lake stocks.

Based on weir counts from 1959 to the present, escapement of Tahltan Lake sockeye salmon generally quadrupled from 5-year cycle averages of approximately 10,000 sockeye in the early 1960's, increasing steadily to average 40,000 fish in early 1980's. Since then, cycle averages exhibit a pronounced decadal oscillation with low cycle averages of approximately 10,000 followed by peak cycle averages of approximately 50,000 sockeye. The current 5-year average (2014-2018) weir count is approximately 29,900 sockeye. In 2018, the Tahltan Lake weir personnel were evacuated on two different occasions due to safety concerns from local fire activity. Therefore, a complete count of how many sockeye salmon entered Tahltan lake was not achieved. Counts were monitored up to early August and then expanded using recent run timing information to estimate the total number of sockeye salmon that escaped into Tahltan Lake.

Total Stikine sockeye run size estimates are available since 1979 and they generally follow a similar trend over the past three decades. Five-year averages have fluctuated from a low of approximately 64,000 to peak cycle-averages in excess of 260,000 fish. The current cycle-average (2014-2018) is approximately 146,200 fish.

As on the Taku River, PST arrangements for Stikine River sockeye include a joint Canada-U.S. enhancement project. Eggs are collected at Tahltan Lake, incubated and hatched at a central incubation facility at Port Snettisham Alaska, and resultant fry are outplanted back into Tahltan Lake. Prior to 2015, fry were also back-planted into Tuya Lake in the Stikine headwaters.

For management and monitoring purposes, Stikine River sockeye salmon are subdivided into two distinct stock groups:

- the **Tahltan stock**, which is composed of the *wild Tahltan* stock (fish originating from naturally spawning sockeye salmon in Tahltan Lake) and the *planted Tahltan* stock (fish originating from broodstock collected at Tahltan Lake and subsequently returned as fry into Tahltan Lake);
- the **Mainstem stock** conglomeration which comprises all other natural sockeye populations in the Stikine River. The principal spawning sites of this stock group include numerous side channels and sloughs of the mainstem Stikine and Iskut rivers, and the Verrett, Scud, Porcupine and Chutine rivers.

1.1.3 Coho Salmon

Estimates of the total run size of Stikine coho salmon are less reliable than either Chinook or sockeye salmon being primarily based on comparisons of test fishery and/or commercial catch-per-unit-effort data with that of sockeye salmon. Historically, coho run sizes are believed to be of similar magnitude as the Taku River. Based on limited aerial survey data, the run status appears to have been declining since 2002. Coho salmon generally cross the international border at the Stikine River into Canada in August with the peak of the run arriving in early to mid-September. For research and management purposes all spawning groups (stocks) of coho salmon in the Stikine River are considered one management unit.

One coho CU has been identified for the Stikine River based on ecotypic characteristics (Lower Stikine, LSTIK). The principal coho spawning stock groupings include: Iskut (Verrett and Craig rivers); Katete River; Porcupine River; Scud River; and streams located in the U.S. section of the Stikine River.

1.1.4 Pink and Chum Salmon

A number of pink salmon spawning sites in Canada have been documented in the Stikine mainstem near the Porcupine and the Iskut River near Zappa Creek. Pink salmon production from the Stikine River is relatively minor. Based on ecotypic characteristics, Stikine pink salmon form part of the broader Transboundary Fjord pink salmon CU (TBFj).

Chum salmon spawning sites have been documented in the Stikine and Iskut rivers (mainstem locations), although Stikine River chum salmon production is also considered to be low. Based on ecotypic characteristics, Stikine chum salmon constitute one CU, i.e. Lower Stikine (LSTIK).

Currently, there are no programs in place to assess pink or chum salmon border escapements or drainage-wide spawning escapements within the Stikine River.

1.1.5 Steelhead salmon

Steelhead salmon (fall run) are present in the Stikine River drainage although data regarding abundance and life history are limited. Spawning locations have been identified in the Tahltan River, Little Tahltan River and tributaries of the Iskut River.

1.2 Description of Stikine Salmon Fisheries

There are three fisheries that target salmon in the Canadian section of the Stikine River: a First Nation FSC fishery, a recreational fishery, and a commercial gillnet fishery. Fisheries in Alaska that also target Stikine salmon stocks include: Alaska District 108 (adjacent to the mouth of the Stikine River) and Alaska District 106 (Sumner and Clarence straits) commercial drift gillnet fisheries; the Wrangell and Petersburg area sport fishery; and, a subsistence fishery in the lower Stikine River in Alaska. S.E. Alaskan troll and seine fisheries also intercept Stikine salmon stocks of which Chinook and coho are of primary interest to the troll fleet.

1.2.1 Tahltan First Nation Fishery

The Tahltan First Nation (TFN) has been actively fishing on the Stikine River since well before European contact. The Tahltan Band is mainly centred around the community of Telegraph Creek, B.C., while the Iskut Band members mostly reside in Iskut, just south of Dease Lake, B.C. Subject to achieving spawning escapement requirements, eligible First Nation people or designated fishers are permitted to practice traditional food, social and ceremonial (FSC) fishing activities throughout the Stikine River drainage in Canada.

The First Nation FSC fishery predominantly occurs in the Telegraph Creek area. The fishery commences when Chinook salmon begin to appear in upper Stikine portions of the watershed, usually in May. Steelhead are also encountered during May and June as late over-wintering adults or downstream migrants. Fishing effort during May and early June is generally light. Fishing for sockeye salmon occurs from mid-June through early August with most fishing activity completed by late August. Gear primarily involves set gillnets (10-15 m in length) with an average mesh of 13.3 to 15.2 cm (5.25 to 6 inches). In some cases, mesh sizes up to 20.3 cm (8 inches) are employed when targeting Chinook salmon. Most gillnets are secured to, and serviced from, shore by boom poles. Sport fishing gear is also used in tributaries such as the Tahltan River.

Over the past decade (2009-2018), the FSC fishery has annually harvested an average of approximately 7,400 sockeye (range since 1972 of approximately 2,000 to 10,600

sockeye), 600 large Chinook (range: 100 to 1,400 fish); and 230 small Chinook (range: <100 to 600 fish). Generally, sockeye catches have been increasing over the past four decades and have roughly doubled over that time period; the highest reported catch occurred in 2016. Moving ten-year average Chinook catches increased to peak levels in the mid 1990's and levelled off through the mid 2000's and has since declined. Few, if any, coho, pink or chum salmon are encountered in the First Nation FSC fishery.

1.2.2 Recreational Fishery

The most prominent recreational fishery on the Stikine River in Canada focuses on Chinook salmon, with fishing effort primarily occurring on the Tahltan River near its confluence with the Stikine River. Minor recreational fishing efforts for both Chinook and coho salmon also occur in the mainstem of the Stikine River as well as the Iskut River. Fishing for steelhead occurs in a few upstream tributaries (e.g. Tahltan River) in the fall.

The TFN controls recreational access on Reserve Lands and frequently conducts a creel census program on the Tahltan River to monitor recreational fishing activity. Over the last 10 years (2009-2018), recreational fishers retained an average of 36 large Chinook per year, ranging from 0 (2007, 2016, 2017, 2018) to 420 (2002) since 1979.

1.2.3 Commercial Fishery

Currently, there are twenty-three limited entry party-based licences allocated to fish commercially on the Stikine River. Of these, six commercial licenses are designated to fish in the upper Stikine River near Telegraph Creek, while the remaining licenses are designated for the lower Stikine River fishery. Most commercial licence holders on the Stikine River hire an additional fisher to assist them with their fishing.

Commercial fishing occurs in two principle fishing areas (Figure 8) described as follows:

- The upper Stikine River fishing area, which has been fished since 1975, occurs from the confluence of the Chutine River, upstream to the confluence of the Tuya River, excluding any other tributaries of the Stikine River; and
- The lower Stikine River fishing area which opened in 1979 and includes:
 - the portion of the Stikine River, from the Canadian / U.S. international border upstream to the boundary signs located approximately 2 km above the Stikine River confluence with the Flood River;
 - the portion of the Iskut River from its confluence with the Stikine River to fishing boundary signs located approximately 1.5 km upstream from the water survey station on the lower Iskut River, excluding any other tributaries of the Stikine or Iskut Rivers.

Most of the commercial fishing activity and catch originates in the lower river. Average lower river commercial catches over the past decade (2009-2018) include: 38,700 sockeye (range since 1979: 6,100 to 95,800 sockeye salmon), 1,600 large Chinook (range of 0 to 19,100 Chinook salmon); 740 small Chinook salmon (range of 0 to 2,100), 5,560 coho salmon (range of 0 to 15,900 coho); 100 pink salmon; and 200 chum salmon.

Over the past decade (2009-2018), the upper Stikine commercial catch has averaged: 780 sockeye (range since 1975: 200 to 2,500 sockeye); 4 large Chinook salmon; and 9 small Chinook salmon.

Since 2005, the PST established the conditions (abundance-based) under which the Parties may pursue directed commercial fisheries for Stikine River Chinook salmon. The management and harvest of sockeye and coho salmon is also subject to terms and conditions outlined in the PST.

When the run strength is deemed sufficient, the Chinook salmon fishery typically commences in early May and continues through late-June overlapping with the beginning of the sockeye salmon fishery. The sockeye salmon fishery typically commences mid-June in statistical week (SW) 26 and terminates in late August (SW 35). The early portion of the coho salmon return is subject to harvest in the later periods of the directed sockeye commercial fishery in the lower Stikine. Improved market conditions in recent years have rekindled commercial interest in harvesting of coho salmon which has extended the fishing season into September. Few coho salmon migrate upstream into the upper Stikine commercial fishing area. Pink and chum salmon are caught as bycatch during the lower Stikine sockeye fishery but are seldom encountered in the upper Stikine fishing area. Also in the lower river, although not targeted, steelhead are encountered during the sockeye and coho fisheries in late summer and fall. All steelhead intercepted in commercial fisheries must be released.

Salmon captured in the lower Stikine River are processed (gutted and blast frozen) at a federally registered processing plant located on the banks of the Stikine River near the Canada/ U.S. border. Salmon are also marketed in the round to buyers located in Wrangell and or Petersburg, Alaska. Marketed products include fresh frozen, fresh and smoked salmon. Commercially caught salmon in the upper Stikine are generally sold fresh or fresh-frozen to local buyers.

1.2.4 Fisheries for Excess Salmon to Spawning Requirements (ESSR)

The intended purpose of ESSR fisheries is to facilitate the harvest of salmon deemed surplus to spawning escapement requirements. ESSR fisheries have occurred at Tahltan Lake in 1993 to 1996, and in 2002, when sockeye salmon numbers exceeded the upper end of the spawning escapement goal range. ESSR catches in excess of 14,300 sockeye (1996) have been recorded during this period.

ESSR fisheries have also been conducted on the Tuya River for enhanced sockeye salmon from 1996 to 2000, as well as in 2003 and 2004 with catches of over 7,000 occurring (2004). Tuya River sockeye salmon mostly originate from fry outplants into Tuya Lake as part of the joint Canada/ U.S. Stikine sockeye enhancement program. Adults returning to the Tuya River are considered surplus since they are unable to return to the lake due to impassable water falls located near the mouth of the river. The last Tuya Lake sockeye salmon fry outplant occurred in 2014 and very few returns are expected in 2019.

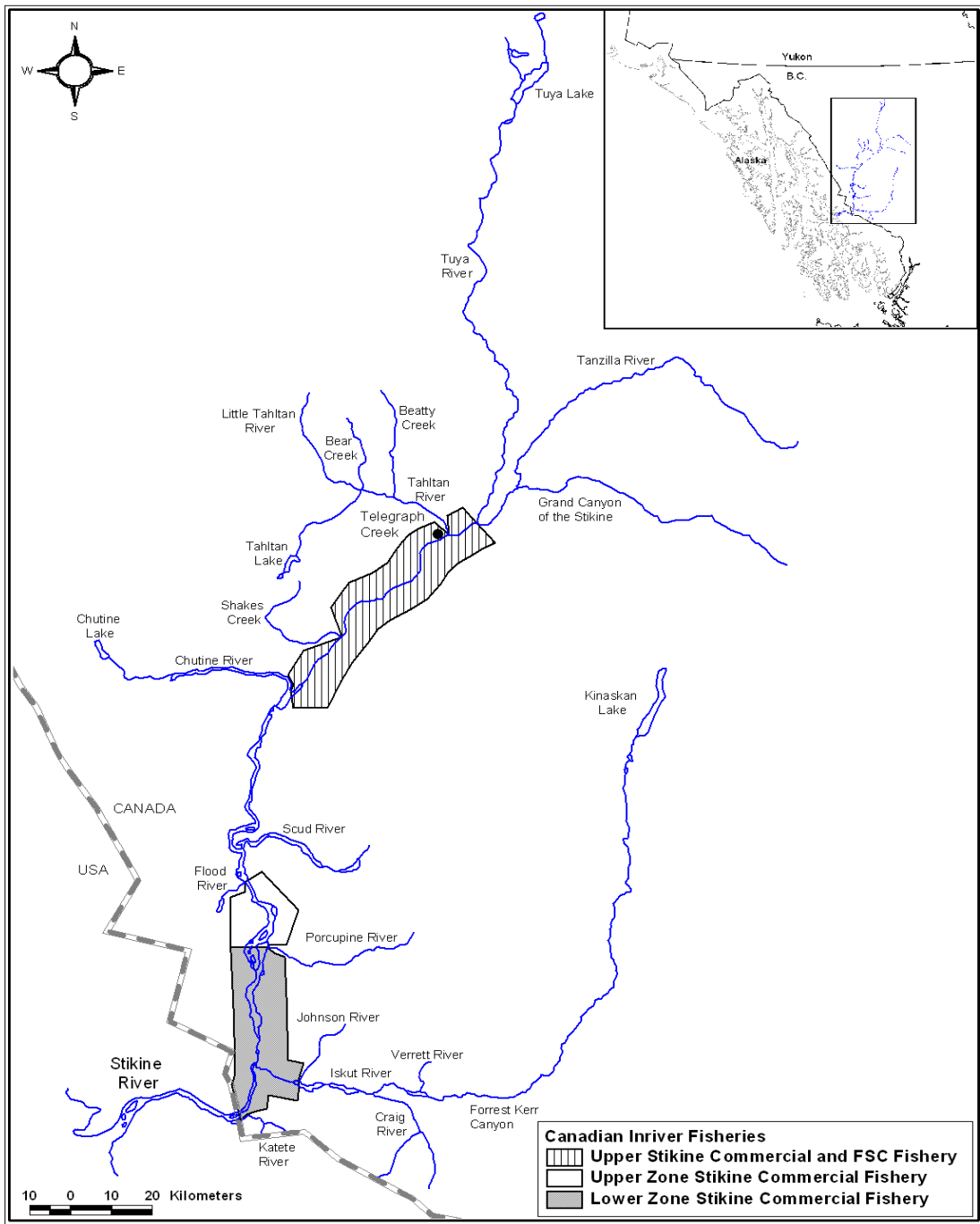


Figure 9. The Stikine River and Canadian fishing areas.

2 RUN OUTLOOKS FOR STIKINE SALMON IN 2019

2.1 Chinook Salmon

The 2019 outlook for the terminal run of Stikine River Chinook salmon is 8,300 large fish, which is 58% below the recent ten-year average run size of approximately 19,500 large Chinook salmon, and well below the target escapement goal range of 14,000 to 28,000 fish. This outlook is based on a sibling forecast model that was adjusted downward by the recent 5-year model error as the model has tended to overestimate the run size in recent years. The sibling return data indicates that productivity is well below average and well below what would otherwise be expected based on historical spawner-recruitment relationships.

2.2 Sockeye Salmon

The 2019 terminal Stikine River sockeye run outlook is approximately 90,000 fish which is below the recent ten-year average (2009-2018) run size of approximately 120,000 fish. The components of this forecast are summarized below.

Tahltan Lake Sockeye

The total run outlook for Tahltan Lake sockeye is approximately 66,000 fish of which 36,000 are expected from the enhancement project and 29,000 are expected from natural spawners. For comparison, the ten year average (2009-2018) run size of Tahltan Lake sockeye salmon is approximately 75,000 fish. The outlook is based on a smolt model which uses the number of smolts emigrating from Tahltan Lake in 2016 (1,019,421 natural, 1,075,171 enhanced) and 2017 (1,186,154 natural, 1,274,721 enhanced) combined with the recent 2-year average survival rates. This is the second year that the 2-year average survival rate was applied. This is a change from past years smolt forecasts which used a 5-year average survival.

Mainstem Sockeye

The outlook of 24,000 mainstem sockeye salmon is based on a sibling forecast and below the ten year average (2009-2018) run size of approximately 45,000 fish. The 2017 returns of 4 year olds from the 2013 brood year were used to predict the number of 5 year olds expected to return in 2018. Prior to 2018, an average of stock-recruitment and sibling forecasts were used.

2.3 Coho Salmon

The lack of reliable escapement and marine survival data for Stikine River coho salmon precludes the development of a reliable numerical outlook for this stock in 2019. Aerial surveys are conducted once annually and are subject to various surveying and run timing variables.

2.4 Pink and Chum Salmon

A pre-season outlook for Stikine River pink or chum salmon has not been developed due to limited data on historical escapement and abundance pertaining to these species.

3 SPAWNING ESCAPEMENT GOALS FOR STIKINE SALMON

3.1 Chinook salmon

The Canada/U.S. bilaterally agreed escapement goal range for Stikine River Chinook salmon is 14,000 to 28,000 large Chinook salmon with a S_{MSY} point estimate goal of 17,400 large Chinook salmon. The Canadian management objective for Little Tahltan River Chinook salmon is 2,700 to 5,300 large fish with a point target of 3,300 large fish. The Chinook escapement goal is based on a peer-reviewed analyses conducted by U.S. and Canadian TTC members and associates and reported in: *Bernard, D.R., S.A. McPherson, K.A. Pahlke, and P. Etherton. 2000. Optimal production of Chinook salmon from the Stikine River. Alaska Department of Fish and Game, Fishery Manuscript No. 00-1, Anchorage.* Escapement concerns particularly with respect to Little Tahltan Chinook are currently undergoing technical review by Canada with input from the TTC.

Escapements goals for other stock groupings, such as the Tahltan, mainstem Stikine (between Butterfly and Flood rivers), and Iskut rivers have not yet been established. A 2005 radio telemetry project indicated that these three stock groupings represented 41%, 8% and 14%, respectively, of the combined Stikine River spawning population. This same report attributed 13% of the total escapement to the Little Tahltan River. In the future, based on improved definition of specific stocks through GSI and external tagging, management considerations may be directed at other spawning groups.

3.2 Sockeye salmon

Escapement goals have been bilaterally agreed by Canada and the U.S. for two Stikine River sockeye stock groups: the total Tahltan Lake stock and the mainstem stock conglomerate. The Tahltan and mainstem stocks are considered to be independent. Surpluses or deficits in escapement realized in one stock are not used to balance deficits or surpluses in the other.

Tahltan Stock

In 1993, Canada and the U.S. adopted a bilateral escapement target of 24,000 fish for the Tahltan Lake sockeye salmon stock which included an escapement goal of 20,000 naturally spawning fish and up to 4,000 sockeye for broodstock to meet the objectives of the current Canada/US sockeye enhancement program. Escapement goal ranges for the various management categories for the Tahltan stock are summarized in Table 12 below.

Table 12. Tahltan sockeye escapement goals for 2018.

	TARGET = 24k				
Escapement	0 - 12k	13k - 18k	18k - 30k	30k - 45k	>45k
Mgmt. Category	Red	Yellow	Green	Yellow	Red

Mainstem Stock

The target escapement goal for the mainstem stock is 30,000 sockeye salmon. Escapement goal ranges for the various management categories for this stock are summarized in Table 13 below.

Table 13. Mainstem sockeye escapement goals for 2018.

	TARGET = 30k				
Escapement	0 - 15k	15k - 20k	20k - 40k	40k - 75k	>75k
Mgmt. Category	Red	Yellow	Green	Yellow	Red

A post-season estimate of escapement that falls within the green escapement goal range will be considered fully acceptable, while one that falls above the escapement range will be considered acceptable but not desirable. Finally, a return that falls below the escapement range is considered undesirable. These scenarios translate to Management Categories employed by DFO with Green considered fully acceptable, Yellow considered acceptable but not desired and the Red Management Category undesirable.

3.3 Coho salmon

The interim escapement goal range for Stikine coho salmon is 30,000 to 50,000 fish.

3.4 Pink and Chum salmon

Escapement goals for Stikine pink and chum have not been developed due to the limited abundance of these species.

4 CONSULTATION PROCESSES FOR STIKINE SALMON FISHERIES

The development of decision guidelines and specific fishery management plans for Stikine River fisheries involves consultation with the Stikine River Salmon Management Advisory Committee (SRSMAC) and the Tahltan First Nation. Recommendations of the Transboundary Rivers Panel (TRP) of the PSC provide an overarching back-drop for decision guidelines as do DFO policies, scientific advice and the experience of fishery managers.

4.1 Tahltan First Nation: Aboriginal Fisheries Strategy Consultation

Consultations with the TFN relating to the Aboriginal Fisheries Strategy (AFS) occur throughout the year. Results of these consultations are contained within a multi-year DFO/TFN Fisheries Agreement. The Agreement details fish management and stock

assessment programs, enforcement protocols, communal and commercial licenses, ESSR fishing opportunities and the First Nations' fishery and communal license provisions. The TFN also participate actively in the Stikine River Salmon Management Advisory Committee and have representation on the Transboundary Rivers Panel.

4.2 Stikine River Salmon Management Advisory Committee (SRSMAC)

The SRSMAC is comprised of representatives of DFO, TFN, and Stikine River salmon resource stakeholders, specifically commercial harvesters. Recreational fishers have also participated in Committee meetings. Membership is established by DFO through consultation with the groups which choose their representatives. Transboundary Rivers Panel members with Stikine interests also participate in SRSMAC meetings to ensure continuity and coordination in domestic and international discussions and recommendations. The Committee endeavours to meet twice annually to develop recommendations pertaining to management plans, conduct post-season reviews, and to address issues such as licensing, allocations and licence conditions.

4.3 Transboundary Rivers Panel (TRP) of the Pacific Salmon Treaty

Canada/U.S. arrangements for the coordinated conservation and abundance-based management of salmon stocks originating in the Canadian portion of the Stikine River are specified in Chapter 1, paragraph 3(a), of Annex IV of the PST. The TRP oversees the implementation of these arrangements with technical support from the joint Transboundary Technical Committee. Fishery management, conservation, enhancement and stock assessment plans are reviewed and discussed annually by the Panel and/or the Committee. The TRP provides recommendations on salmon fishery and conservation actions to the Pacific Salmon Commission which, upon review, conveys recommendations to respective national governments. The obligations and provisions contained in the PST and subsequent recommendations from the PSC adopted by the Parties provide the foundation for development of this IFMP. Management regimes under Annex IV will be implemented by Fisheries and Oceans Canada and US agencies for the 2019 season.

5 DECISION GUIDELINES FOR STIKINE SALMON MANAGEMENT

Fishery decisions are made by DFO based on the provisions identified in Chapter 1 of the PST and recommendations from the TRP, the SRSMAC and the TFN. The following sections describe the various decision guidelines for Stikine salmon.

5.1 Chinook Salmon

Provisions for harvest sharing and management of directed fisheries for Stikine River large Chinook salmon (Chinook ≥ 660 mm mid-eye to fork length) were successfully negotiated by the TRP and implemented commencing 2005. Updates to these provisions have been

made during recent re-negotiations and are in effect January 1, 2019 through to December 31, 2028.

The catch sharing provisions were developed to acknowledge the traditional catches in existing fisheries, referred to as base level catches (BLCs), which had occurred prior to 2005. Considerations for traditional catches included incidental catches and bycatch in Canadian and U.S. commercial gillnet fisheries, U.S. and Canadian sport fisheries, the Canadian First Nation fishery and the Canadian assessment fishery. For directed fisheries, it was agreed that for the 2019-28 PST Chapter 1 period, the total allowable catch (TAC) would be calculated as follows:

- TAC = Terminal run - Base terminal run (BTR);
- BTR = Spawning Objective + Assessment Fishery + U.S. BLC + Canadian BLC:
 - The S_{MSY} spawning objective for Stikine River Chinook salmon is 17,400 large fish;
 - BLCs are as follows:
 - US Stikine BLC: 3,400 large Chinook salmon ;
 - Canadian Stikine BLC: 2,300 large Chinook salmon;
 - Assessment fishery: up to 1,400 large Chinook salmon.

Directed fisheries may be implemented based on pre season forecasts only if the pre-season forecast terminal run size equals or exceeds the spawning objective as defined in the annual management plan in addition to the combined Canada and U.S. base level catches (BLCs) and assessment fishery catches of Stikine River Chinook salmon. The pre season forecast shall only be used for management until bilaterally approved in-season projections become available. For the purposes of determining whether to allow directed fisheries using in-season information, such fisheries shall not be implemented unless the projected terminal run size exceeds the spawning objective as defined in the annual management plan in addition to the combined Canada and U.S. BLCs and assessment fishery catches of Stikine River Chinook salmon. The TTC shall determine when in season projections can be used for management purposes and establish the methodology for in-season projections and update them weekly or at other approved intervals.

Harvest sharing and accounting of the TAC shall be as follows:

- 50% is allocated to the U.S.;
- 50% is allocated to Canada;
- If the pre-season TAC forecast exceeds 30,000 Chinook salmon, the Panel shall review and recommend potential harvest share adjustments to the Parties.

When the terminal run is insufficient to provide for the Parties' Stikine River Chinook salmon BLC and the lower end of the escapement goal range, the reductions in each Party's base level fisheries, i.e. the fisheries that contributed to the BLCs, shall be proportional to the Stikine BLC shares. In this situation, the TTC may recommend details for an alternate assessment program. Following the Panel's approval, an assessment fishery may be implemented which fully considers the conservation needs of the stock.

If the escapement of Stikine River Chinook salmon is below the lower end of the agreed escapement goal range for three consecutive years, the Parties shall examine the management of base level fisheries and of any other fishery that harvests Stikine River Chinook salmon stocks, with a view to rebuilding the escapement.

The bilaterally agreed terminal run pre-season forecast of 8,300 large Chinook does not meet the threshold for implementing a directed Chinook commercial fishery based on the terminal run pre-season forecast as described in the decision provisions above. The TAC, based on the pre-season forecast, is therefore 0 Chinook salmon. According to the harvest sharing provisions, Canada's share of the TAC is 0 large Chinook salmon which does not provide for a directed Chinook fishery. The Canadian catch allocation may be adjusted according to the in-season projections once they become available but for 2019 this is not considered likely.

The pre-season forecast is expected to serve as the principal run size estimator for 2019. Typically, the pre-season forecast will be replaced with in-season run projections once reliable, in-season estimates become available based on the Stikine Chinook Management Model (SCMM) which primarily uses Kakwan catch-per-unit-effort (CPUE) data; mark-recapture estimates expanded by historical timing data may be used in conjunction with the model projections. Weekly mark-recapture estimates are normally available by SW22 (26 May - 01 June) but it is anticipated that very few tags will be applied in 2019 and recoveries in the Canadian fisheries (incidental interceptions in sockeye fishery) will be minimal.

For 2019, in the unlikely event that in-season run size projections allow for a directed large Chinook salmon harvest, the fishery will be managed on a weekly basis with management actions driven by the SCMM and in-season mark-recapture results combined with pre-season decision rules (conservation and allocation objectives). Weekly inputs to the model will include: catch data from Alaska District 108 gillnet, troll and sport fisheries; catch data from the Canadian Stikine commercial, test, First Nation, and sport fisheries; catch and effort from the Kakwan tagging site; and escapement requirements. The in-river run timing model for 2019 (which is used to expand the mark-recapture estimates to give projections of the total in-river run size) will be based on the average run timing of large Chinook salmon observed in the Canadian commercial/assessment fisheries in 2009-2018. Extrapolation of current D-108 catches to provide estimated seasonal values will be based on a District 108 timing model. This model will incorporate D-108 drift gillnet CPUE data, Kakwan Point CPUE data lagged by one week, and Canadian Chinook test fishery CPUE data lagged by two weeks.

5.2 Sockeye Salmon

Under the revised PST provisions for 2019-28, harvest shares for Stikine sockeye will be calculated as follows:

- 53% U.S. / 47% Canada from 2019 through 2023. If the final 2017 or 2018 Stikine sockeye production plan (SEPP) provides an expected production of 100,000 returning sockeye salmon, the harvest shares shall be 50% U.S. / 50% Canada in 2022 or 2023.

- Beginning with the final 2019 SEPP and subsequent years, if expected production is 100,000 returning sockeye salmon, the harvest shares three years later shall be 50% U.S. / 50% Canada. Otherwise, the harvest share for the Party that failed to implement enhancement projects designed to annually produce 100,000 returning sockeye salmon shall be reduced by 7.5% and reallocated to the other Party.
- If either the U.S. or Canada fully terminates or does not continue its participation in the joint enhancement program, that Party's harvest share shall be reduced to 35%, and the harvest share adjustment shall be reallocated to the other Party for the subsequent fishing season(s).

The pre-season forecast translates into an expected TAC of 36,000 fish and a 47% harvest share for Canadian fisheries of 16,900 sockeye salmon. This estimate will be updated once in-season run size projections become available and are incorporated into weekly management decisions.

Weekly management actions will consider data from stock assessment projects (including the CPUE from the fisheries) and the projected run sizes, catch and escapements from the Stikine Management Model (SMM) and the Stikine Forecast Management Model (SFMM). Descriptions of these models and data inputs are summarized in:

- *Pacific Salmon Commission Transboundary Technical Committee Report. [in prep]. Salmon Management and Enhancement Plans for the Stikine, Taku and Alsek rivers, 2017.*
- *Pacific Salmon Commission Transboundary Technical Committee Report: TCTR (88)-2, Salmon Management Plan for the Transboundary Rivers, 1988.*

The part of the SMM model which determines total and weekly TAC levels for the U.S. and Canadian fisheries has been formulated in EXCEL® for use by managers in-season. Estimates of weekly TAC and effort are provided as guidelines for the managers and are derived from average run timing of the stocks and the corresponding average CPUE levels of each fishery. The 2019 in-season predictions of abundance and TAC will be based on the following datasets:

1. Management actions for sockeye salmon will be based on the pre-season forecast from the opening of the season through SW27 (July 6) and perhaps as late as SW28.
2. The forecasts for SW28-32 (July 07 through August 10) will be based on the SMM and the SFMM produced forecasts.
3. After SW32, the management models will continue to be updated; however, run projections are typically less reliable after SW32 and will be viewed accordingly.
4. Historical timing data will be used to provide weekly guideline harvests for each country.
5. Weekly management decisions may include other considerations such as:
 - a. The lower river commercial CPUE of the Tahltan Lake stock grouping may be used to calculate the in-river run size by a linear regression equation independent of the model. The run size of the mainstem stock grouping will be determined based on the proportion of the CPUE of these stock groupings in the current statistical week and expanded by run timing (note: water

- levels and associated changes in exploitation rates will be monitored and used in assessing the run size);
- b. The current weeks in-river run size of Tahltan Lake sockeye salmon may be calculated based on the estimated harvest rate in the lower Stikine River commercial fishery expanded by run timing. The harvest rate is estimated based on the historical relationship between effort and in-river run size. The run size projections for the mainstem stock groupings will be determined based on the proportion of the CPUE of these stock groupings through the current statistical week and expanded by run timing (note: water levels and associated changes in exploitation rates will be monitored and used in assessing the run size);
 - c. Harvest rates in existing fisheries compared to historical averages, run sizes, and water levels;
 - d. Comparison of current year in-river harvest performance by stock grouping against past harvest performance and run size, and perceived changes in current year run timing information from the run timing regime identified in the management models.

Separate projections of terminal run size will be made for the combined Stikine sockeye stocks (wild + enhanced), the Tahltan stock (wild + enhanced) and the mainstem stock. This information will be used in-season to assist in fisheries management and post season will be evaluated along with other measures of abundance.

Consideration for Tahltan Lake sockeye stock management objectives should persist through July 27 (SW30) when the contribution of Tahltan stocks typically drops to below 50%. Thereafter, management attention will be focused primarily on mainstem sockeye stock objectives.

Table 14. Key Decision Points for Tahltan Lake sockeye salmon.

In-river run size: Tahltan Lake sockeye	FN Fishery	Commercial Fishery
>30,000	Unrestricted	Normal 2-3 day fishery with possible extensions
24,000 – 30,000	Unrestricted	Restricted fishery 1-2 days – possible gear/area restrictions
18,000 - 24,000	Unrestricted	Closure considered
12,000 – 18,000	Restricted – days reduced	Closed
5,000 - 12,000	Closure considered	Closed
<5,000	Closed*	Closed

[note: a FN fishery closure is imposed only if the commercial fishery closed for at least one week prior].

Table 14 and Table 15 identify the Canadian management reference points for Tahltan Lake and mainstem sockeye salmon, respectively. Since the FN fishery occurs mostly

upstream of the mainstem sockeye spawning areas, it is not generally affected by conservation concerns for this stock as indicated in Table 15.

Table 15. Key Decision Points for Stikine mainstem sockeye salmon.

In-river run size	FN Fishery	Commercial Fishery
>40,000	Unrestricted	Normal 2-3 day fishery with possible extensions.
30,000 – 40,000	Unrestricted	Restricted fishery 1-2 days – possible gear/area restrictions.
20,000 - 30,000	Unrestricted	Closure considered
<20,000	Unrestricted	Closed

5.3 Coho salmon

Pursuant to the PST, management efforts of the U.S. are intended to ensure that sufficient coho salmon are allowed to pass into the Canadian section of the Stikine River to meet escapement needs, plus an annual Canadian catch of 5,000 coho salmon in a directed coho salmon fishery. Coho salmon taken as bycatch during the directed sockeye fishery in Canada, i.e. prior to SW35, do not count towards this quota. In 2019, Canadian coho salmon management will commence in SW35 (August 25 - 31).

5.4 Pink and Chum Salmon

As pink and chum salmon are currently not targeted in lower Stikine fisheries, and are seldom encountered in the First Nation fishery, harvest sharing arrangements have not been developed for these stocks.

6 STIKINE FISHERY PLANS FOR 2019

6.1 First Nation Fishery

6.1.1 Stikine River First Nations Basic Needs Allocation (BNA)

The Communal Fishing Licence for the Tahltan and Iskut First Nation (TIFN) allows for a BNA of up to 10,000 sockeye, 2,000 Chinook, and 200 coho salmon.

6.1.2 Stikine River First Nations Control and Monitoring of Removals

The poor production of Chinook salmon continues to be a concern in 2019. Although additional restrictions in FSC fisheries are not anticipated, TFN members are encouraged to avoid harvesting large Chinook salmon and to focus harvest on sockeye salmon. Additional adjustment of this strategy may need to occur should conservation issues arise. Of potential concern again in 2019, is the impact of the land slide in the lower Tahltan River on upstream Chinook migration. Modifications made to the land slide in the winter of 2018 should alleviate any passage concerns. Changes to the FSC fishery management strategy such as reductions in fishing time and/or area closures will only be considered if

sufficient adjustments cannot be accomplished through reductions or closures in commercial and/or recreational fisheries and will be made through application of the Stikine River Decision Guidelines and consultation with the TFN.

Catches will be recorded in-season by Fisheries and Oceans Canada from specific harvest data submitted to the Department on a weekly basis by the TFN Fisheries Program. Biological sampling to assess age, size and stock identification will be conducted during the latter portion of the Chinook salmon fishery and throughout the sockeye fishery.

6.1.3 Stikine River First Nations Communal Licensing

Communal licences are issued to First Nations that have rights to fish in the Stikine River watershed for FSC purposes. The First Nation maintains control of these licenses and has the authority to designate all persons fishing in this category.

6.2 Stikine River Salmon Recreational Fishery

In British Columbia, recreational fishing opportunities for salmon are regulated by the *British Columbia Sport Fishing Regulations* pursuant to the federal *Fisheries Act*. Salmon fishing in the Stikine River watershed in B.C. is covered under the Region 6 fishing regulations (see: the *2017-2019 B.C. Freshwater Fishing Regulations Synopsis* at: http://www.env.gov.bc.ca/fw/fish/regulations/docs/1719/fishing_synopsis_2017-19_region6.pdf; or, the Fisheries and Oceans Sport Fishing Guide for Region 6 at: <http://www.pac.dfo-mpo.gc.ca/fm-gp/rec/fresh-douce/region6-eng.html>).

Recreational angling restrictions and requirements are subject to change in-season if additional conservation concerns arise or if additional recreational opportunities become available. Changes are communicated through Fishery Notices, media reports, telephone information lines, Twitter (@sportfishingbc) and/or the in-season decisions website: <http://www.pac.dfo-mpo.gc.ca/fm-gp/rec/season-saison/index-eng.html>.

To address conservation concerns associated with low escapements of Chinook salmon in recent years and specifically 2019, the retention of Chinook salmon is prohibited (effective April 1 to March 31). In addition, the Tahltan River will be closed to recreational angling from June 1st to August 31st. This closure will address Chinook salmon conservation concerns due to low numbers as well as concerns over adult salmon migration delays associated with the recent landslide (2014) located approximately one kilometer upstream from the confluence of the Tahltan and Stikine River.

6.2.1 Stikine Recreational Control and Monitoring of Removals

The controls for the Stikine recreational fishery for salmon include daily possession limits, hook restrictions, area closures, catch record keeping requirements, catch reporting requirements and licencing requirements. These are described at: <http://www.pac.dfo-mpo.gc.ca/fm-gp/rec/fresh-douce/region6-eng.html>. Some of the highlights include the following:

- For 2019, the daily limit for Chinook salmon is 0 per day;

- The daily limit for coho salmon is 4 per day, with 2 over 50 cm (nose to fork of tail);
- The daily limit for each of sockeye, pink and chum salmon is 0;
- The maximum number of salmon (species combined) that can be retained in any one day is 4;
- The possession limit is 8 salmon (in the aggregate, species combined);
- The annual catch limit for Chinook salmon in non-tidal waters is 10;
- All retained salmon must measure 30 cm or more;
- All retained Chinook salmon must immediately be recorded in ink on the angling licence;
- It is illegal to catch or attempt to catch salmon by willfully foul hooking. Any accidentally foul-hooked salmon must be released;
- Only single barbless hooks are allowed to be used when fishing for salmon in streams;
- All steelhead must be released;
- Annual fishing area openings include:
 - **As noted in Section 6.2 above, in 2019, the Tahltan River will be closed to salmon fishing June 01 until August 31.**
 - The remainder of the Stikine River drainage is open to salmon fishing from April 01, 2019 to March 31, 2020.

Additional restrictions may be implemented in 2019 other than those listed above or outlined in the B.C. Freshwater Salmon regulations. If the in-season run size projections of Chinook and/or coho salmon indicate conservation or FSC concerns, further closures, or reductions in quotas including non-retention, may be required. Increases in the possession limits could be considered if the conservation and FSC objectives will be significantly exceeded.

Fishing activity in the Telegraph Creek area will be monitored opportunistically by a TFN field technician stationed near the Tahltan River to collect catch and release data. The technician will also be tasked with the collection of baseline biological data including sex, size and age of harvested fish as well as the collection and collation of fish tags recovered by the fishery.

Compliance monitoring and enforcement will be undertaken by enforcement personnel with the Province of B.C. and/or DFO.

6.2.2 Stikine River Recreational Fishery Licensing

Recreational fishing on the Stikine River is permitted provided the angler is the holder of a current BC “Non-Tidal Angling Licence”. A “Salmon Conservation Stamp” must be validated with the basic angling licence if the fisher intends to keep salmon. In order to fish for steelhead, a “Steelhead Conservation Surcharge Stamp” is required (see: <http://www.env.gov.bc.ca/fw/fish/licences/surcharge.html>).

Residents under the age of sixteen may fish without a licence unaccompanied by a licence holder. Non-residents under the age of sixteen may fish without a licence but must be

accompanied by a valid licence holder. Catches must be counted towards the possession limit of the licence holder. Licence fees vary depending on the type of licence required.

6.3 Stikine Commercial Salmon Fishery

The commercial fishery is allowed to operate providing conservation, FSC, recreational (in the case of Chinook salmon) and PST harvest sharing objectives are likely to be met. The Canadian catch will be managed with the objective of meeting escapement and agreed Canada/US and domestic harvest sharing objectives.

The 2019 pre-season Chinook salmon forecast is not sufficient to proceed with a directed commercial fishery for Stikine Chinook salmon and the likelihood of conducting an assessment fishery is low as the run outlook does not meet the escapement target. Further restrictions in the commercial, recreational, and FSC fisheries may be required should in-season run projections suggest escapement needs for Chinook salmon will not be met.

The implementation of Chinook conservation measures will delay the opening of the sockeye salmon fishery until the week of June 23-29 (SW26). The retention of incidentally caught Chinook salmon will be prohibited. The use of set nets will be permitted in the commercial sockeye fishery SW26-27, but limited to 30 minute soak times. For the duration of the sockeye management period (SW26-34), the maximum mesh size will be 14.0 cm (~5.5"). The lower Stikine River commercial sockeye salmon fishery will be managed on a weekly basis according to abundance. The upper Stikine commercial fishery will open for sockeye salmon on or about July 2 (SW27) with consideration given to the projected Chinook salmon escapement. Upper Stikine River fishers are permitted to use one net of the same dimensions as that used by fishers participating in the lower Stikine River commercial fishery (see Section 6.3.8). Daily and weekly catches will be collected by a DFO representative on site with catches reported to DFO's Whitehorse office on a weekly basis (of particular note is historical commercial fishing activity demonstrates that this fishery is largely inactive through late June (SW26). Management regimes directed at coho salmon will commence in SW 35 (August 25-31).

6.3.1 Stikine Commercial Chinook Fishery Controls

The three primary fishery management actions to control weekly commercial harvests include:

- Adjusting fishing time: Fishing time in the lower Stikine River fishery generally depends upon stock assessment and international and domestic catch allocation considerations. The pre-season expectation is for a run size not capable of providing directed commercial fishing opportunities, so fishing opportunities will not be provided. Once in-season projections become available (late May), short duration openings may be provided but are not considered likely for 2019.
- Adjusting the fishing area: Typically, the lower commercial Chinook salmon fishing area extends from the Canada/U.S. boundary upstream to a location near the mouth of the Porcupine River. The section of the Stikine River from the confluence of the Porcupine and Stikine rivers upstream to near the mouth of the Scud River may be opened should the Chinook salmon abundance be greater than

expected and well above spawning escapement and First Nation fishery requirements. In the Iskut River, the area will remain unchanged from previous years, i.e. from the mouth to a marker located approximately 10 km upstream from the mouth. For the upper Stikine commercial fishery, the fishing zone in the Stikine River is bounded in the south by the confluence of the Chutine and Stikine rivers, and in the north by the confluence of the Tuya and Stikine rivers.

- Adjusting the fishing gear: Initially, only one net per license will be permitted and may be deployed as a set or drift gillnet. The maximum mesh size permitted is 20.3 cm (8.0 inch). Gear may be increased to two gillnets should an increase in exploitation rate be warranted based on in-season abundance estimates. The maximum allowable net length will remain at 135 meters. Additional gear limitations are described in Section 6.3.8. If Chinook salmon conservation concerns arise, a maximum mesh size restriction of 140 mm (5.5 in) may be implemented as in previous years to conserve Chinook during sockeye openings. Typically this restriction is removed once Chinook salmon have migrated out of the fishing area.

Note – Opportunities for directed commercial harvest of Chinook salmon are unlikely in 2019.

6.3.2 Stikine Commercial Sockeye Fishery Controls

The commercial fishery will be managed on a weekly basis with management actions driven by results of stock, catch, and escapement projections, in river catch performance compared to historical catch performance and run size and water levels, and in-season escapement monitoring projects. Conservation concerns generally result in fishing time and area restrictions. In the event that increased fishing effort is justified, extensions to fishing time would be granted first. If additional effort is warranted, there will be consideration for increasing the fishing area and/or gear. Additional fishing effort will be dependent on stock status and precautionary principles.

The four primary fishery management responses during the sockeye season will include:

- Adjusting fishing time: Fishing time periods in the lower Stikine sockeye salmon fishery depend upon stock assessment and international and domestic catch allocation considerations. Although the pre-season expectation is for a run size capable of providing commercial fishing opportunities, initial fishing periods for sockeye salmon will likely be of shorter duration due to uncertainty over the pre-season run outlook. Once in-season projections become available, caution will be exercised in providing extensions to the fishing times. In the upper Stikine commercial fishery, weekly fishing times will generally follow those of the lower river lagged by one week;
- Adjusting the fishing area: Initially, fishing boundary locations will extend from the Canada/US boundary upstream to a location near the mouth of the Porcupine River. The section of the Stikine River upstream from the Porcupine-Stikine confluence will be closed for the initial sockeye salmon fishing periods.

Consideration for increasing the fishing area upstream to the boundary sign located approximately 9 km below the Stikine-Scud confluence will only be given if the in-season indicators for both Chinook and sockeye salmon indicate strong runs, FSC obligations will be met, escapement targets are expected to be exceeded and overall harvests are below allocation targets. In the Iskut River, the area will remain unchanged from previous years, i.e. from the mouth to a marker located approximately 10 km upstream from the mouth;

- Adjusting fishing gear: Initially, only one net per licence will be permitted and may be deployed as a set or drift gillnet. Gear may be increased to two gillnets, should an increase in exploitation rate be warranted based on in-season terminal run size estimates. If required to address Chinook salmon conservation concerns, there will be a maximum mesh size restriction of 140 mm (5.5”) through August 24 (SW34) to conserve Chinook salmon while permitting harvest opportunities on sockeye salmon.
- Release of bycatch: Release of incidentally caught Chinook salmon will be required during the course of the directed sockeye fishery.

6.3.3 Stikine Commercial Coho Fishery Controls

For the directed coho fishery, weekly harvest strategies commencing SW35 (August 25-31) will be influenced by the 5,000 piece allocation as prescribed by the PST for the Canadian targeted Stikine coho salmon fishery. If the effort level is low in 2019, the coho salmon fishery may see liberal openings during the targeted coho salmon fishery. The fleet is expected to harvest the allocated TAC of 5,000 pieces within a two-to-three week period.

An indication of the coho run strength is expected to be gathered over the course of the sockeye fishing season, which extends from late June through to mid-August. If there is a coho conservation concern, the Canadian fishery will be restricted primarily through reduced fishing time during the directed coho fishery.

6.3.4 Stikine Commercial Pink and Chum Harvest Controls

Pink and chum salmon are not targeted in the Stikine River; however some bycatch is anticipated during the directed fishery for sockeye salmon and to a lesser extent during the coho season. Due to the limited abundance of pink and chum salmon, few are expected to be encountered in the Stikine commercial fishery.

6.3.5 Stikine Commercial In-Season Catch Reporting Program

Commercial catch reporting requirements are detailed in the Conditions of Licence issued to all commercial fishers. While participating in the lower Stikine commercial fishery, fishers are required to land catches at a registered landing station within 2 hours of the daily closing time, except for the last calendar day on which fishing occurs in any given week, when the deadline will be 4 hours after closure. Hail information collected throughout the openings will be used to justify extensions to fishing times. In the upper Stikine commercial fishery, commercial fishers have until 24 hours after the close of each weekly fishery to

provide catch records to the Tahltan Fisheries Department official stationed at Telegraph Creek. As in past years, catches of Stikine salmon shall be made available for sampling by Departmental staff or designates when requested.

Fish slips must be completed and provide the information required as defined in the Conditions of Licence (note: details regarding specific reporting requirements differ between Lower Stikine and Upper Stikine commercial fishing areas). For example, this may include: the number and weight of each species caught separated by gill net mesh size and type (set net or drift net); whether fish were landed in the round or dressed; and the location where fishing occurred. In the unlikely event that retention of Chinook salmon is permitted in 2019, Chinook salmon must also be separated by size (large and small). A small Chinook salmon is a fish with a fork length, i.e. tip of nose to fork of tail, of less than 735 mm. A fork length measurement is used in this case since it is easier and quicker to determine than the mid-eye to fork length, which is the standard length measurement for biological sampling programs for Stikine River Chinook salmon. A logbook is required to document the number of fish caught but subsequently released, and it is submitted along with harvest and tag recovery information after each 24-hour fishing period.

Targeting of pink and chum salmon in the commercial fishery does not occur; however, all catches of these species must be recorded (including those that are released). It is unlikely that close times would be varied for pink or chum salmon.

Any steelhead captured during commercial fishing must be live-released and records of release must be retained and submitted to DFO.

6.3.6 Stikine Commercial Non-Retention Species

All opening announcements will contain the species that will be allowed to be retained. As a result of Chinook salmon conservation concerns, retention of incidentally caught Chinook salmon is prohibited. All other species noted in the weekly announcements must be released to the water with the least possible harm (this requirement includes all steelhead).

6.3.7 Stikine Commercial Monitoring Plan

The lower Stikine fishery will be monitored by DFO and/or TIFN Fisheries Program Technicians stationed at the lower Stikine Field Office. The upper Stikine fishery will be monitored by a TFN Fisheries Department official stationed at Telegraph Creek. Personnel will collect daily catch and tag recovery data from landing stations on the lower Stikine River and sample portions of the catch for biological samples and stock composition determinations. Catch and tag recovery data will be collected weekly in the upper fishery and will be recorded for each licence by species and hours fished. DFO Conservation and Protection personnel will monitor and enforce compliance in the fishery.

6.3.8 Stikine Commercial Gill Net Construction

Specific restrictions such as the specifications for net construction are found in the Conditions of Licence, which are attached to the licence. No changes from 2018 are

anticipated. Fishers are urged to read these conditions carefully to ensure that their fishing gear and activities are in accordance with the rules under which they will operate.

The maximum allowable net length for the Stikine River commercial fishery is 135 metres. All gill nets (set or drift) must meet the following web specifications or those as revised by Public Notice:

- Have 30 or more filaments in each twine of the web, with all filaments in the web of equal diameter. (This is the web which has been typically fished on the Stikine River in Canada); or,
- Have 6 or more filaments in each twine of the web, with all filaments in the web a minimum of 0.20 mm in diameter. (This web is otherwise known as “Alaska twist”).
- The minimum allowable mesh size of gill nets used in this fishery shall not be less than 100 millimetres (4 inches).
- Subject to conservation or FSC concerns, the maximum allowable mesh size of gillnets used in this fishery shall not exceed 204 millimetres (8 inches).
- The maximum gill net depth shall not exceed 60 meshes.
- The maximum gill net hang ratio shall not exceed 3:1, i.e. three fathoms of mesh-to-one fathom of cork-line.
- The minimum cork-line to web distance may not exceed zero cm.
- The maximum cork-line to web distance may not exceed zero cm.
- The distance between set nets shall be at least 150 metres, measured from any point between nets.

Set nets must be identified with an orange coloured buoy with the fisher’s licence number clearly marked on it. The buoy must be attached to the end of the net that is furthest from shore.

Specific restrictions for net configuration are found in the Fishery Notices issued prior to every commercial fishery. Fishers are urged to read these carefully to ensure that their fishing gear is in accordance with the provisions for each opening.

6.3.9 Stikine Commercial Licensing

All commercial licences are available through the National Online Licencing System which replaces the in-person payments of licensing fees at DFO offices (see: <https://fishing-peche.dfo-mpo.gc.ca/>). Harvesters will use the online licensing system to go online to pay for and print their commercial fishing licence and licence conditions. The cost of a commercial licence is \$200 regular fee and \$20 First Nation reduced fee. Seven of the 23 commercial licences on the Stikine River are currently held by the Tahltan Band Council who have the authority to designate fishers to utilize licences.

Recommendations for a process regarding relinquishing commercial licences have been developed by the SRSMAC and were adopted in 2004.

6.4 Stikine ESSR Fisheries

6.4.1 Stikine ESSR Licensing

It is possible that the number of sockeye salmon reaching Tahltan Lake may exceed escapement requirements. In preparation for this possibility as per previous years, the Department intends to issue an ESSR licence to the Tahltan First Nation to harvest excess sockeye at the weir at Tahltan Lake, or in the Tahltan River. In accordance with Departmental policy, the Tahltan First Nation will be given the right of first refusal for the 2019 ESSR for Tahltan Lake sockeye. If the Tahltan First Nation declines the ESSR, the opportunity may be offered to other groups or individuals.

The issuance of an ESSR licence must follow stringent policy guidelines. Some of the noteworthy principles and policy guidelines include:

- DFO will attempt to manage existing fisheries to minimise surpluses. Therefore, DFO will not manage for an ESSR. Fish taken under an ESSR licence are fish that are surplus to spawning requirements that could, or should, have been taken in existing fisheries. As a result, there is no guarantee that fish will be available for an ESSR fishery and there is no guaranteed amount of salmon that may be taken.
- In allocating an ESSR, the first priority will be to use the surplus to meet outstanding First Nation requirements for FSC purposes which cannot be met through approved Section 35 fisheries. This may be done under a communal licence or AFS agreement. Fish caught under this licence may be sold commercially or given away, traded or bartered. As a second priority, the local First Nation may be offered the first opportunity to harvest all, or part of the ESSR. Therefore, in accordance with DFO policy, the Tahltan First Nation will be given the right of first refusal for the ESSR for Tahltan Lake sockeye.
- ESSR licence holders are required to invest profits from sales of the surplus into community-based fisheries projects and activities such as enhancement, stock restoration, habitat restoration, and, or, fishery or habitat management research.

6.4.2 Stikine ESSR Control and Monitoring of Removals

The ESSR fishery will only be initiated if it is expected that there will be excess sockeye salmon on the spawning grounds. The general operating conditions for harvesting Tahltan Lake sockeye under an ESSR licence are expected to include:

- a) harvesting will not commence until the weir count exceeds 15,000 sockeye salmon and the in-season projection is for more than 27,000 sockeye salmon to enter the lake. DFO will determine when the fishery commences and how many fish can be taken;
- b) for cumulative weir counts of less than 27,000, up to 25% of the daily sockeye salmon escapement into Tahltan Lake may be harvested subject to (a) above;

- c) once the weir count exceeds 27,000, the percentage may be increased to 75%. Consideration will be given to increasing this percentage depending on run size and fish quality;
- d) the licensee has the responsibility to inspect, record and report the catch as outlined in operating procedures determined between DFO and licence holder.

The above conditions will serve as general guidelines for 2019. However, consideration may be given for modifications to address logistical or other challenges, providing such modifications do not impair the achievement of conservation objectives. Due to the migration characteristics of Stikine River sockeye salmon, the actual implementation of fishing opportunities at Tahltan Lake would likely occur on very short notice.

7 STIKINE SOCKEYE ENHANCEMENT PLAN FOR 2019

Joint Canada /U.S. sockeye enhancement projects are conducted in the Stikine River watershed under terms outlined in the PST and/or as modified by the Transboundary Panel. Broodstock is captured in Canada at Tahltan Lake, with eggs and milt collected to fertilize eggs. Fertilized eggs are flown by float-plane or helicopter to the Snettisham Central Incubation Facility south of Juneau, Alaska where they are incubated and thermally marked. The original enhancement plan stipulated that the fry originating from Tahltan Lake broodstock were to be released (back-planted) into Tahltan and/or Tuya lakes within the Stikine River drainage as per plans recommended by the TRP. However, due to Canadian concerns over the fate of terminal adult returns to the Tuya system, outplants into Tuya Lake have been suspended since 2015.

The PST identifies the following commitments:

- A Stikine Enhancement Production Plan (SEPP) shall be prepared annually by the TTC by February 1. The SEPP will detail the planned enhancement activities to be undertaken by the Parties and the expected production from site specific egg takes, access improvements and all other enhancement activities outlined in the annual SEPP. The TTC will use this data to prepare an initial enhancement production forecast based on the best available information.
- The Transboundary Panel shall review the annual SEPP and make recommendations to the Parties as to whether the plan should be revised or accepted as is by February 28.

The SEPP for 2019 is summarized in Table 16.

Table 16. Stikine Enhancement Production Plan (SEPP) 2019.

Enhancement Project	Activities	Expected Production	Technique to document production
Tahltan Lake	Egg Take: target of 5.0 million eggs.	70,560 adults resulting from direct release in Tahltan Lake.	Thermal mark

	Guideline for last adult broodstock collection day is September 25 Outplant: All fry to be “direct release” into Tahltan Lake	(Survival Rate: 72% green egg to fry, 28% fry to smolt, 7% smolt to adult)	
Expected Total Production		70,560	

Notably, as per 2015, outplants of sockeye salmon fry into Tuya Lake will not occur to ongoing concerns over the inability to harvest adequate numbers of fish downstream of the velocity barrier in the Tuya River. The suspension of the outplant program may impact future Stikine River egg-take targets, and, as per paragraph 3(a)(i)(C) of Annex IV, Chapter 1, will in turn have an effect on harvest share allocations for Stikine River sockeye salmon in the future. DFO will continue to explore options that address these concerns.

7.1 Tuya River Sockeye Enhancement Review

DFO will continue to work with the TFN, the Transboundary Technical Committee and Transboundary River Panel to review options for Tuya River sockeye salmon enhancement. In 2016, a project funded by the Northern Fund was initiated to bring together all sources of information related to Tuya Lake enhancement for inclusion in a report that provides analysis and synthesis of available information. The report will cite all references utilized and provide clarity on fish production, harvest, terminal escapement, opportunities and challenges and recommendations for consideration. Upon project initiation, DFO and a consultant will seek input from Tahltan/Iskut First Nations, local Stikine residents and stakeholders to clearly inform concerns, information needs and ensure the project develops mutually valued information and opportunities. The consultant will also conduct field visits to collect information on current field conditions on which to base recommendations (e.g. fish passage, terminal harvest access, etc.) Recommendations will be developed to better attempt to realize the full potential of Tuya Lake enhancement and focus stakeholder interest on feasible options.

8 STIKINE STOCK ASSESSMENT PLAN FOR 2019

8.1 Chinook Salmon

Stikine Chinook salmon in-river stock assessment programs planned for 2019 include:

- The joint Canada/US mark-recapture project at Kakwan Point (15 km downstream of the Canada/U.S. border) involves live-capture, spaghetti tag application and release of the salmon. Tags will be recovered in the commercial fishery, Little Tahltan weir and potentially in FSC fisheries, as well as in escapement surveys of various spawning locations (e.g. Verrett and Craig rivers, and Shakes and Johnny Tashoots creeks).

- The collection of baseline biological information (age-size-sex composition, spaghetti tags, CWT's, spaghetti tags) from biological samples and from catches taken in the lower Stikine commercial and/or assessment fishery, the FSC fishery and the upper Stikine commercial fishery. An assessment fishery will not be conducted in the absence of a directed Chinook salmon fishery for 2019 in light of the poor pre-season forecast.
- The opportunistic collection of tissue samples from specific stocks drainage-wide in order to update baselines for GSI purposes.
- The weekly collection of GSI tissues from the lower Stikine commercial fishery (not likely in 2019) and from the Kakwan tagging site. GSI will be used to determine relative, perhaps absolute, stock-specific run strength on a weekly basis.
- Application of coded-wire tags (CWTs) with a target of 50,000 Chinook smolts in order to obtain information on production, ocean survival and marine distribution.
- The Chinook salmon escapement enumeration and tag observations at the Little Tahltan River. Baseline data (may include age, gender, size), spaghetti tags, CWT and secondary mark sampling may also be collected from spawning locations (see Fig.9 for historical counts).
- The collection of catch statistics and associated baseline biological information from the recreational fishery located at the Tahltan River (not likely for 2019).
- Aerial surveys of key Chinook salmon spawning areas located throughout the Stikine River.

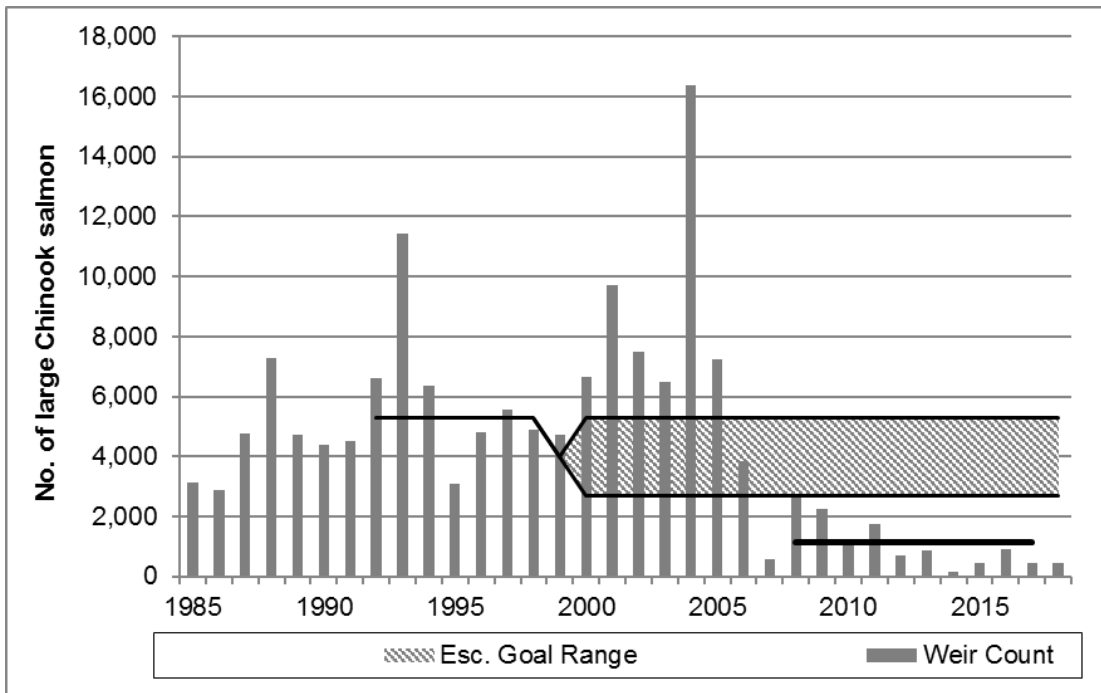


Figure 10. Weir counts of Little Tahltan River Chinook, 1985 to 2018 (does not include jacks). A landslide impeded access to the Tahltan R. drainage Chinook salmon spawning grounds in 2014. 2019/20 Salmon Integrated Fisheries Management Plan – Transboundary Rivers 98

8.2 Sockeye Salmon

The expected assessment program for Stikine sockeye salmon in 2019 will include the following:

- Catch monitoring and sampling in the lower Stikine commercial fishery to obtain weekly inputs of catch, effort and stock composition for the Stikine Management Models (SMM and SFMM). Matched otolith, scale and egg diameter data will be collected.
- Catch monitoring and sampling (age, gender, size, otoliths and egg diameters) from the upper Stikine FSC, commercial and ESSR fisheries.
- Sampling post-spawned sockeye salmon opportunistically from various spawning locations for genetic stock ID.
- Escapement enumeration and sampling (age, gender, size, otoliths and egg diameters) at Tahltan Lake (see Figure 10).
- Aerial surveys of index sites to enumerate spawning of mainstem sockeye.
- A number of projects to evaluate the joint Canada/US sockeye enhancement program on Stikine sockeye including: fry outplant and smolt emigration studies at Tahltan Lake (see Figure 11); and analyses of catches, escapements and juvenile samples to determine enhanced and wild contributions.
- Estimating non-Tahltan Lake sockeye salmon run size and escapement. Tahltan Lake sockeye escapements are enumerated at the Tahltan Lake, whereas, mainstem escapement is calculated. The calculations involve: estimating the total in-river run from the sampling programs on the lower Stikine (assessment and commercial fishery sampling); obtaining the stock composition results based on egg diameters (large egg = mainstem) to estimate the mainstem component; and, subtracting the estimated in-river catches of mainstem sockeye stocks from the in-river run size estimate of the mainstem component.

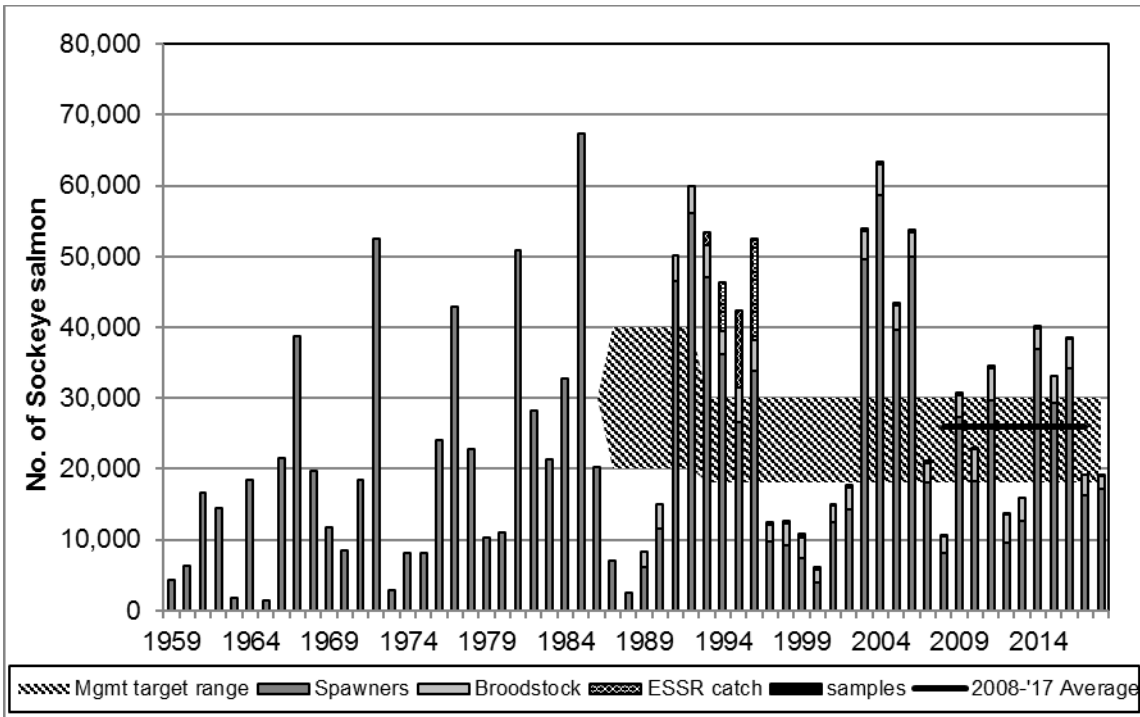


Figure 11. Weir counts of Tahltan Lake sockeye, 1959 to 2018. Note that annual weir count equals the sum of spawners + broodstock + ESSR catch + samples.

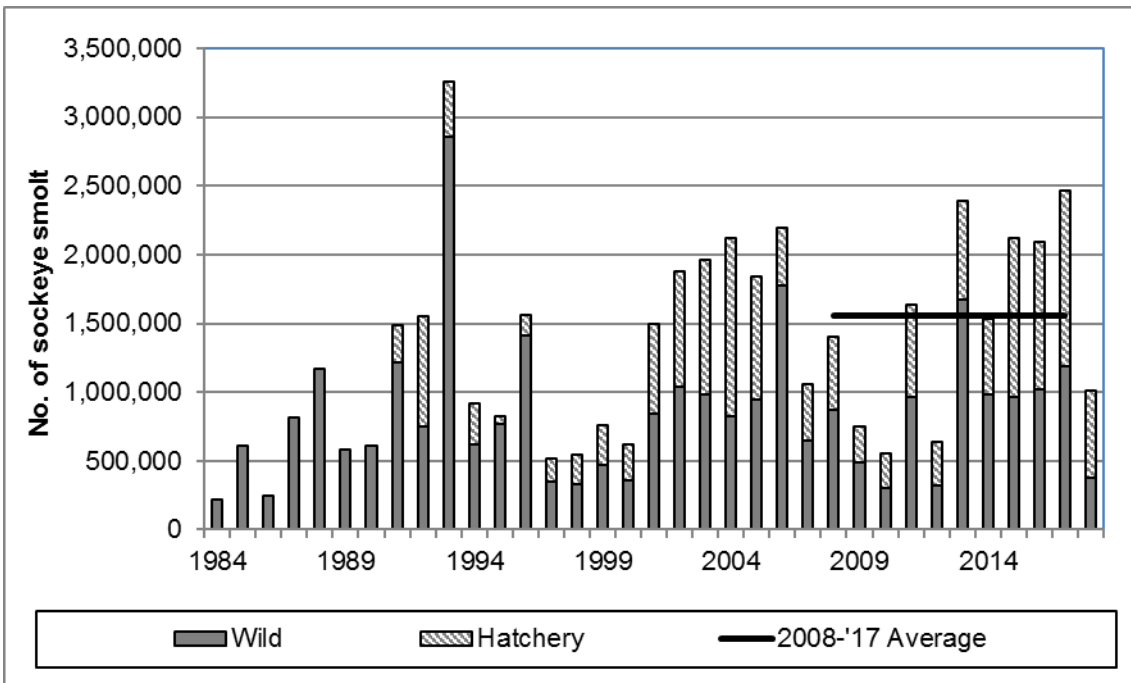


Figure 12. Weir counts of sockeye salmon smolt emigrating from Tahltan Lake, 1984 to 2018.

8.3 Coho Salmon

The expected stock assessment program for Stikine coho salmon in 2019 will include the following:

- A CWT program (target of 10,000 tags to be applied to coho smolt) to provide information on marine interception areas and run timing through approach water fisheries, and to provide a total smolt production estimate.
- Catch monitoring and sampling (age, gender, and size) of coho salmon taken in the lower Stikine commercial and assessment fisheries.
- The collection of CWT heads from all marked fish (adipose clipped) observed in the sampling pool.
- Aerial surveys to assess the spawning escapement of coho salmon at six select index sites (see Figure 12).
- Pilot studies to determine the potential for enumerating specific components Stikine River coho salmon run will be conducted at the following locations: the Iskut River, the Chutine River and the Katete River. The Iskut River will be the focus of a mark-recapture feasibility study; the other two rivers will be assessed for the use of sonar technology. Development of a genetic stock identification baseline.

8.4 Pink and Chum Salmon

The assessment program for Stikine pink and chum in 2019 will involve monitoring catch and effort in the lower Stikine River commercial fisheries.

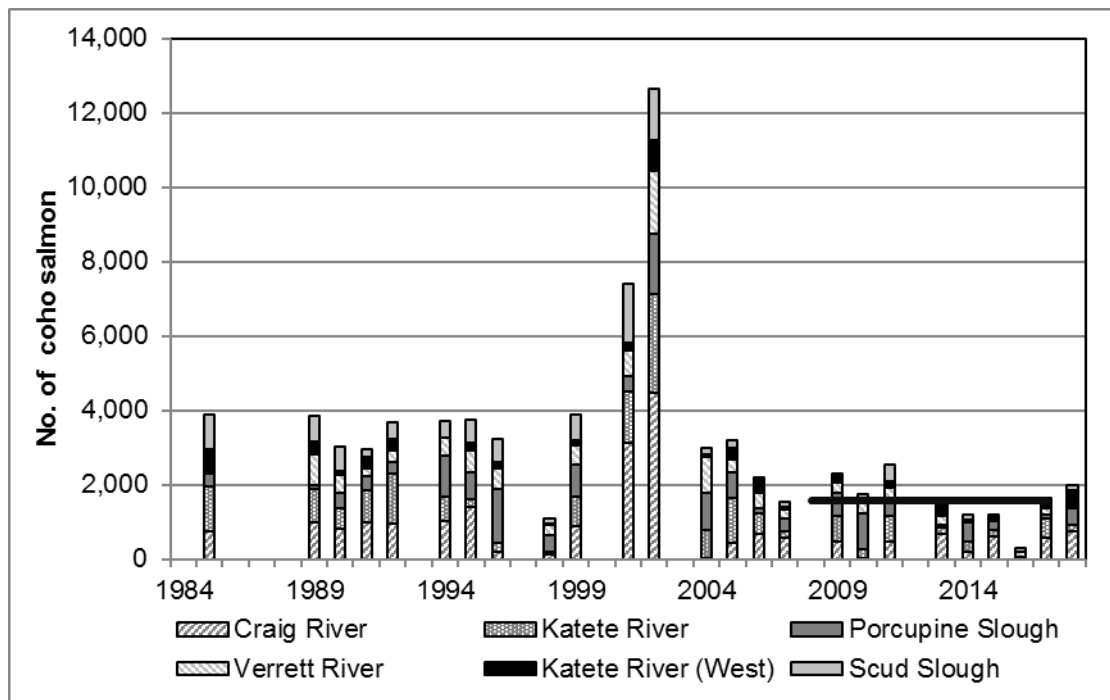


Figure 13. Aerial counts of coho salmon in Stikine R. spawning index areas: 1984-2018. Surveys are flown once annually the end of October or early November. Only years when all six index areas were surveyed are displayed. A program to estimate total system-wide coho salmon escapement was discontinued in 2012.

9 STIKINE POST SEASON REVIEW

A comprehensive post-season review is conducted annually by the Transboundary Technical Committee for the Transboundary Panel and the Pacific Salmon Commission. Results of the 2018 TTC review appear in:

Transboundary Technical Committee. In prep. *Preliminary estimates of Transboundary river salmon production, harvest and escapement and review of joint enhancement activities in 2018*. Pacific Salmon Commission.

The following sections summarizing the 2018 season are based substantially on the results of the TTC post season review and any recent updates.

9.1 Conservation

The spawning escapements of Stikine Chinook and sockeye salmon are presented in Table 17. The estimated escapement of Stikine River large Chinook salmon was 8,355 fish; below both the escapement goal target of 17,400 fish and the escapement goal range of 14,000 to 28,000 fish. Hence, the system-wide Chinook salmon escapement goal was not achieved and the Little Tahltan River Chinook count was well below historical levels. Sockeye salmon migration did not appear to be impaired by the slide in 2018. However, Decheeka Falls located at the upper portion of a small canyon above the Little Tahltan River confluence with the Tahltan River may also be a potential impediment at certain water flows. Helicopter overflights and on the ground surveys showed significant numbers of sockeye were likely unsuccessful at negotiating the falls in 2018.

The Tahltan Lake sockeye salmon escapement goal range of 18,000 to 30,000 fish was achieved in 2018 (Figure 10) with 19,241 estimated to have reached the lake. The spawning escapement for the mainstem Stikine sockeye stock conglomerate was estimated at approximately 10,232 fish, which is below the lower end of the escapement goal range for this group.

The coho salmon escapement could not be quantified definitively but appeared to be above average based on limited aerial surveys of primary index streams (Figure 12). In prior years when a coho test fishery was used to estimate system-wide escapement, the correlation between aerial surveys and test fishing indices was determined to be weak.

Table 17. Escapement goals vs. observed escapement of Stikine River salmon, 2018.

Species/Stock	Escapement Goal		Escapement in 2018	Escapement Goal Met?
L. Tahltan CN (large)	2,700	5,300	453	No
Total Stikine CN (large)	14,000	28,000	8,355 ^a	No
Tahltan Sockeye	18,000	30,000	19,241	Yes
Mainstem Sockeye	20,000	40,000	10,232	No
Coho	30,000	50,000	?	?

^a based on tag recoveries from Chinook bycatch in directed sockeye commercial fisheries and spawning ground recoveries.

9.2 First Nation Fishery

The First Nation FSC harvest of sockeye salmon was below average and the Chinook salmon harvest was below average in 2018. The BNA was not achieved for Chinook, sockeye, or coho salmon (Table 18). The sockeye catch was 26% below the previous 10-year average.

Table 18. First Nation harvest of Stikine River salmon, 2018.

Species	BNA	Harvested	Restrictions
Chinook (large)	2,000	165	No
(small)		456	
Sockeye	10,000	5,415	No
Coho	200	0	No

9.3 Recreational Fishery

Participation in the Stikine recreational fishery has declined over the past ten years. In 2018, it is estimated that no Chinook salmon were harvested due to the restrictions put in place which included the Tahltan River closure and non-retention of Chinook over 65 cm, as well as, access restrictions imposed through Tahltan First Nation lands by the Tahltan First Nation. Access was limited by the First Nation due to concerns over declining Chinook salmon abundance in the Little Tahltan River over the past decade (Figure 9).

9.4 Commercial Fishery

The total Chinook commercial incidental catch (and subsequently released) included 476 large and 636 small Chinook salmon in 2018. There was no directed Chinook fishery in 2018 and all Chinook catches occurred during the sockeye fishery between SW 26-33 (Table 19). Post-season retrospective analysis indicated the actual Canadian allocation for directed fisheries was 0 large Chinook based on the post-season estimated run size of 8,827 large Chinook.

The total commercial sockeye salmon harvest of 17,322 fish was roughly 82% above the post-season estimated allocation (Table 19). The primary reason for this is attributed to differences in the in-season vs post-season run size estimates. Catch guidelines according to in-season projections were generally adhered to.

The coho salmon allocation target for the commercial fishery was not achieved in 2018 with a total catch of 3,685 fish, of which 3,324 coho were taken in the directed coho fishery (Table 19). This was below the directed coho fishery allocation of 5,000 coho salmon.

Table 19. Commercial salmon allocation and harvest on the Stikine River, 2018.

Species	Allocation	Harvest against allocation	Met/within 90%	Restrictions	Total Catch
Chinook - large	0 - directed	none	NA	Yes	0

Chinook - small	NA		NA	Yes	0
Sockeye	22,987	above	No	Yes	17,322
Coho	5,000 ^a - directed	3,324 - directed	Yes	Yes	3,685
Pink	NA		NA	Yes	94
Chum	NA		NA	Yes	526

^a based on 5,000 PST allocation minus FN catch of 0.

9.5 PST Harvest Sharing Performance in 2018.

Chinook salmon

The post-season estimated run size of Stikine Chinook salmon is 8,827 large fish. A run size of this magnitude is not sufficient to provide for the following: the agreed S_{MSY} escapement goal of 17,400 large Chinook salmon; the base-level catches (BLC) of large Chinook salmon outlined in Treaty (which total 7,100 large Chinook); and allow for a directed harvest of large Chinook salmon. There was no Canadian directed catch of Chinook salmon in 2018.

Canada's BLC amounted to 0 large Chinook salmon as all incidentally caught Chinook salmon in the directed sockeye fishery were released, which was below the Treaty entitlement of 2,300 large fish. The sockeye assessment fishery catch caught and released 21 large Chinook salmon, which occurred in Canada incidentally during the fishery to assist in in-season sockeye run assessments. There were no assessment or directed fisheries for Chinook salmon in 2018.

Sockeye salmon

Under the PST, the Parties agreed that each country would manage its fisheries to achieve a 50% share of the overall TAC of Stikine sockeye salmon. How this is to be implemented is described annually in a management plan prepared by the Canada/U.S. Transboundary Technical Committee. Basically the plan stipulates that the Tahltan and mainstem components will be managed and accounted for independently. Surpluses or deficits in the escapement of one stock cannot be used to balance surpluses or deficits in the escapement of the other stock. Further, the plan stipulates that since enhanced Tuya fish co-mingle with the Tahltan stock, harvesting of enhanced Tuya sockeye salmon in traditional fisheries will be constrained by the applicable harvest rate for the Tahltan stock.

The most recent post season estimate of the terminal run size of Stikine River sockeye salmon is 63,651 fish which includes: 43,005 Tahltan Lake sockeye (wild plus enhanced), 18,492 mainstem sockeye, and 2,154 (enhanced) Tuya sockeye salmon.

Canada exceeded its overall Treaty allocation target for Stikine sockeye salmon in 2018. The Canadian total catch of 22,737 sockeye salmon represented 119% of the total TAC and exceeded Canada's AC by 139% and was approximately 13,206 sockeye over the allowable harvest for Canada. For the Tahltan stock component, the estimated total TAC was 18,153 sockeye salmon (total run minus the escapement goal minus the test fishery

catch) shared equally between the Parties (i.e., 9,076 Tahltan sockeye each for Canada and the U.S.). Canada’s catch was 18,439 Tahltan sockeye (203% of Canada’s allocation). For the mainstem stock, the total TAC was zero. Canada’s estimated catch was 3,613 mainstem sockeye.

Coho salmon

The Canadian catch of Stikine coho salmon in directed fisheries was 3,324 fish; below the PST allocation of 5,000 coho salmon (Table 20).

Table 20. Harvest sharing report card for Stikine River salmon, 2018.

Sp.	Component	2018 Treaty-based allocation		2018 Actual		Obligations Met?	
		Canada		Canada		Canada	
CN	Directed AC catch	0		0		yes	
	BLC- trad'l fisheries	2,300		0		yes	
	BLC – test fishery	1,400		0		yes	
SO	%TAC (all Stikine)	50%		119%		no	
	Catch (all Stikine)	9,531		22,737		no	
	%TAC (Tahltan stock)	50%		203%		no	
	Catch (Tahltan)	9,076		18,439		no	
	%TAC (mainstem)	50%		>100%		no	
	Catch (mainstem)	0		3,613		no	
	%TAC (Tuya stock)	50%		151%		no	
	Catch (Tuya)	455		685		no	
CO	Directed catch	5,000		3,324		yes	

note: primary obligations are in **bold** type

9.6 Stikine Sockeye Enhancement Activities in 2018.

In January 2019, the Transboundary Rivers Panel reviewed the 2017 Sockeye Enhancement Production Plan for the Stikine River (SEPP). The review included actions that had been conducted in the fall of 2017 (egg takes); a review of the spring 2018 fry releases (brood year 2017) was also completed. Through this review the 2017 SEPP was deemed complete and an update of 2018 SEPP activities was completed which is summarized as follows:

Objectives:

- Spring 2018 release of unfed fry into Tahltan Lake from the 2017 egg collections;
- A bilateral collection target of 5.0 million sockeye eggs in the fall of 2017 (produced fry to be released in the spring of 2018). This goal was modified to 3.7 million eggs based on the escapement into Tahltan Lake and requirement not to exceed a 50:50 ratio of wild to enhanced smolts.

Results:

- 2.6 million fry were released into Tahltan Lake;

- Green-egg to out-planted survival for the Tahltan Lake bound fry was 67%;
- 2.5 million eggs were collected and delivered to the Port Snettisham hatchery by September 25, 2018. This was below the revised Canadian target of 5.0 million eggs due to requirement not to exceed a 50:50 ratio of wild to enhanced smolts;
- All fry were thermally marked.

APPENDIX 3: TAKU RIVER INTEGRATED SALMON FISHERIES MANAGEMENT PLAN, 2019.

1 INTRODUCTION

The Taku River drains an area of approximately 19,000 km² in northwestern British Columbia and S.E. Alaska. The mouth of the river is located approximately 45 km northeast of Juneau, Alaska. Close to 90% of the Taku River watershed is located in British Columbia encompassing two main ecoregions: the Boundary Ranges Ecoregion characterized by rugged mountains, ice fields and glaciers and moist climate strongly influenced by its proximity to the ocean; and the drier sub-Arctic climates of the Yukon-Stikine Highlands Ecoregion (<http://www.env.gov.bc.ca/ecology/ecoregions/>). The lower Taku River is highly braided, confined within a wide mountainous valley with major glacial influences in close proximity to the mouth (e.g. Tulsequah Glacier and its unique *jökulhlaup* or sudden release of glacially impounded melt-water). This is sharply contrasted by the small lakes and streams surrounded by boreal forests and upland meadows of the Stikine Highlands. Transition zones between the ecosystems are characterized by high gradient watercourses and deep canyons (e.g. Nakina River canyon).

1.1 Description of the Taku River Salmon Resources

Amongst the Transboundary rivers, the Taku River is a major contributor of Chinook, sockeye, coho, pink and chum salmon and steelhead with most of the spawning occurring in Canadian portions of the drainage. Salmon distribution is widespread throughout the Inklin River and its tributaries, whereas velocity barriers in the Nakina River drainage prevent salmon access to a greater proportion of the larger headwater lakes and streams, such as Sloko and Nakina lakes.

Salmon stocks returning to the Taku River drainage are jointly managed by DFO, the Taku River Tlingit First Nation (TRTFN) and the Alaska Department of Fish and Game (ADFG) through the Canada/U.S. Transboundary Technical Committee of the Transboundary Rivers Panel (pursuant to the PSC).

1.1.1 Chinook Salmon

The Taku River is a major producer of Chinook salmon in northwestern B.C. and southeast Alaska. Over the past decade (2009-2018), the annual terminal run size of large Chinook salmon (i.e., fish with a mid-eye to fork length measuring 660 mm or more) has averaged approximately 23,500 fish. The historical range since 1995 is 7,424 (2018) to 126,202 (1997). The run generally enters the river mouth in early May, peaks early June and has moved upstream from the lower river by early July.

Three Chinook Conservation Units have been identified in the Taku River based on timing and habitat characteristics: TAKU-early; TAKU-mid; and TAKU-late. Primary Chinook salmon spawning stocks include: Nakina River (TAKU-mid); Nahlin River (TAKU-early); Tseta Creek (TAKU-early); Dudidontu River (TAKU-early); Sheslay and Hackett rivers (TAKU-late); Tatsatua River (TAKU-late); and Kowatua River (TAKU-late).

Aerial survey data from select index spawning streams have been collected consistently over the past 4 decades. Smoothed counts over that period reflect a bell shaped curve with spawning escapements increasing from the mid 1970's to a peak in the mid-late 1990's and then declining through 2018 back to the low counts of the mid 1970's. The time series of in-river run and terminal run estimates based on mark-recapture data are shorter, commencing in 1989 and 1995, respectively. These data show a similar pattern with a sharp peak in abundance in 1997 followed by a marked decline in annual estimates and 6-year cycle averages since that time; the recent 6-year (2013-2018) average terminal run size of 18,278 being the lowest cycle average recorded. Prior to 1999, there had not been directed terminal commercial fisheries for several cycles and stocks were in rebuilding mode. New PST provisions commencing 2005 allowed for directed fisheries when warranted by abundance.

1.1.2 Sockeye Salmon

The Taku River is also a major producer of Transboundary sockeye salmon. Over the past decade (2009-2108), the annual terminal run size has averaged approximately 190,512 sockeye salmon. Since 1984 when estimates commenced, the run size has ranged from 118,427 (1988) to 396,678 (2001). Cycle (5-year) average escapements have been relatively stable undulating within 25% of the long term average total spawning escapement of approximately 106,622 fish. The run generally enters the river mouth in early June, peaks mid-late July and vacates the lower river by late August.

One River-type and four Lake-type sockeye Conservation Units have been identified for the Taku River based on genetic attributes. The River-type CU is part of the broadly distributed Northern Transboundary Fjord CU; the lake-type CU's include: Kuthai, Little Trapper, Tatsamenie, and King Salmon. Sockeye escapement assessment projects occur on these CU's. Besides these lake systems, other notable Taku sockeye spawning locations include: the mainstem Taku, Nakina, Hackett, and Nahlin rivers. Canada/U.S. cooperative management regimes focus on aggregate stock objectives, although consideration is given to specific CU's in some years (e.g., Tatsamenie).

As part of the PST arrangements, a joint sockeye enhancement program for sockeye salmon exists on the Taku River. The primary enhancement project involves egg-takes at Tatsamenie Lake, incubation in an Alaskan hatchery in Port Snettisham and out-planting of fry back into the system of origin. Various other projects have been/are being investigated including improving sockeye salmon access to Trapper and King Salmon Lakes, extended rearing at Tatsamenie Lake, and potential fry planting at King Salmon Lake.

1.1.3 Coho Salmon

The Taku River is a major producer of coho salmon in the Transboundary rivers. Estimates of the total run size of Canadian-origin fish average approximately 146,739 coho over the 2009-2018 period, and range from 50,886 (1997) to 339,736 (1994) since 1992 when the time series began. Estimates of in-river abundance are available from 1987. The trend in 4-year cycle averages in this dataset show a near tripling of in-river abundance from the

late-1980's cycle averages of roughly 60,000 coho salmon, to cycle averages in excess of 170,000 fish in the early-to-mid 2000's, followed by a progressive decline to the current 4-year (2015-2018) cycle average of approximately 73,983 coho salmon. Trends in total run estimates closely resemble those of the in-river run estimates.

Coho salmon generally cross the international border in mid-July with the peak of the run arriving in early to mid-September. For international cooperative management and harvest sharing purposes, two run components are considered separately: the early part of the run (coho salmon that migrate prior to statistical week 34, roughly mid-August); and the late run (coho salmon that migrate into the river SW34 and thereafter). The late run has been subject to specific harvest sharing objectives outlined in Chapter 1 of Annex IV of the PST.

One coho CU was officially identified for the Taku River based on an initial examination of ecotypic characteristics. However, subsequent investigations have suggested three CU's might be more appropriate (TAKU-early timing, TAKU-mid-timing, and TAKU-late timing) based on run timing information and three dominant aquatic ecotypes in the drainage: the dynamic, highly braided and glacially influenced streams of the Taku mainstem and lower river; the lake-dominated streams on the eastern slopes of the Boundary Ranges; and, the high elevation streams and small lakes of the Stikine Plateau.

Coho salmon spawning areas in the Taku River watershed are widely distributed. Notable spawning locations include: mainstem Taku River; Nakina River; Hackett River; Nahlin River; Tatsatua River; Kowatua River; Tulsequah River; Sloko River; and streams located in the U.S. section of the Taku River.

1.1.4 Pink Salmon

The Taku River is the largest producer of pink salmon in the Transboundary area with more than a million spawners occurring in some years. Based on ecotypic characteristics, Taku pink salmon form the major component of the broader Transboundary Fjord pink salmon CU (TBFj). The run typically enters the river in late June, peaks in mid-July and has departed the lower river for upstream spawning grounds by mid-August. Pink salmon spawning areas documented in the Taku River include: Nakina River, tributaries to the lower Taku and Tulsequah rivers, Dudidontu and Nahlin rivers. Pink salmon are not targeted in the Canadian fisheries in the Taku River. Currently, there are no programs dedicated to assess pink salmon border escapement or drainage-wide spawning escapements. Inferences on abundance are obtained from catches (and subsequent release) of pink salmon in the Canyon Island fish wheels which are used to tag Chinook, sockeye and coho salmon as part of the joint Canada/U.S. mark recapture program.

1.1.5 Chum Salmon

Although abundance appears to be in a depressed state, the main production of chum salmon from the Transboundary area originates from the Taku River. This is a fall-run stock comprising one CU (TAKU) which typically enters the river mouth in August with peak abundance in mid-September. Spawning occurs primarily in groundwater fed areas of the lower Taku River; however, spawning may also occur in the lower reaches of the

Nakina and Inklin Rivers and tributaries. As with pink salmon, chum salmon are not targeted in the Canadian fisheries in the Taku River. Currently, there are no programs dedicated to assess chum salmon border escapement or drainage-wide spawning escapements however some information on relative abundance is available from catches of chum salmon in the Canyon Island fish wheels used in the joint Canada/ U.S. mark-recapture program.

1.1.6 Steelhead

Steelhead salmon (primarily thought to be fall run) are present in the Taku River drainage although information on abundance and life history is limited. Spawning is known to occur in the Nakina River and in some of the headwater tributaries of the Inklin River (e.g. Sheslay River).

1.2 Description of Taku River Salmon Fisheries

There are three fisheries that target salmon in the Canadian section of the Taku River: the First Nation food, social and ceremonial (FSC) fishery, the recreational fishery and the commercial gillnet fishery. Fisheries in Alaska that also target Taku salmon stocks include the District 111 commercial drift gillnet fishery in Taku Inlet, the Juneau area sport fishery, and a limited personal use fishery in the lower Taku River in Alaska. S.E. Alaskan troll fishers also catch Taku salmon stocks of which Chinook and coho are of primary interest. Seine fisheries conducted along the migration routes also intercept Taku stocks, notably sockeye and pink salmon. Cooperative and coordinated management regimes for Taku Chinook, sockeye and coho salmon are contained in current PST, Annex IV, Chapter 1; these arrangements and recent updates to them (e.g. for coho) cover the 2009-2018 period.

1.2.1 Taku River Tlingit First Nation FSC Fishery

The Taku River Tlingit First Nation (TRTFN) has engaged in fishing activities on the Taku River since well before European contact. In recent years, TRTFN fisheries have primarily employed drift and set gillnets, although angling and gaffing are also utilized in certain headwater locations. First Nation food, social and ceremonial fisheries predominantly occur immediately upstream of the international border (in the same location as commercial fishery). Harvesting also occurs in the lower Nakina River as well as on the Silver Salmon River (near the outlet of Kuthai Lake). Over the past decade, 2009-2018 FSC catches have averaged 88 Chinook, 142 sockeye and 121 coho salmon. Fishing generally commences in May and continues through October.

1.2.2 Recreational Fishery

The recreational fishery in the Taku River watershed is mostly focused around the lower Nakina River. Other sites frequented by recreational fishers include the Tatsatua River and the Sheslay River. Chinook salmon is the targeted salmon species. It is estimated the annual recreational catch of Chinook salmon averages approximately 105 fish. Low catches (mostly a catch and release fishery) and light fishing pressure are primarily due to the

remote nature of the watershed which is accessed mostly by helicopter or fixed wing aircraft.

The number of anglers varies year to year, however based on information gathered through a recreational creel survey conducted in 2000 it is estimated that approximately 60 anglers per year take part in the recreational fishery on the Nakina River.

1.2.3 Commercial Fishery

The Canadian commercial fishery was established on the lower Taku River in 1979 and currently involves seventeen commercial licences, more than half of which are associated with the TRTFN. The TRTFN currently holds 7 commercial salmon licences issued with reduced annual fees, in addition to 2 communal commercial “F” licences issued at no cost to the First Nation.

The commercial fishing area on the Taku River in Canada extends from the point identified by the fishery boundary signs (located approximately 50 metres upstream of the international border) to the boundary signs erected near a geological feature locally known as Yellow Bluff, which is located approximately 18 kilometres upstream from the border (Figure 13). The commercial fishing area does not include Flannigan's Slough or South Fork Lake and outlet channel, which are marked with fishing boundary signs. Almost all commercial fishing activity takes place in the lower half of this area, downstream of the mouth of the Tulsequah River.

Since the inception of the fishery, targeted species in the Canadian commercial fishery have included sockeye and coho salmon. Commencing in 2005, revised PST provisions allowed for a directed commercial fishery for Taku Chinook salmon. When warranted by the pre-season forecast (see decision rules in Appendix 3, Section 5.1), the Chinook fishery usually commences the end of April or early May (SW 18/19) and continues to late June (SW 25/26). The directed sockeye salmon fishery runs from mid/late June (SW 25/26) to mid-August (SW 33). The directed coho fishery commences mid-August (SW 34) and usually concludes in September or early October (SW 41). The early portion of the coho run is subject to bycatch in the directed sockeye fishery. Due to market, weather and transportation considerations, fishing for coho salmon ceases before the end of the coho migration.

During the past decade (2009-2018), annual catches in the Taku River commercial fishery have averaged approximately 1,951 large and 465 small Chinook, 23,328 sockeye and 9,530 coho salmon. Fishing is primarily conducted with drift and/or set gillnets using small, outboard-driven riverboats. Landing stations to handle commercial caught salmon are operated in the lower river. Most salmon harvested on the Taku River are transported to commercial buyers via boat to Juneau, Alaska, while a small number are taken via air to Atlin B.C. and sold locally there or in Whitehorse. Marketed products include fresh frozen, fresh and smoked salmon.

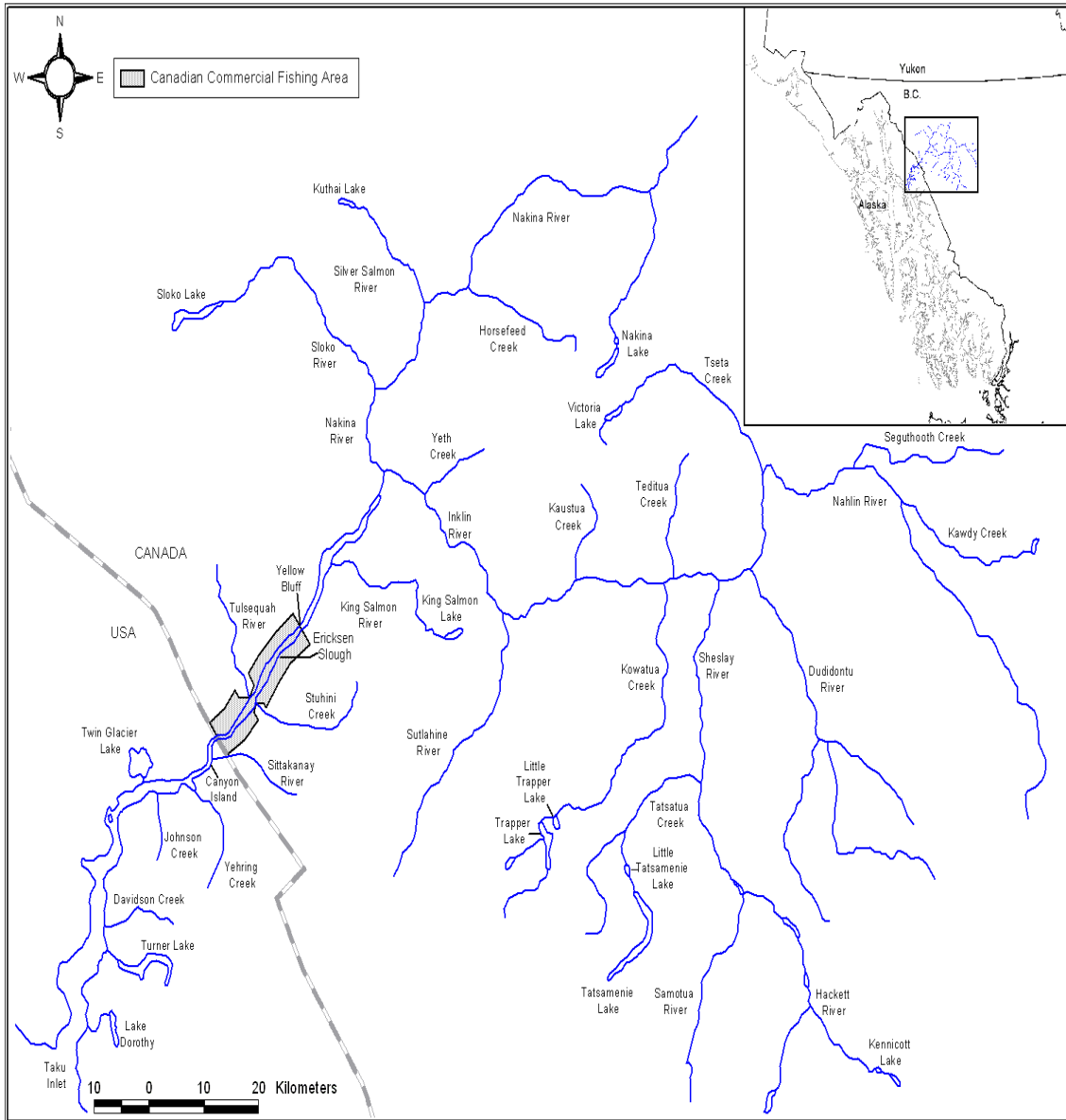


Figure 14. The Taku River watershed and the Canadian commercial fishing area.

2 RUN OUTLOOKS FOR TAKU SALMON IN 2019

As with other Transboundary salmon stocks, recent fluctuations in overall survival have resulted in uncertainty in the development of pre-season outlooks. Despite challenges with accuracy in forecasting, pre-season outlooks are useful when used in concert with fishery performance (e.g. CPUE) for management until such time as in-season data becomes available for in-season run size projections.

2.1 Chinook Salmon

The 2019 pre-season terminal run forecast for large Taku River Chinook salmon (Chinook ≥ 660 mm mid-eye-to-fork length) is 9,100 fish, which is 62% below the ten-year average terminal run of approximately 23,641 fish, and well below the target escapement goal range of 19,000 to 36,000 fish. This outlook is based on a sibling forecast model that was adjusted downward by the recent 5-year model error as the model has tended to overestimate the run size in recent years. The sibling return data indicates that productivity is well below average and well below what would otherwise be expected based on historical spawner-recruitment relationships.

2.2 Sockeye Salmon

The 2019 pre-season forecast for the terminal run of wild Taku River sockeye salmon (composite of all stocks) is approximately 154,000 fish. This forecast is based on a stock-recruitment model that was adjusted based on the recent 10-year model error. The model adjustment (downwards 23%) was used in 2018-19. The forecast run size is below the recent ten-year average (2009-2018) of 181,671 wild fish.

Tatsamenie Sockeye

The outlook for the terminal Tatsamenie sockeye salmon run is 6,000 wild and 2,500 enhanced fish (8,500 total) which is near below the ten-year average (2009-2018) run size of 21,000. The wild component is forecasted using a smolt model based on estimates of out-migrating wild smolt in 2016 (240,314) and 2017 (151,844), and recent four odd years average smolt to adult survival rate of 2.8%. The enhanced component is forecasted by averaging a smolt model based on estimates of out-migrating enhanced smolt in 2016 (190,580) and 2017 (178,349) with a recent four odd years average smolt to adult survival rate of 1.4%.

2.3 Coho Salmon

The outlook for the terminal run of Taku River coho salmon in 2019 is approximately 73,000 fish, well below the ten-year average (2009-2018) terminal run of 116,354. The forecast is developed using a smolt model which applies the three-year average smolt to adult marine survival rate (5.7%) to the 2018 estimated Taku River smolt emigration (~ 1.6 million) and reduces by the average non-terminal marine harvest rate of (23%).

2.4 Pink Salmon

Pink salmon returning in 2019 will be the product of the 2017 escapement. Based on the 2017 Canyon Island traditional fish wheel catches of 18,520 pink salmon, which was 23% above the ten even-year average (1999-2017) catch of 15,081 fish, the return in 2019 is expected to be above average.

2.5 Chum Salmon

Based on the 2019 primary brood year catches of chum salmon in the Canyon Island traditional fish wheels, 2014 (310) and 2015 (95), which were above and below the ten-year average (2006-2015) Canyon Island fish wheel catch of 271 fish, the 2019 fall chum salmon run is expected to be close to average.

3 SPAWNING ESCAPEMENT GOALS FOR TAKU SALMON

Escapement goals have been bilaterally identified by the Transboundary Technical Committee for all species of salmon spawning in Canadian portions of the Taku River watershed. Escapement goals for Chinook, sockeye and coho salmon are based on various analyses of historical harvest and biological data from catch, escapement and/or juvenile sampling programs. Escapement goals for pink and chum salmon are based primarily on much more limited databases and professional judgment. These escapement goals are considered as ‘interim goals’ and are subject to change as additional stock-recruitment data and detailed analyses are performed.

Goals in effect for the 2019 season are summarized in Table 21 below:

Table 21. Interim escapement goals for Taku River salmon in effect for 2019.

Species	Year established	Interim escapement goals/ ranges		
		from	Point target	to
Sockeye	2019	55,000	59,000	62,000
Coho	2015	50,000	70,000	90,000
Chinook	2009	19,000	25,500	36,000
Pink	1985	150,000	n/a	250,000
Chum	1985	50,000	n/a	80,000

3.1 Chinook Salmon

Annex IV, Chapter 1 of the PST required the Parties to review an appropriate escapement goal for Taku Chinook salmon by January 15, 2009 and to pass a jointly prepared technical report through accelerated domestic review processes in time for a revised goal to be applied to the 2009 season. Detailed analyses of harvest and spawning abundance by age class and smolt production were used to generate a recommendation for an escapement goal range of 19,000 to 36,000 large fish (marine age 3-5 and mid-eye to fork length of ≥ 660 mm), and, a point S_{MSY} goal of 25,500 large Chinook salmon. This goal was in place on an interim basis for the 2010 fishing season pending finalized review in the fall of that year. The escapement goal received thorough review by the Chinook Technical Committee and Centre for Science Advice Pacific (CSAP), the latter which has replaced the Pacific Scientific advice Review Committee (PSARC). Both committees concluded the analysis to be sound. The Transboundary Technical Committee (TTC) and Panel have since endorsed the revised goal.

3.2 Sockeye Salmon

The agreed spawning objective for wild Taku River sockeye salmon is a range from 55,000 to 62,000 fish with a point goal of 59,000 fish (interim for 2019).

Although an escapement goal has not yet been established for Tatsamenie Lake, escapement of sockeye salmon to this location has bearing on the Canada/U.S. egg take program. Based on a fecundity of approximately 4,000 eggs per female, equal sex ratios, a broodstock holding success rate of 80%, along with the guideline that no more than 30% of the escapement can be utilized for enhancement purposes, an escapement of about 4,000 sockeye salmon would be needed to achieve the maximum egg take of 2.5 million eggs referred to in the 2019 Taku Enhancement Production Plan as outlined in Appendix 3, Section 7.

3.3 Coho Salmon

In 1999, the PST called for developing a revised escapement goal for coho salmon no later than May 1, 2004. A detailed analysis of the Taku River coho salmon escapement goal was completed in 2004. Staff who conducted that analysis recommended that a modified escapement goal not be adopted until production from the very high escapements in 2002 and 2003 could be included in the analysis.

The revised Transboundary Chapter of Annex IV of the PST obliged the Parties to develop an agreed MSY escapement goal prior to the 2010 fishing season. A preliminary report was reviewed by CSAP in the fall of 2010 and it was determined that additional information should be included in the analysis; hence, the report was not finalized at that time. In 2013, DFO reconfirmed its commitment to conduct updated scientific analysis of the Taku River coho salmon escapement goal and completed that analysis in the fall of 2014. Based on that analysis which was peer-reviewed and accepted by CSAS, the TTC recommended a point goal of 70,000 coho salmon with a range of 50,000 to 90,000 fish to the Transboundary Panel and this goal was adopted by the Panel in early 2015.

3.4 Pink and Chum Salmon

Interim escapement goal ranges for Taku pink and chum salmon are based on professional judgement informed by historical catches in terminal areas and limited in-river spawning escapement observations.

4 CONSULTATION PROCESSES FOR TAKU SALMON FISHERIES

The development of decision guidelines and specific fishery management plans for Taku River fisheries involves consultation with the Taku River Salmon Management Advisory Committee (TRSMAC) and the Taku River Tlingit First Nation (TRTFN). Recommendations of the Transboundary Rivers Panel (TRP) of the PSC provide an overarching back-drop for decision guidelines as do DFO policies, scientific advice and the experience of fishery managers.

4.1 Taku River Tlingit First Nation: Aboriginal Fisheries Strategy Consultation

Consultations with the TRTFN relating to the Aboriginal Fisheries Strategy (AFS) occur throughout the year. Results of these consultations are contained within a multi-year DFO/TRTFN Fisheries Agreement. The Agreement details fish management and stock assessment programs, enforcement protocols, commercial licences, selective fishing, as well as the First Nation fishery and communal licence provisions. The TRTFN also participates actively in the TRSMAC and in the Transboundary Rivers Panel.

4.2 Taku River Salmon Management Advisory Committee (TRSMAC)

The TRSMAC is comprised of DFO and representatives with interests in Taku River salmon resources, specifically the TRTFN and commercial and recreational fish harvesters. Membership is established by DFO through consultation with stakeholder groups which choose their representatives. The Committee endeavours to meet twice annually to develop recommendations pertaining to management plans, to conduct post-season reviews and to address issues such as licensing, allocations and license conditions. Participation of some PST Transboundary River Panel members in TRSMAC meetings assists to facilitate continuity and coordination in domestic and international discussions.

4.3 Transboundary Rivers Panel of the Pacific Salmon Treaty

Canada/U.S. arrangements for the coordinated conservation and abundance-based management of salmon stocks originating in the Canadian portion of the Taku River are specified in Chapter 1, paragraph 3(b), of Annex IV of the PST. The Transboundary Rivers Panel (TRP) oversees the implementation of these arrangements with technical support from the joint Transboundary Technical Committee. Fishery management, conservation, enhancement and stock assessment plans are reviewed and discussed annually by the Panel and/or the Committee. The TRP provides recommendations on salmon fishery and conservation actions to the Pacific Salmon Commission which, upon review, conveys recommendations to respective national governments.

The obligations and provisions contained in the PST and subsequent recommendations from the PSC adopted by the Parties provide the foundation for development of this IFMP. Management regimes under Annex IV will be implemented by Fisheries and Oceans Canada and US agencies for the 2019 season.

5 TAKU RIVER DECISION GUIDELINES FOR 2019

Decision frameworks for the Taku River salmon fisheries are developed in consultation with the TRSMAC and TRTFN. The decision guidelines for Taku Chinook, sockeye and coho salmon reflect the current provisions for harvest sharing and cooperative abundance-based management as specified in the PST. In-season decisions are based on weekly calculations of run size, coupled with conservation requirements and Canada/U.S. harvest sharing objectives.

5.1 Chinook Salmon

Current Canada/U.S. catch sharing provisions were developed to acknowledge the traditional catches in fisheries, referred to as the base level catch (BLC), which occurred prior to the current arrangements. For directed fisheries, the allowable catch (AC) will be calculated as follows:

- TAC = Terminal run - Base Terminal Run (BTR);
- BTR = spawning objective + assessment fishery + U.S. BLC + Canadian BLC:
 - The S_{MSY} spawning objective is 25,500 large Chinook salmon; the agreed escapement goal range is 19,000 to 36,000 large Chinook;
 - BLC's are as follows:
 - US Taku BLC: 3,500 large Chinook salmon;
 - Canadian Taku BLC: 1,500 large Chinook salmon;
 - Assessment Fishery: up to 1,400 large Chinook salmon.

Directed fisheries may be implemented based on pre season forecasts only if the pre-season forecast terminal run size equals or exceeds the spawning objective as defined in the annual management plan in addition to the combined Canada and U.S. base level catches (BLCs) and assessment fishery catches of Stikine River Chinook salmon. The pre season forecast shall only be used for management until bilaterally approved in-season projections become available. For the purposes of determining whether to allow directed fisheries using in-season information, such fisheries shall not be implemented unless the projected terminal run size exceeds the spawning objective as defined in the annual management plan in addition to the combined Canada and U.S. BLCs and assessment fishery catches of Stikine River Chinook salmon. The TTC shall determine when in season projections can be used for management purposes and establish the methodology for in-season projections and update them weekly or at other approved intervals.

Harvest sharing and accounting of the TAC shall be as follows:

- 50% is allocated to the U.S.;
- 50% is allocated to Canada;
- If the pre-season TAC forecast exceeds 30,000 Chinook salmon, the Panel shall review and recommend potential harvest share adjustments to the Parties.

When the terminal run is insufficient to provide for the Parties' Stikine River Chinook salmon BLC and the lower end of the escapement goal range, the reductions in each Party's base level fisheries, i.e. the fisheries that contributed to the BLCs, shall be proportional to the Stikine BLC shares. In this situation, the TTC may recommend details for an alternate assessment program. Following the Panel's approval, an assessment fishery may be implemented which fully considers the conservation needs of the stock.

If the escapement of Stikine River Chinook salmon is below the lower end of the agreed escapement goal range for three consecutive years, the Parties shall examine the management of base level fisheries and of any other fishery that harvests Stikine River Chinook salmon stocks, with a view to rebuilding the escapement.

Table 22 identifies Canadian fisheries management reference points for large Taku River Chinook salmon. The decision triggers are based on the following priorities: 1) escapement requirements (S_{MSY} of 25,500 large Chinook, an agreed escapement goal range of 19,000 to 36,000); 2) base level catches (6,400 combined Canada and U.S.) with the special obligation in Canada to provide for FSC needs; and, 3) the directed commercial fishery. The Red Zone reflects when closures in all Canadian fisheries are very likely to occur. The upper end of the Yellow Zone reflects the number of fish required to meet the low end of the escapement goal range plus the full base level catches. In this zone, consideration will be given to reducing Canadian base level catches with the recreational fishery (e.g. reduced catch limits) and the commercial fishery (e.g. mesh restrictions) the first to be affected. Restrictions become more severe the closer the projection is to low end of this zone and whether efforts are being taken to curb base level catches in Alaskan fisheries. The Green Zone allows for full base level catches, i.e. normal First Nation and recreational fisheries occur and incidental catches occur in the commercial fishery targeting sockeye salmon as well as consideration for additional directed catches. A directed commercial fishery for Chinook salmon does not occur until the run is sufficient to meet the S_{MSY} escapement goal plus the full base level catches.

Table 14. Key Decision Points for Taku River Chinook salmon.

Zone	Terminal Run Projection	Fishery	Guideline Harvest	Anticipated Management Action
Red	<19,000	Aboriginal	0	Restrictions considered – consultation with TRT.
		Commercial	0	Delayed opening for sockeye fishery.
		Recreational	0	Quota reductions.
Yellow	19,000 – 31,900	Aboriginal	0-500	Restrictions not anticipated.
		Commercial	0 directed – potential for assessment fishery	Closed until third week of June, then maximum mesh 140mm (5.5") - incidental only.
		Recreational	none specified	Possible restrictions.
Green	>31,900	Aboriginal	500	Unrestricted
		Commercial	100% of AC available	Potential for a directed fishery.
		Recreational	none specified	As per BC Freshwater Salmon Regulations; liberalization considered

The in-season management of Taku River Chinook salmon depends on abundance estimates generated from the joint mark-recapture program in the lower Taku River with tags being applied at Canyon Island and recoveries typically being made in the Canadian test and or commercial fisheries. Based the poor pre-season forecast, directed Taku River Chinook salmon fisheries will not occur in 2019. Additionally, unlike similar situations in the past, the commercial fishery will not operate in an assessment mode to serve as the test

fishery identified in the PST agreement; the primary purpose of the test fishery is to collect data for the in-season run projections. The lack of a directed or assessment fishery will mean in-season terminal run projections are not likely to be generated.

In most years when there is not a directed harvest and a need to achieve reliable abundance estimates for the early part of the run, the TTC has developed weekly assessment fishery catch guidelines which are linked to the number of tags applied and the assessment fishery target catch of up to 1,400 Chinook salmon as approved by the TRP.

Normally, in-season estimates of the in-river run would be made using a bilaterally agreed-to (by Canadian and U.S. managers) sulk rate for tagged fish released in event-one of the two-event mark-recapture study. Sulk rates would be based on the analysis of in-season data. In the event bilateral agreement could not be reached with respect to the sulk rate, an assumed 10-day sulk rate would be used. In-season terminal run projections would be made using average run timing from catches at Canyon Island (or other bilaterally agreed-to timing). In addition, the terminal marine harvests would be lagged one week to account for travel time between Taku Inlet and the event-two sampling area.

For in-season terminal run size estimates, a valid Petersen mark-recapture estimate would be sought based on the following equation:

$$TR = [(P_t + C_{us(t-1)})/p_t]$$

Where:

- TR = the projected terminal run of large Chinook salmon for the season;
- P_t = the inriver population estimate from the mark-recapture program through week “t”;
- $C_{us(t-1)}$ = the cumulative US Chinook salmon catch to week “t-1”, i.e. US catch lagged one week to account for migration timing;
- p_t = the estimated cumulative proportion of run through to week “t” determined from the inriver run timing based on historical catch data from Canyon Island. Adjustments to run timing estimates in-season will only be made by mutual agreement between Canadian and U.S. managers.

In the event a valid Petersen estimate is not available, upon agreement, another valid estimate may be used. Should there be no agreement on an alternate valid estimator then the most recent agreed valid estimate would be used. If no agreed-to valid estimate has been generated the pre-season forecast would be used.

5.2 Sockeye Salmon

Canada/U.S. sharing arrangements for Taku River sockeye salmon during the 2019-2028 period, as outlined in the PST, include:

- Directed fisheries on Taku River sockeye will occur only in the Taku River drainage in Canada and in District 111 in the US;

- Annual abundance of wild Taku River sockeye salmon shall be estimated by adding the catch of wild Taku River sockeye salmon in U.S. District 111 to the estimated above border abundance of wild sockeye salmon. The annual TAC of wild Taku River sockeye salmon shall be estimated by subtracting the agreed escapement objective as defined in the annual management plan from the annual terminal run abundance estimate;
- The management of U.S. and Canadian fisheries shall be based on weekly estimates of the TAC of wild sockeye salmon;
- For in-season management purposes, identifiable enhanced Taku River origin sockeye salmon shall not be included in the calculations of the annual TAC. Enhanced sockeye salmon are harvested in existing fisheries incidentally to the harvest of wild Taku River sockeye salmon.
- The Parties' primary management objective is to achieve the agreed spawning objective as defined in the annual management plan. As a result, the following apply:
 - To the end of 2019, Canada may, in addition to its share of the TAC, harvest any projected sockeye salmon escapement in excess of 80,000 fish apportioned by run timing.
 - For the remainder of the Chapter Period beyond 2019, the Parties shall manage fisheries in accordance with spawning objectives and the resulting ACs unless otherwise indicated in sub subparagraph (iii).
 - Upon acceptance of a revised Taku River sockeye salmon escapement goal by the Parties and upon adoption by the Committee of recommendations from the experts as deemed critical by the Panel, Canada may, in addition to its share of the TAC, harvest any projected sockeye salmon in excess of spawning objectives and broodstock needs apportioned by run timing returning to the Taku River.
 - In absence of establishing a bilaterally approved MSY escapement goal for Taku River sockeye salmon prior to the 2020 fishing season, the Panel shall recommend an interim spawning objective.
- The Parties recognize that not all surplus enhanced sockeye salmon are harvested in existing commercial fisheries due to management actions required to ensure the wild spawning escapement. Canada may implement additional fisheries upstream of the existing commercial fishery to harvest surplus enhanced sockeye salmon.
- The Parties agree to the objective of increasing sockeye salmon runs in the Taku River. The United States long-term objective is to maintain the 82% U.S. harvest share of wild Taku River sockeye salmon only adjusted based on documented enhanced sockeye salmon returns. Canada's long-term objective is to achieve an equal sharing arrangement for sockeye salmon. The Parties shall continue to develop and implement a joint Taku River sockeye salmon enhancement program intended to eventually annually produce 100,000 returning enhanced sockeye salmon.

The Parties annual TAC share of Taku River sockeye salmon is described in Table 23 below.

Table 15. U.S. and Canadian harvest shares of Taku River sockeye salmon.

Enhanced Production	U.S. TAC Share	Canadian TAC Share
0	82%	18%
1 – 5,000	80%	20%
5,001 – 15,000	77%	23%
15,001 – 25,000	75%	25%
25,001 – 50,000	72%	28%
50,001 – 75,000	68%	32%
75,001 – 100,000+	65%	35%

In 2019, the enhanced production is expected to fall in the 1-5,000 range based on the pre-season forecast of 2,500 enhanced Tatsamenie Lake sockeye salmon (Appendix 3, Section 2.2). Hence, Canada’s share of the sockeye TAC is expected to be 20%. In-season projections of the run size of enhanced fish may result in this share changing as per Table 23.

In-season management relies on projections of the TAC of wild Taku sockeye salmon and is determined as follows:

$$TAC_{(w)} = [(E_{w(t)} + C_{w(t)} + A_{w(t-1)}) / \rho_{w(t)}] - E_w$$

- Where:
- $TAC_{(w)}$ = the projected total allowable catch of wild w sockeye for the season;
 - $E_{w(t)}$ = the cumulative escapement to week t based on the joint Canada/US mark-recapture data;
 - $C_{w(t)}$ = the cumulative Canadian wild catch to week t ;
 - $A_{w(t-1)}$ = the estimated cumulative U.S. catch of wild Taku sockeye salmon to the preceding week $t-1$ (preceding week used to allow for migration time);
 - $\rho_{w(t)}$ = the estimated proportion of run through to week t determined from the average in-river run timing based on historical CPUE data from the Canadian fishery. (Run timing estimates will be adjusted in-season according to in-season CPUE data relative to historical data in both U.S. and Canadian fisheries); and
 - E_w = the system-wide escapement goal for wild stocks. (A value of 59,000 will be used which is close to the midpoint in the interim range of 55,000 to 62,000 fish).

The projections of TAC are then apportioned by PST harvest sharing provisions and historical run timing data to provided weekly guideline harvests for the management of Canadian fisheries.

Table 24 identifies Canadian fisheries management reference points for Taku River sockeye salmon developed in consultation with the TRSMAC. When escapement projections are in the Red Zone, closures in all fisheries are likely to occur. The Yellow Zone is based on the lower and upper ends of the escapement goal range. In the Yellow Zone, the only fishery allowed to operate is the FSC fishery which could face increasing

restrictions the closer escapement projections fall towards the lower end of this zone. Decisions to restrict the FSC fishery will also take into account the management actions and catch taken to date in U.S. fisheries.

Escapement projections in the lower Green Zone signify when an unrestricted FSC fishery can occur and openings in the commercial fishery are considered. The primary guiding factor is the catch share provisions of the PST. If escapement projections exceed 120,000 sockeye (upper Green Zone), which is 1.6 times the point target escapement of 75,000, as per the PST agreement, Canada may harvest any surplus above this.

Table 24. Key Decision Points for Taku River sockeye salmon.

Zone	Escapement Projection	Fishery	Guideline Harvest	Anticipated Management Action
Red	<55,000	Aboriginal Commercial	0 0	Restrictions considered – consultation with TRT. Closed
Yellow	55,000 – 62,000	Aboriginal Commercial	0 - 2,000 0	Restrictions not anticipated. No directed harvest.
Green	>62,001	Aboriginal Commercial	2,000 18% - 35% of TAC dependent on size of enhanced return	Unrestricted Normal 2-3 day fishery with possible extensions.

5.3 Coho Salmon

With the approval by the TRP to adopt an escapement goal range of 50,000 to 90,000 coho salmon and a S_{MSY} point target of 70,000 coho salmon commencing in 2015, interim harvest sharing provisions were adopted. Updates to these provisions have been made during recent re-negotiations and are in effect January 1, 2019 through to December 31, 2028:

- The Parties agree to implement an abundance-based approach to managing coho salmon on the Taku River.
- The escapement point target of 70,000 fish will be used in pre-season and in-season management decisions;
- The following applies to the management and allocation of terminal run Canadian-origin Taku River coho salmon:
 - The calculation of terminal abundance shall include harvest prior to statistical week 34;

- The following applies to the assessment of the terminal run of Taku River coho salmon after accounting for the harvest prior to statistical week 34:
 - If the pre-season terminal abundance forecast is less than the lower end of the escapement goal range plus 5,000 fish, the Committee may recommend an alternate assessment program. Following the Panel’s approval, an assessment fishery may be implemented which fully considers the conservation needs of the stock.
 - When the terminal abundance exceeds the lower end of the escapement goal range, plus 5,000 coho salmon, and up to the MSY point goal plus 5,000 fish, Canada may harvest 5,000 coho salmon apportioned by bilaterally approved run timing;
- The Parties’ annual terminal and in-river TAC share of Taku River coho salmon shall be as follows:
 - For terminal abundances in excess of 75,000 coho salmon, AC accumulates as follows:

Terminal Run Size		Allowable Catch Range		Harvest Share	
Lower	Upper	Lower	Upper	U.S.	Canada
75,001	80,000	1	5,000	100%	0%
80,001	100,000	5,001	25,000	50%	50%
Greater than 100,000		25,001+		90%	10%

Note: the harvest shares associated with the above terminal run sizes are based on an escapement goal range of 50,000 to 90,000 coho salmon with an MSY Point goal of 70,000 fish.

- The Parties’ primary management objective is to achieve the agreed spawning escapement goal. If the projected spawning escapement of Canadian origin Taku River coho salmon is greater than the agreed spawning escapement point goal, Canada may, in addition to its AC, harvest the projected surplus to spawning escapement apportioned by run timing.
- The performance of coho salmon fisheries shall be evaluated on an annual basis as follows:
 - no new directed terminal or in-river fisheries for Taku River coho salmon shall be undertaken prior to statistical week 34;

- coho salmon harvested incidentally in terminal, in-river, and assessment fisheries that occur prior to statistical week 34 are not included in paragraph 4 Trigger 2 considerations;
- if a Party does not fully harvest its AC to the extent that spawning escapement exceeds the upper end of the spawning escapement goal range in 3 consecutive years, the Panel shall review the Party’s harvest and allocation and the factors contributing to fishery performance, and may recommend the adjustment of allocations to terminal or in-river fishery AC for the following year;
- determination of the terminal abundance of Taku River coho salmon shall occur through the administration of a bilateral assessment program. When a mark-recapture program is employed to determine abundance, the program shall be designed to ensure that tag recovery (mark evaluation) is apportioned by run timing.

In-season terminal run projections rely on the in-river run estimates of Taku River coho salmon from the joint Canada/U.S. adult mark-recapture program where population estimates are expanded by historical run timing plus the estimated D111 harvest of Taku River coho salmon. The in-river coho projections will be based on the following simplified formula:

$$R_{IR(ACI)} = R_{IR(ACI)t} / T$$

Where :

$R_{IR(ACI)}$	=	projected total inriver run above Canyon Island;
$R_{IR(ACI)t}$	=	estimated run size to time “t” based on mark-recapture data;
T	=	average cumulative run timing at Canyon Is. through time “t”.

Catch-per-unit-effort (CPUE) and CWT recoveries from the SE Alaska troll fishery are additional indicators of Taku River coho run size and can also be used for in-season management.

Table 25 summarizes the coho salmon decision matrix and anticipated management actions to be taken given different border passage projections. These decision points reflect the recent revisions to the coho management regime agreed to by the TRP.

The Red Zone indicates when all fisheries could expect closures. A FSC fishery closure would only occur if previous actions had been taken to close the recreational and directed commercial fisheries.

In the Yellow Zone, it is expected the FSC fishery would proceed along with an assessment fishery involving commercial fishers.

For border passage projections above 70,000, i.e. the Green Zone, normal FSC and recreational fisheries will occur and commercial fishery opportunities will be liberalized to harvest fish surplus to escapement requirements.

Table 25. Key Decision Points for Taku River coho salmon, commencing statistical week 34.

Zone	Border Passage	Fishery	Guideline Harvest	Anticipated Management Action
Red	<50,000	Aboriginal	0	Closure considered
		Commercial	0	Closed
		Recreational	0	Closure considered
Yellow	50,000 to 75,000	Aboriginal	750	Unrestricted
		Commercial	5,000 (assessment fishery)	Restricted fishery driven by assessment guidelines.
		Recreational	none specified	Restrictions as per BC Freshwater Salmon.
Green	>75,000	Aboriginal	750	Unrestricted
		Commercial	5,000 assessment catch plus AC as per PST provisions	Normal 2-3 day fishery with possible extensions.
		Recreational	none specified	Restrictions as per BC Freshwater Salmon. Possible increases in daily catch limits.

5.4 Pink and Chum Salmon

Pink and chum salmon are not actively targeted in Taku River fisheries, although pink salmon are caught as bycatch during the targeted sockeye fishery. It is unlikely that commercial close times will be varied for pink salmon. There is limited/no harvesting of pink salmon in recreational and FSC fisheries.

Bycatch of fall chum salmon also occurs later in the sockeye season and during the coho salmon fishery. Due to the currently depressed state of Taku River chum salmon stocks, all chum salmon encountered must be released.

6 TAKU RIVER FISHERY PLANS FOR 2019

6.1 First Nation Fishery Plan

6.1.1 Taku River Tlingit First Nation Basic Needs Allocation

The main guiding factor in the Taku River Tlingit First Nation (TRTFN) fishery will be conservation goals and the basic needs allocations as specified in the Communal Fishing Licence of the TRTFN, specifically: 500 Chinook, 2,000 sockeye and 750 coho salmon.

Although restriction of the TRTFN FSC fishery is not anticipated in 2019, adjustment of this strategy may need to occur should conservation issues arise. Any changes to the FSC fishery management strategy will occur in accordance with the Taku River Decision Guidelines and include consultation with the TRTFN. Given concerns over Chinook salmon stock abundance, DFO has recommended voluntary reduction of Chinook salmon harvested in TRTFN fisheries.

6.1.2 Taku River Tlingit First Nation Control and Monitoring of Removals

The TRTFN collects and provides information on the total FSC fishery harvest to Fisheries and Oceans Canada on a weekly basis throughout the season. Any reductions in fishing time, if required, will only be considered if no other conservation-oriented harvest adjustments can be achieved in the commercial and/or recreational fisheries.

6.1.3 Taku River Tlingit First Nation Communal Licencing

Communal licences are issued to First Nations that have rights to fish in the Taku River watershed for FSC purposes. Individual First Nations maintain control of this licence and have the authority to designate all persons fishing in this category.

6.2 Recreational Fishery

In British Columbia, recreational fishing opportunities for salmon are regulated by the *British Columbia Sport Fishing Regulations* pursuant to the federal *Fisheries Act*. Regulations are generally summarized in the *British Columbia Sport Fishing Guide* covered under Region 6 (see:

http://www.env.gov.bc.ca/fw/fish/regulations/docs/1719/fishing_synopsis_2017-19_region6.pdf; or, the Fisheries and Oceans Sport Fishing Guide for Region 6 at: <http://www.pac.dfo-mpo.gc.ca/fm-gp/rec/fresh-douce/region6-eng.html>).

Recreational angling restrictions and requirements are subject to change in-season if additional conservation concerns arise or if additional recreational opportunities become available. Changes are communicated through Fishery Notices, media reports, telephone information lines, Twitter (@sportfishingbc) and/or the in-season decisions website: <http://www.pac.dfo-mpo.gc.ca/fm-gp/rec/season-saison/index-eng.html>.

6.2.1 Taku River Recreational Control and Monitoring of Removals

The controls for the Taku Recreational Fishery for salmon include daily and possession limits, hook restrictions, area closures, catch record keeping requirements, catch reporting requirements, and licencing requirements. These are described at: <http://www.pac.dfo-mpo.gc.ca/fm-gp/rec/fresh-douce/region6-eng.html>. Some of the highlights for 2019 include the following:

- **Retention of Chinook salmon is prohibited in 2019 (effective April 1 to March 31);**
- The daily limit for coho salmon is 4 per day, with only 2 >50 cm (nose to fork of tail);
- The daily limit for each of sockeye, pink and chum salmon is 0;
- The maximum number of salmon (species combined) that can be retained in any one day is 4;
- The possession limit is 8 salmon (in the aggregate, species combined);
- The annual catch limit for Chinook salmon in non-tidal waters is 10;
- All retained salmon must measure 30 cm or more;

- All Chinook retained must immediately be recorded in ink on the angling licence;
- It is illegal to catch or attempt to catch salmon by willfully foul hooking. Any accidentally foul-hooked salmon must be released;
- Only single barbless hooks are allowed to be used when fishing for salmon in streams;
- All steelhead must be released;
- Annual salmon fishing closures include:
 - Tatsatua Creek and its tributaries are closed to all salmon fishing from August 20 to September 15;
 - From April 1 to March 31, 2020, Nakina River from a boundary sign located approximately 300 meters upstream of the Nakina and Sloko rivers confluence to a boundary sign located approximately 1300 meters upstream of the Nakina and Sloko rivers confluence; the salmon fishing closure will encompass the area from the center line of the Nakina River bordered by its northern bank;
 - The Nakina River is closed to all salmon fishing from July 20 to August 15.

Fishers are encouraged to read the regulations regarding closures closely and check for updates. Additional restrictions in fishing time are not anticipated in the Taku recreational fishery. However, if the in-season projections of coho salmon indicate a conservation or FSC concern, non-retention, reduction in possession limits, and/or closure of the recreational fishery will be considered. Increases in the possession limits could be considered if the conservation and FSC objectives will be exceeded.

Compliance monitoring and enforcement will be undertaken by enforcement personnel with the province of BC and, or, DFO.

6.2.2 Taku River Recreational Fishery Licensing

Recreational fishing on the Taku River is permitted provided the angler is the holder of a current BC Non-Tidal Angling Licence if they are over the age of sixteen. A Non-Tidal Salmon Conservation Stamp must be validated with the basic angling licence if the fisher intends to retain salmon. In order to fish for steelhead, a Steelhead Conservation Surcharge Stamp is required.

Residents under the age of sixteen may fish without a licence unaccompanied by a licence holder; whereas, non-residents under the age of sixteen may fish without a licence but must be accompanied by a valid licence holder. Catches must be counted towards the possession limit of the licence holder. Daily quotas and other regulations apply (see: <http://www.env.gov.bc.ca/fw/fish/regulations/>). Licence fees vary depending on the type of licence required.

6.3 Taku River Commercial Fishery

If conservation, FSC, recreational and PST harvest sharing objectives are likely to be met, the commercial fishery will open. The Canadian catch will be managed with the objective

of meeting escapement targets and agreed Canada/US and domestic harvest sharing objectives.

In years when a directed commercial fishery for Chinook salmon is sanctioned, the date of the earliest commercial opening is typically the last Sunday in April; this is determined in consultation with the TRSMAC and with the U.S. through the TTC. The sockeye season generally commences mid-June and lasts through mid-August after which time coho salmon management takes precedence.

The 2019 pre-season Chinook salmon forecast is not sufficient to proceed with a directed commercial fishery; additionally, an assessment fishery involving commercial fishers will not be prosecuted to obtain in-season data on run status as the forecast is well below the lower end of the escapement goal range.

For the sockeye season, the directed commercial sockeye fishery will be delayed until the week of June 23 to 29 (SW 26) restricted to a maximum 48-hour period in consideration of Chinook conservation concerns and an anticipated weak Kuthai Lake sockeye salmon return. Canadian sockeye management decisions will be based on weekly projections of terminal run sizes of wild and enhanced fish, TAC, and the escapement of wild stocks, and will follow the decision guidelines outlined in Appendix 3, Section 5.2. The PST harvest sharing provisions will be applied to the weekly wild sockeye TAC projections to guide the management of the commercial fishery. Run timing will be used to apportion the projected Canadian allowable catch each week and to make projections of the total escapement. The Canadian catch will be adjusted with the objective of meeting escapement and agreed Canada/U.S. harvest sharing objectives. Retention of Chinook salmon captured incidentally in commercial fisheries is prohibited in 2019.

Prior to mid-August (SW 34), bycatch of coho salmon occurs in the directed sockeye commercial fishery. Management focus generally shifts to coho salmon in mid-August (SW 34) with the evaluation of the coho catch, effort, and CPUE in the commercial fishery relative to historical levels and in-river run size estimates from the Taku River mark-recapture program. The duration of weekly openings will be based on the in-season run projections and the coho salmon harvest provisions for Canada as recommended by the TRP for 2019 (as outlined in Section 5.3).

It is anticipated that the commercial fishery will not target pink salmon unless markets are developed, which isn't expected to occur soon. Chum salmon will also not be targeted.

6.3.1 Taku Commercial Fishery Controls

The primary commercial fishery management control will be through adjustments in weekly fishing times. Duration of openings will be based on weekly guideline harvests developed in consideration of spawning escapement requirements and or specific stock conservation concerns, Canada/U.S. catch sharing provisions, domestic allocation priorities, and fishery performance parameters (e.g., effort, catch, historical run timing).

For example, poor sockeye returns to Kuthai Lake continue to be of concern. The duration of commercial openings in SW 26-27 (June 23 – July 06) may be limited to augment the escapement of the Kuthai Lake stock. During SW 31-33 (July 28 - August 17), fishing times may also be limited to ensure adequate numbers of sockeye salmon escape to Tatsamenie Lake to support escapement and egg-take objectives.

Additional Taku commercial fishery controls include:

1. Adjusting the fishing gear: For the first few weeks of the directed sockeye fishery a maximum mesh restriction of 140 mm (approximately 5.5 inches) will be in effect through SW29 (week ending July 20) to reduce likelihood of Chinook salmon interception. In addition, set nets will be prohibited until SW 27 or later. Other restrictions on gillnet mesh size may be implemented to reduce catches of non-target species.
2. Adjusting the fishing area: The fishing area could be reduced during test/assessment fisheries in order to ensure adequate monitoring can be achieved and catches do not exceed weekly targets.
3. Non-retention: To address chum salmon conservation concerns, the retention of chum salmon will be prohibited throughout the season. In addition, fishers must release any steelhead caught. **The retention of incidentally caught Chinook salmon is prohibited in 2019.**

6.3.2 Taku Commercial In-Season Catch Reporting Program

Details regarding catch reporting requirements are provided in the Conditions of Licence issued to each commercial fisher. While participating in the fishery, commercial fishers are required to land catches at a registered landing station within 1.5 hours of the end of the fishing period as identified by a single variation order, except for the final fishing period in any given week, when the deadline will be 2.5 hours after closure. Hail information collected throughout the openings will be used to justify extensions to fishing times. As in past years, catches shall be made available for sampling by Departmental staff or designates.

Fish slips must specify the number and weight of each species caught separated by: gear type, i.e. fish wheel or gill net; mesh size used; and, by fish landed in the round or dressed (head-on and head-off). If available, price per pound should be noted. Chinook salmon must also be separated by flesh colour (red and white) and size (large and small). A small Chinook salmon is considered to be a fish with a mid-eye to fork length of less than 660 mm. A logbook is required to document the number of fish caught but subsequently released and the information is submitted along with harvest and tag recovery information after each 24-hour fishing period.

6.3.3 Taku Commercial Non-Retention Species

All opening announcements will contain the species that will be allowed to be retained. All other species must be released to the water with the least possible harm. Licence conditions prohibit retention of chum salmon and steelhead.

6.3.4 Taku Commercial Monitoring Plan

The fishery will be monitored by DFO Fisheries Technicians stationed at the Eriksen Slough Field Office. They will collect catch and tag recovery data from landing stations and sample portions of the catch for biological samples and stock composition determinations. Catch and tag recovery data will be collected daily and will be recorded for each licence by species and hours fished. DFO Conservation and Protection personnel will monitor and enforce compliance in the fishery.

6.3.5 Taku Commercial Gill Net Construction

Specific restrictions such as the specifications for net construction are found in the Conditions of Licence, which are issued along with the commercial fishing licence. Fishers are urged to read these conditions carefully to ensure that their fishing gear and techniques are in accordance with licence conditions.

The maximum gill net length for the Taku River commercial fishery is 36.6 metres (120 feet) for both drift and set nets. All gill nets (drift and set) must meet the following web specifications:

- Have 30 or more filaments in each twine of the web, with all filaments in the web of equal diameter. (This is the web that is typically fished on the Taku River in Canada); or,
- Have 6 or more filaments in each twine of the web, with all filaments in the web a minimum of 0.20 mm in diameter. (This web is otherwise known as “Alaska twist”).
- The minimum allowable mesh size of gill nets used shall not be less than 100 millimetres (four inches).
- The maximum allowable mesh size of gill nets used shall not be greater than 204 millimetres (eight inches).

Set nets must be identified with an orange-coloured buoy with the fisher’s licence number clearly printed on it and attached to the end of the net that is furthest from shore.

Specific restrictions for net configuration are found in the Fishery Notice issued prior to every commercial fishery. Fishers are urged to read these carefully to ensure that their fishing gear is in accordance with the opening.

6.3.6 Taku Commercial Licensing

There are currently seventeen limited entry party based licences allocated for commercial fishing on the Taku River. All commercial licences are available through the National Online Licencing System (NOLS) which replaces the in-person payments of licensing fees at DFO offices (see: <https://fishing-peche.dfo-mpo.gc.ca/>). Harvesters will use NOLS to pay for and print their commercial fishing licence and licence conditions. The cost of a licence is \$200 (regular fee) and \$20 First Nation (reduced fee). In addition, two Aboriginal Communal Commercial Licences are issued to TRTFN pursuant to the *Aboriginal*

Communal Fishing Licences Regulations for participation in the general commercial fishery.

Recommendations for transferring commercial licences were developed by the TRSMAC and adopted in 2004.

6.4 ESSR Fisheries

No ESSR fisheries are anticipated on the Taku River in 2019. If ESSR situations were to occur, consideration would be given to initiating ESSR fisheries subject to the provisions of the DFO ESSR policy (see Section 6.3.4).

7 TAKU RIVER SOCKEYE ENHANCEMENT PLAN FOR 2019

PST arrangements call for joint Canada /U.S. sockeye enhancement projects to be conducted in the Taku River watershed. Currently, broodstock are captured at Tatsamenie Lake. Fertilized eggs are flown by small float-plane or helicopter to the Snettisham Central Incubation Facility south of Juneau, Alaska where they are incubated and thermally marked. Fry produced from the Tatsamenie egg-take are returned to Tatsamenie Lake in the subsequent spring. Most are directly released into the lake; however, a portion is dedicated to a Northern Fund project conducting extended rearing trials to assess fry release strategies to improve fry-to-adult survival. Other projects in the Taku River watershed include: the investigation of the suitability of Trapper Lake for introduction of anadromous sockeye salmon through barrier removal; and, the feasibility of broodstock capture, smolt production and adult survival in King Salmon Lake. Broodstock collections were conducted in 2012 and 2014; adult enumeration and sampling is planned for 2019.

The PST identifies the following commitments:

- A Taku Enhancement Production Plan (TEPP) shall be prepared annually by the TTC by February 1. The TEPP will detail the planned enhancement activities to be undertaken by the Parties and the expected production from site specific egg takes, access improvements and all other enhancement activities outlined in the annual TEPP. The TCC will use this data to prepare an initial enhancement production forecast based on the best available information.
- The Transboundary Panel shall review the annual TEPP and make recommendations by February 28.

The 2019 TEPP is presented in Table 26.

Table 26. Taku Enhancement Production Plan (TEPP), 2019.

Enhancement Project	Activities	Expected Production	Technique to document production
Tatsamenie Lake	<p>Egg take: target of 50% of available adult brood stock (up to 3.0 million eggs)</p> <p>Outplant: Progeny (fry) from 500,000 eggs will be held for in-lake “extended rearing” and fry from the remainder of the eggs will be for “direct release” into the lake.</p>	<p>8,670 adults from direct release (Survival Rate: 5.1% green egg to smolt, 6.8% smolt to adult)</p> <p>2,541 adults from extended rearing (Survival Rate: 36.3% green egg to smolt, 1.4% smolt to adult)</p>	Thermal mark
Trapper Lake	<p>Egg take: target of 500,000 eggs from Little Trapper Lake.</p> <p>Outplant: All fry to be “direct release” into Trapper Lake.</p> <p>Future program continuation/expansion contingent on adult sockeye passage remediation.</p>	1,400 adults (Survival Rate: 4% green egg to smolt, 7% smolt to adult)	Thermal mark
King Salmon Lake	<p>Egg Take: target of 250,000 (pending broodstock availability)</p> <p>Outplant: All fry to be “direct release” into King Salmon Lake.</p>	5,250 adults (Survival Rate: 2.1% green egg to adult)	Thermal mark
Expected Total Production		17,861 adults	

8 TAKU SALMON STOCK ASSESSMENT PLAN FOR 2019

8.1 Chinook Salmon

The Taku River Chinook in-river stock assessment program planned for 2019 includes:

- A mark-recapture program with marking occurring in the lower Taku River (Canyon Island and Wright River) and recoveries in the Canadian fisheries as well as in select spawning streams to determine in-season projections and post-season estimates of total in-river run size and escapement, major stock timing and overall age and size composition. Estimates from the mark-recapture program are integral to the development of annual estimates of the total run size (Figure 14);

- A radio telemetry project (year 5) to determine Chinook salmon abundance, dropout rates, final fates and spawning locations;
- An assessment fishery (drift-netting only) involving commercial fishers may be conducted to recapture tagged adult fish if run abundance does not permit the prosecution of a directed commercial fishery (unlikely in 2019 due to poor preseason forecast);
- Sampling in Canadian and US gill net fisheries to determine age and size composition of catches and contributions of enhanced stocks (in US fisheries only) and to recover CWTs.
- A CWT program to provide smolt production estimates associated with escapement estimates, ocean survival, harvest rates, and stock identification and contributions to marine fisheries.
- Aerial surveys of select escapement index streams, potentially Nakina, Nahlin, Tatsamenie, Tatsatua, Kowatua and Dudidontu rivers.
- Sampling for age-size-gender, and tag recovery (spaghetti tags, CWT, radio) of select spawning populations such as Nakina (carcass weir), Nahlin, Tatsamenie (at upper Tatsamenie and at carcass weir), Kowatua, Tseta and Dudidontu.
- Enumeration of large Chinook salmon in the lower Nahlin River using sonar.
- Creel survey of Nakina River recreational anglers (unlikely in 2019 due to Chinook salmon retention prohibition).

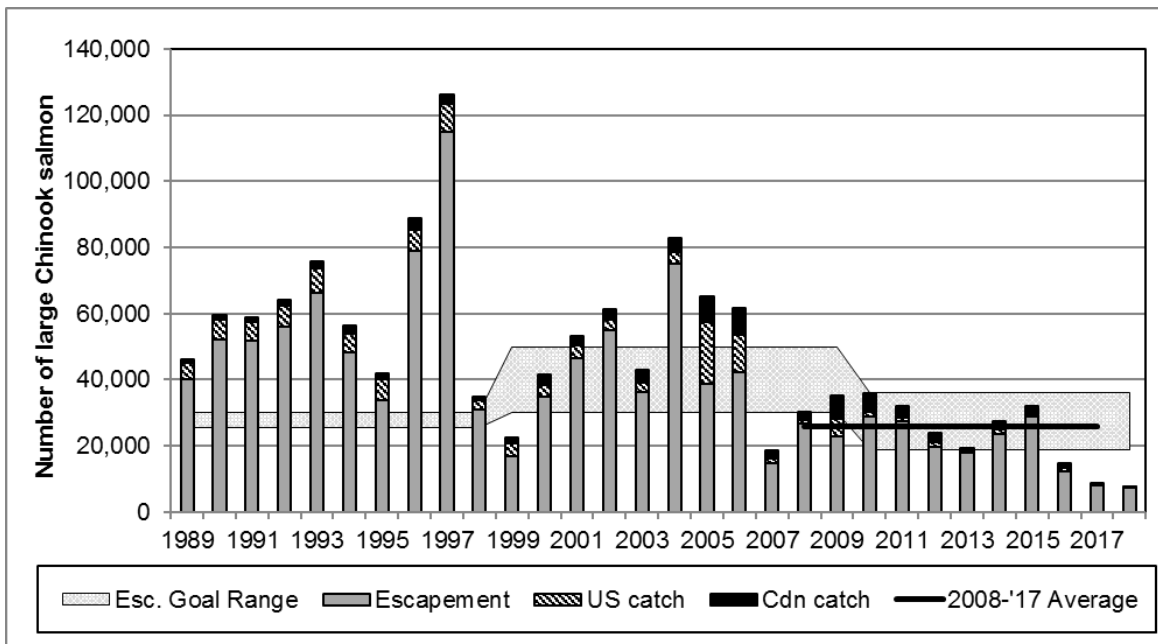


Figure 15. Terminal run of large Taku Chinook (≥ 660 mm mid-eye to fork length), 1989 to 2018. [Note: estimates of US catch prior to 1995 are derived from an assumed harvest rate of 10% (based on 1995-1999 average). Catches for 1995-2018 based on data from CWT (troll) and GSI (sport and net)]

8.2 Sockeye Salmon

The assessment program for Taku sockeye salmon in 2019 is expected to include the following:

- A mark-recapture program with marking in the lower Taku River (Canyon Island) and recovery in Canadian fisheries to provide in-season projections and post-season estimates of total in-river run size and escapement, major stock timing and overall age and size composition. Estimates from the sockeye mark-recapture program are used in annual run reconstructions summarized in Figure 15;
- A radio telemetry project to assess sockeye dropout rates, to determine final fates, and to determine spawning locations of tagged fish;
- Sampling in Canadian and US gillnet fisheries to determine age and size composition of catches and contributions of enhanced stocks. Sampling is also conducted for stock identification;
- Stock-specific escapement enumeration and sampling (for age, size, gender, GSI, spaghetti tags), at select spawning sites including weirs located at Little Trapper (Figure 16), Tatsamenie (Figure 17), Kuthai (Figure 18) and King Salmon lakes.
- A number of assessment projects to evaluate the joint Canada/US sockeye enhancement program on Taku sockeye including: fry outplant and smolt emigration studies; otolith sampling and analyses in catches, escapements and juvenile samples to determine enhanced and wild contributions; and preliminary investigations of other potential enhancement opportunities.

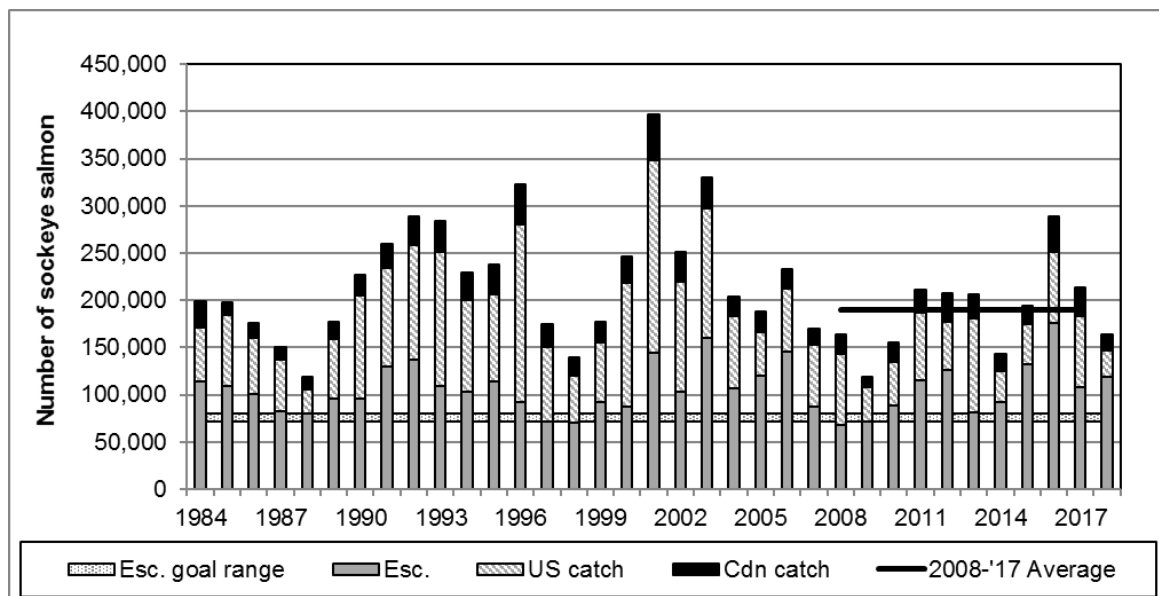


Figure 16. Terminal Run Size of Taku River sockeye salmon, 1984 to 2018. [Note: Escapement is determined from the mark-recapture program; US catch is based on scale pattern analyses and thermal marks; Canadian catch from inriver catch slips and monitoring]

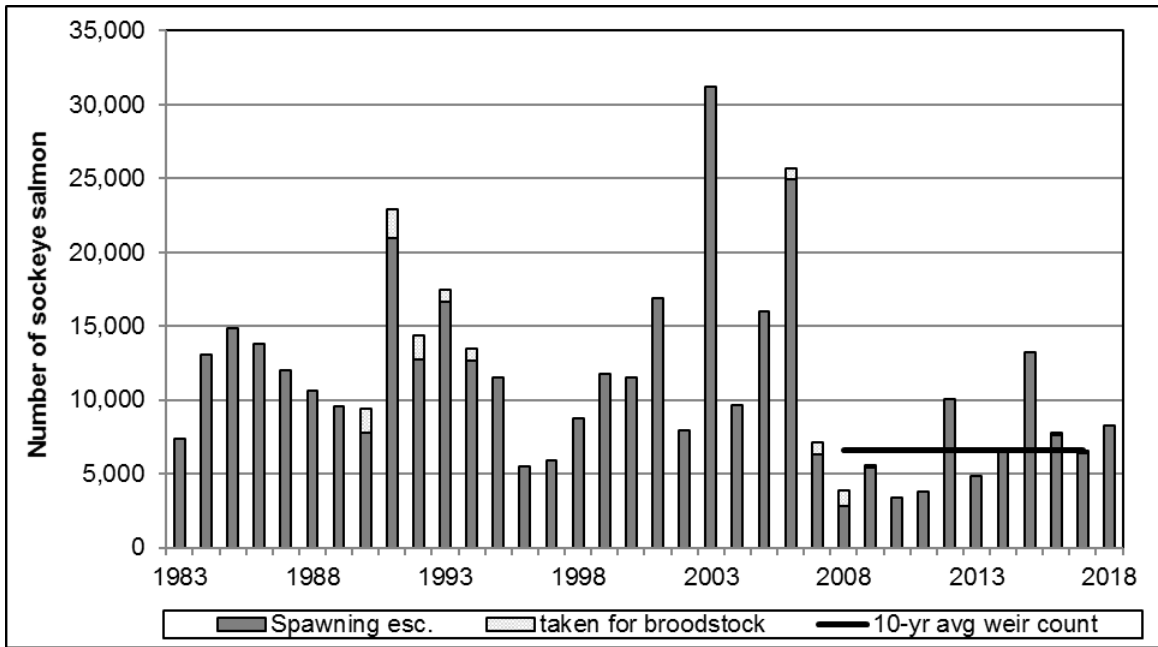


Figure 17. Weir counts of Little Trapper Lake sockeye 1983 to 2018. [Note: Annual weir count is sum of spawning escapement and fish taken for broodstock].

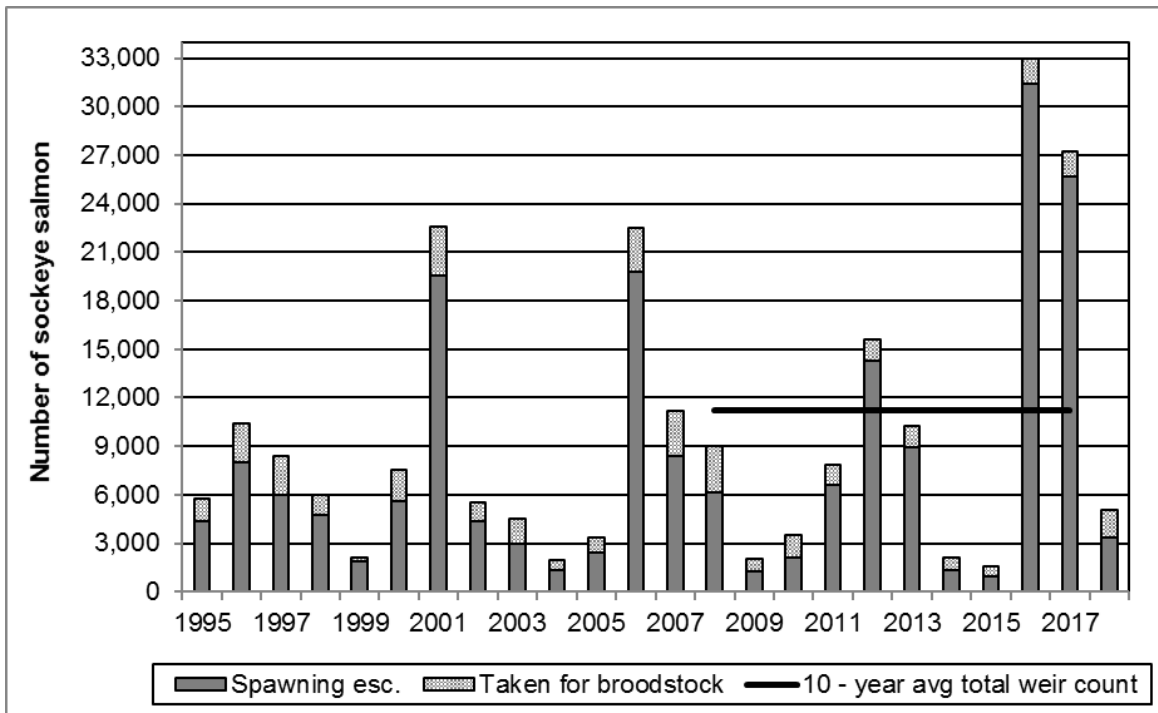


Figure 18. Weir counts of Tatsamenie Lake sockeye: 1985 to 2018. [Note. Annual weir count is sum of spawning escapement and fish taken for broodstock].

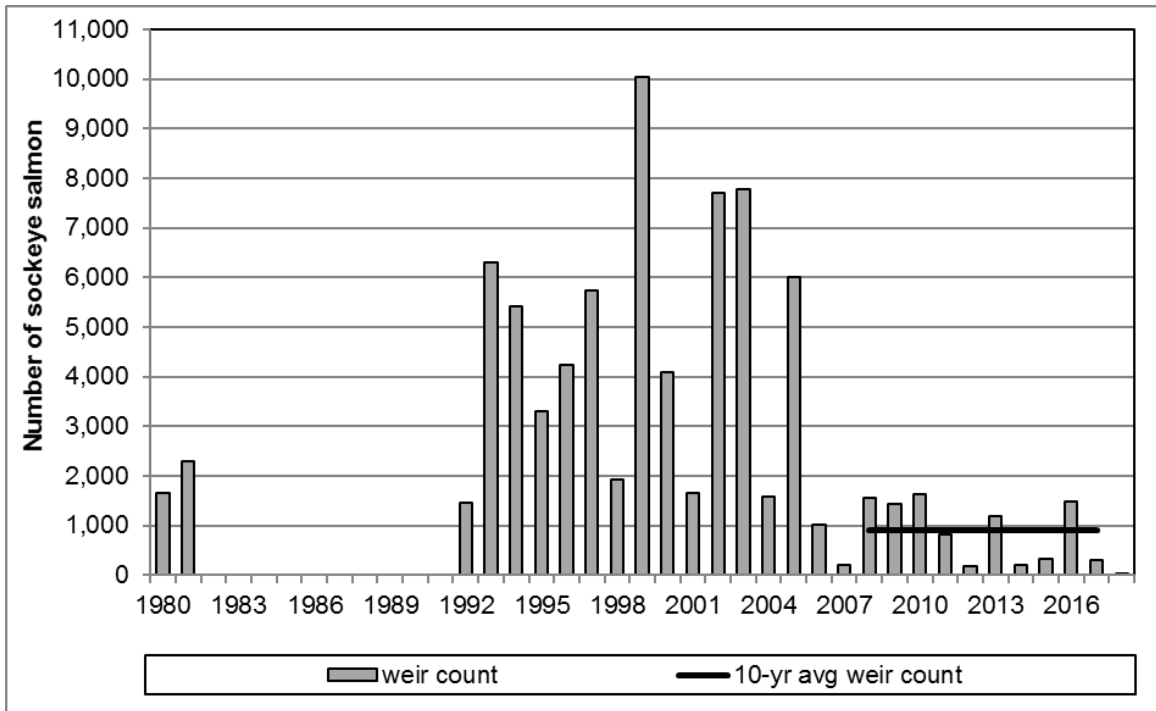


Figure 19. Weir counts of Kuthai Lake sockeye, 1985 to 2018.

8.3 Coho Salmon

The assessment program for Taku coho salmon in 2019 is expected to include the following:

- A mark-recapture program with marking in the lower Taku River (Canyon Island) and recovery in Canadian fisheries to provide in-season projections and post-season estimates of total in-river run size, escapement, major stock timing and overall age and size composition. In-river run estimates are combined with estimates of U.S. catches of Taku coho in troll, sport and net fisheries to produce estimates of the run size of the Taku coho salmon (Figure 19);
- Sampling in Canadian and US gillnet fisheries to determine age and size composition of catches and contributions of enhanced stocks (US fisheries only) and to recover CWTs;
- A coho live release assessment fishery to continue run assessments once commercial fishing has ceased;
- A CWT program to provide smolt production estimates associated with brood year escapement estimates, ocean survival, harvest rates and stock identification and contributions within the marine fisheries;
- Development of a genetic stock identification baseline.

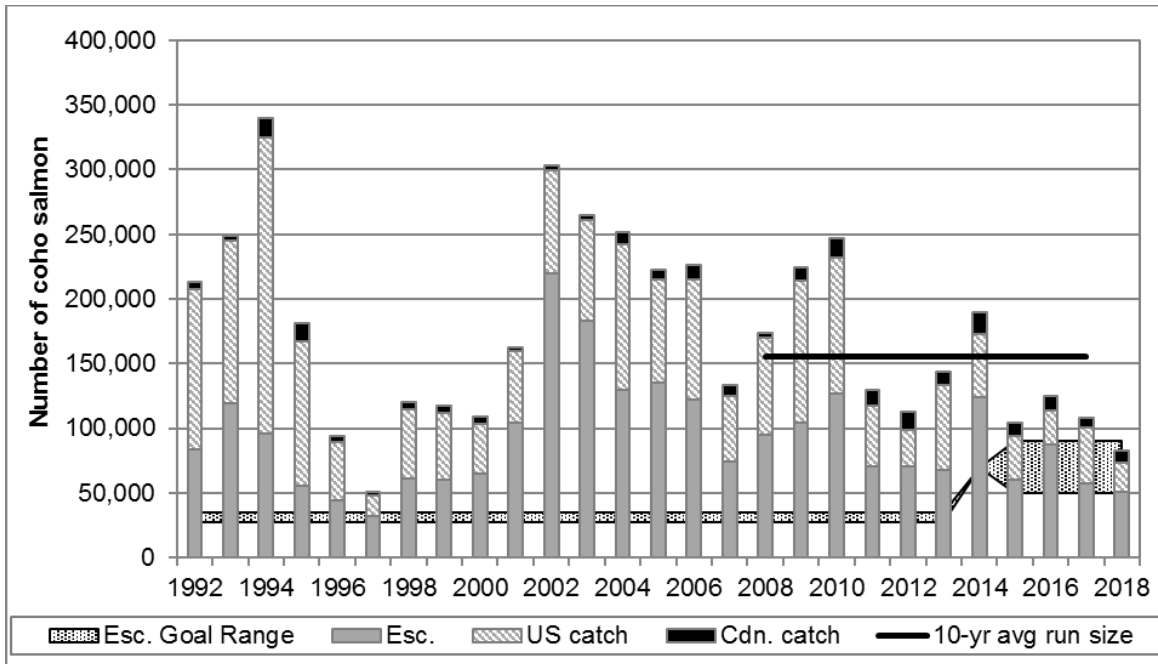


Figure 20. Estimated total run size of Taku River coho salmon, 1992 to 2018.

8.4 Pink and Chum Salmon

The assessment program for Taku River pink and chum salmon in 2019 primarily involves monitoring catches and effort in Canyon Island fish wheels and live-release gill nets, i.e. the gear used for the Chinook, sockeye and coho mark-recapture programs (Figure 20 and Figure 21). The CPUE from these sites has provided an indication of inter-annual variations in abundance although it is recognized that results can be variable, for example, due to water levels.

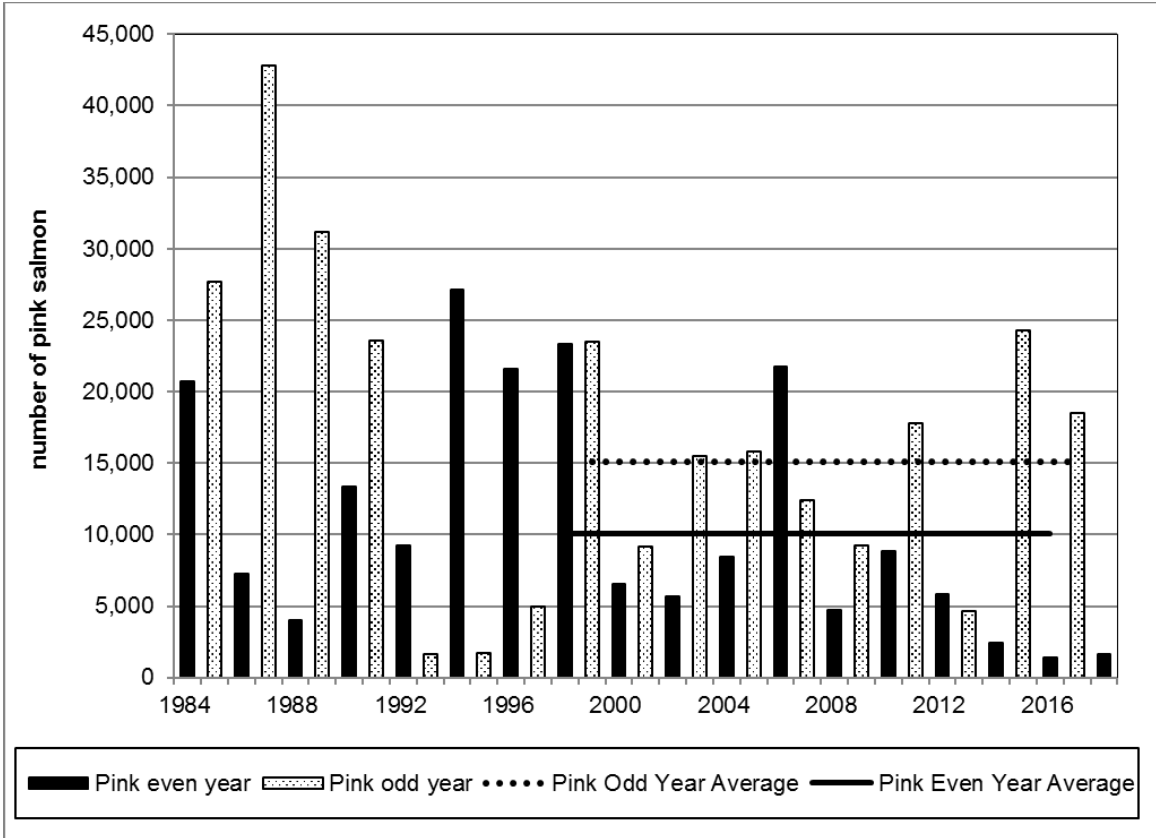


Figure 21. Pink salmon captures in the Canyon Island fish wheels, 1984 to 2018.

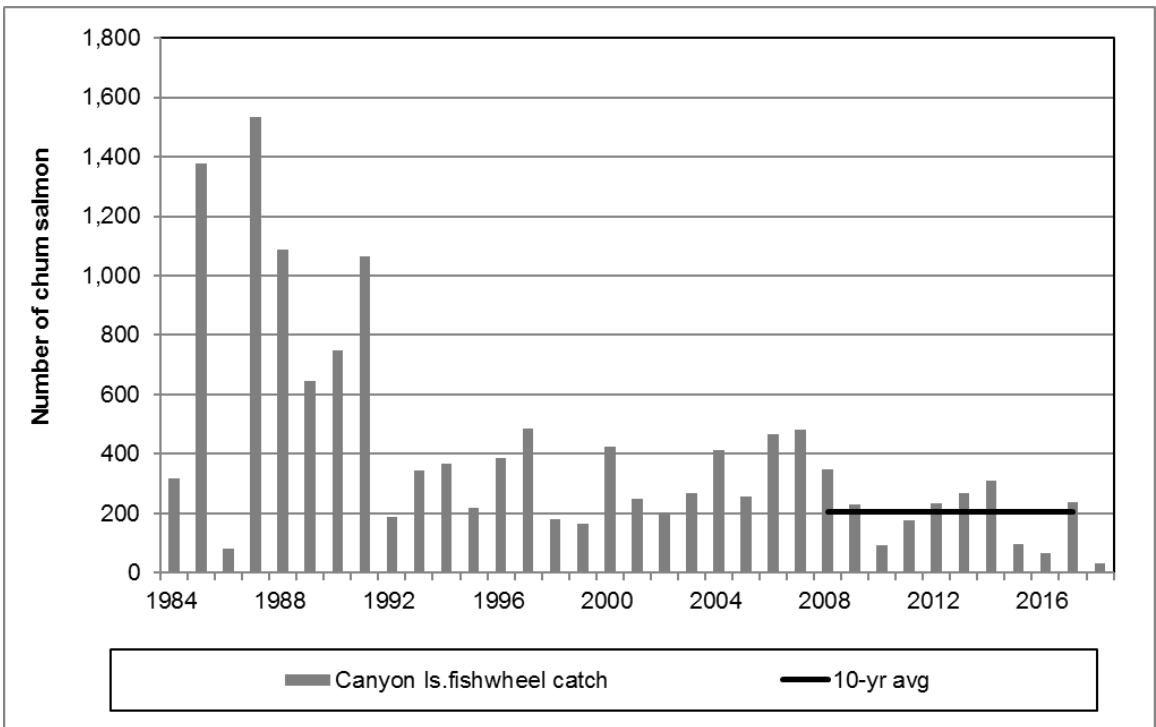


Figure 22. Yearly chum salmon captures in the Canyon Island fish wheels, 1984 to 2018.

9 TAKU RIVER POST SEASON REVIEW

A comprehensive post season review is conducted annually by the Transboundary Technical Committee (TTC) for the Transboundary Rivers Panel (TRP) and the Pacific Salmon Commission (PSC). An initial document with preliminary estimates is prepared for the TRP and PSC in the fall. Once analyses have been finalized, final reports are submitted to the PSC for general distribution. Results of the 2018 TTC review appear in:

Transboundary Technical Committee. In prep. *Preliminary estimates of Transboundary river salmon production, harvest and escapement and review of joint enhancement activities in 2018*. Pacific Salmon Commission.

The following sections summarizing the 2018 season are based substantially on the results of the TTC post season review and any recent updates.

9.1 Conservation

As summarised in Table 27, the sockeye escapement exceeded the escapement goal range (Figure 15), and the coho escapement was below the point target of 70,000 but within the overall escapement goal range established for this species (Figure 19). For Chinook salmon, the escapement estimate of 7,271 large fish was well below the target range (Figure 14). It is uncertain if the pink and chum spawning escapement goals were met due to limited information available. The catch of pink salmon in the Canyon Island fish wheels was above average while that of chum salmon was below average.

Table 27. Escapement goals vs. estimated escapement for Taku River salmon in 2018.

Species	2018 Escapement Goal Ranges		2018 Escapement	Escapement Goals Met?
	from	to		
Sockeye	71,000	80,000	119,033	Exceeded
Coho	50,000	90,000	51,173	Met
Chinook (large)	19,000	36,000	7,271	Not Met
Pink	150,000	250,000	1,604 ^a	Unknown
Chum	50,000	80,000	32 ^a	Unknown

^a Based on Canyon Island fish wheel catches.

9.2 First Nation Fishery

There were no restrictions to the TRT First Nation fishing activities in 2018 and the TRT First Nation had first priority to harvest fish for FSC purposes as presented in Table 28. However, BNA allocations were not achieved for Chinook, sockeye and coho salmon.

Table 28. Taku First Nation FSC Harvest vs. Basic Needs Allocation, 2018.

Species	BNA	Actual FSC Harvest	Priority Fishery
Chinook	500	7 large, 19 small	Yes
Sockeye	2,000	14	Yes
Coho	750	2	Yes
Pink	NA	0	NA
Chum	NA	0	NA

9.3 Recreational Fishery

It is assumed that 0 large Chinook salmon were harvested in recreational fisheries in 2018 due to the in-season restrictions in place resulting from the poor return. Catches of the other salmon species were believed to be negligible.

9.4 Commercial Fishery

Based on TTC pre-season recommendation to the Panel, there was no Chinook salmon assessment fishery in 2018. Additionally, the directed commercial Chinook fishery was not opened. The targeted sockeye commercial fishing season opened on Sunday, June 24 (SW 26) and continued through to mid-August (SW33) when attention thereafter shifted to coho salmon, August 19 (SW 34). Commercial fishing activity ceased by September 18 (SW 38) due to low abundance of coho salmon. However, there was a DFO-TRT catch and release assessment fishery for coho salmon to support the in-season abundance assessment program.

The commercial harvest of 17,948 sockeye salmon was below the previous decade (2008-2017) average of 23,671 fish. The total commercial Chinook salmon incidentally caught and released during the sockeye fishery, consisted of 193 large and 137 small fish. The catch of 9,503 coho salmon was slightly above the previous ten year average (2008-2017) of 8,970 fish.

9.5 PST Harvest Sharing Performance

In 2018, fisheries on the Taku River were managed with the objective of achieving harvest sharing arrangements outlined in the Transboundary Rivers Chapter of the PST. General PST performance is summarized in Table 29 below.

Table 29. Harvest sharing report card for Taku River salmon, 2018. [Note: obligations in **bold**].

Species	Component	2018 Treaty-based allocation - Canada	2018 Actual - Canada	Harvest within Catch Allocation?
Chinook	Directed catch	0	0	yes
	BLC- traditional fisheries	1,500	0	yes

	BLC – test fishery	1,400	0	yes
Sockeye	%TAC (Taku wild)	20%		
	Catch (wild)	16,928	17,038	yes
	Catch (enhanced)		924	
Coho	Catch	5,000	9,505	No

Chinook Salmon

The pre-season forecast of 4,700 large Chinook salmon did not meet the threshold for allowing directed Chinook salmon fisheries early in the season. However, the Treaty stipulates that... *“the pre-season forecast will only be used for management purposes until in-season projections become available.”* In-season run size projections throughout May confirmed the run abundance was insufficient to support a directed Canadian harvest, i.e. the in-season predictions were below the in-season threshold of 31,900 fish. As a result, no targeted commercial fishery was conducted; additionally, in-season projections were insufficient enough to support the use of fish for assessment purposes. Canadian “traditional” catches were below the Treaty-specified allowances for Base Level Catches (BLC) of 1,500 for Canada. The Canadian commercial fishery incidentally caught and released 193 large Chinook salmon. The BLC included the following: 0 large Chinook salmon taken as bycatch during the commercial sockeye fishery; 7 harvested in the FSC fishery; and no harvest in the recreational fishery. The spawning escapement benefitted from the BLC’s which were not fully subscribed. The escapement of 7,271 large Chinook salmon was well below the target range of 19,000 to 36,000.

Sockeye Salmon

The post-season estimate of the terminal run of Taku sockeye salmon was 164,397 fish comprised of 159,641 wild, and 4,756 enhanced sockeye salmon. Based on an escapement goal of 75,000 wild sockeye, the TAC of wild fish was 84,641 fish. According to the PST harvest sharing arrangements, Canada’s share of the TAC of wild sockeye was 20% given the enhanced production fell in the 1-5,000 fish range (Table 23). An additional 924 enhanced sockeye contributed to the overall Canadian catch.

Overall, the harvests of Taku sockeye salmon left a spawning escapement of 119,033 fish which was well above the upper end of the 71,000 to 80,000 goal range.

Coho Salmon

For 2018, the Panel had agreed that: a) if the inriver coho salmon run was projected to be less than 75,000 fish, Canada could harvest up to 5,000 coho in a directed fishery for assessment purposes; or, b) if the projected inriver run was >75,000 fish, Canada could harvest all coho in excess of this number. It was the U.S. management intent to allow at least 75,000 coho to cross the border into the Canadian section of the drainage.

Through to the beginning of October, in-season inriver run projections ranged from 64,000 (SW34) – 95,000 (SW39) coho salmon which meant that Canada could harvest above the 5,000 fish for assessment purposes in a directed commercial fishery early in the coho

management period but was restricted to the 5,000 fish assessment AC later in the season. The Canadian fishery was managed throughout the coho season based on agreed to in-season run projections and PST provisions. Once the commercial fishery closed in SW36, a catch and release assessment fishery operated from mid-September through to early October for stock assessment purposes.

The 2018 post season estimate of coho salmon returning to the Canadian portion of the drainage was 60,678 fish. This translated into an allowable directed harvest of only 5,000 coho for Canadian fishers in an assessment fishery. The actual catch for the coho season was 7,245 taken in the directed assessment fishery.

Canada's harvest of 9,505 coho salmon included: 7,245 coho taken in the directed commercial assessment coho fishery; 2,258 coho taken as bycatch during the targeted sockeye commercial fishery; 2 taken in the First Nation fishery. This left a spawning escapement of 51,173 coho salmon which was within the target range of 50,000-90,000 but below the point target of 70,000 coho.

9.6 Taku Sockeye Enhancement Activities in 2018

In January 2019 the Transboundary Rivers Panel reviewed the performance of the 2017 Taku Enhancement Production Plan (TEPP). The review included actions that had been conducted in the summer and fall of 2017 (egg takes and extended rearing trials) and a review of the spring 2018 fry releases (from brood year 2017). Through this review, the 2017 TEPP was deemed complete. The following summarizes TEPP activities undertaken and completed in 2018:

Tatsamenie Lake

Objective:

- 2018 spring release of incubated eggs (unfed fry) from 2017 brood year collections;
- Collection target of up to 2.5 million sockeye eggs in the fall of 2018 (including approximately 500K to be held as fry for extended rearing).

Results:

- Green-egg to stocked fry survival was 75%;
- 1.5 million fry were released to Tatsamenie Lake;
- Of those, 214,000 fry were held in net pens for extended rearing through to June 28;
- 2.5 million sockeye eggs were collected and delivered to the Port Snettisham Hatchery in September 2018;
- Fry will be thermally marked.

Trapper Lake

Objective:

- Collection target of up to 500,000 Little Trapper Lake sockeye eggs in the fall of 2018.
- Release subsequent fry to Trapper Lake for ongoing enhancement program evaluations.

Results:

- Eggs were not collected from Little Trapper due to a shortage of females in the escapement.

APPENDIX 4. CONSERVATION AND PROTECTION 2019 COMPLIANCE PLAN

1 Compliance Objectives

The objective is to ensure compliance with acts and regulations associated with the management of Pacific salmon.

The Conservation and Protection (C&P) program promotes and maintains compliance with legislation, regulations and management measures implemented to achieve the conservation and sustainable use of Canada's aquatic resources, and the protection of species at risk, fish habitat and oceans. The program is delivered through a balanced regulatory management and enforcement approach including:

- promotion of compliance through education and shared stewardship;
- monitoring, control and surveillance activities;
- Management of major cases /special investigations in relation to complex compliance issues.

In carrying out activities associated with the management of Pacific salmon as outlined in this management plan, C&P will utilize principle-based approaches and practices which are consistent with the National Compliance Framework and the DFO Compliance Model.

2 Regional Compliance Program Delivery

For the salmon fisheries in the Pacific Region, C&P will be utilizing a broad scope of tools and approaches to manage compliance towards achieving conservation and sustainability objectives, including:

- Maintain and develop relationships with First Nations communities, recreational groups and commercial interests through dialogue, education and shared stewardship.
- Intelligence-led investigations may specifically target repeat and more serious offenders for increased effectiveness of enforcement effort. Illegal sales of salmon will continue to be a regional priority.
- Prioritize enforcement efforts on measures directed towards conservation objectives.
- Fish habitat protection remains a key focus of fishery officer efforts coordinated regionally by the Fisheries Protection Program.
- Utilize 'Integrated Risk Management' to ensure fishery officer efforts are focused and directed at problems of highest risk.
- Continue high profile fishery officer presence through patrols by vehicle, vessel and aircraft to detect and deter violators.

- Monitor and support at-sea observers and dockside monitors to ensure accurate catch monitoring and reporting.
- Support traceability initiatives within the salmon fishery to enhance accountability. Monitor and verify catches and offloads of salmon to ensure accurate and timely catch reporting and accounting, including coverage of Dual Fishing opportunities.
- Priorities and direct compliance efforts where there is a risk to salmon stocks of concern.
- Use of enhanced surveillance techniques, and new available technology as well as covert surveillance techniques as a means to detect violations and gather evidence in fisheries of concern.
- Patrols during open timed fisheries to increase intelligence gathering, build relationships with stake holders and ensure compliance to licence conditions.
- Inspect fish processors, cold storage facilities, restaurants and retail outlets for compliant product.
- Maintain a violation reporting 24-hour hotline to facilitate the reporting of violations.
- Continue to promote ‘Restorative Justice’ principles in all fisheries.

3 Consultation

C&P works closely within the Fisheries and Aquaculture Management sector and the Fisheries Protection Program to ensure that fishery management plans are enforceable and implemented in a controlled, fair manner and that habitat is protected.

C&P participates on a regular basis in consultations with the fishing community and general public. Education, information and shared stewardship are a foundation of C&P efforts. C&P participates in all levels of the advisory process. The importance of local field level fishery officer input to these programs has proven invaluable and will continue.

C&P will continue meeting at the local level with individual First Nations, through the fishery officer First Nation Liaison Program and with First Nations planning committee meetings that involve many First Nations’ communities at one time.

C&P officers participate in local fishery management ‘roundtables’ and sport fishery recreational advisory committees in their respective areas and participate at Sport Fishery Advisory Board meetings.

Fishery officers are viewed as the public face of the department. During their day-to-day activities, the fishing community and general public provide comment and input that is promptly communicated to C&P managers, fisheries managers and habitat management staff. This public feedback is critical in identifying issues of concern and providing accurate feedback on emerging issues.

4 Compliance Strategy

In 2018, specific objectives for the salmon fishery will be to focus compliance management efforts on:

- Support development and implementation of the Strategic Framework for Fishery Monitoring and Catch Reporting in the Pacific Fisheries.
- Monitoring in-river and in marine approach waters using intelligence to target priority fisheries and compliance issues.
- Work with stakeholders to improve regulatory compliance.

Salmon fishery compliance continues to be a priority for C&P for 2018. There are, however, other competing priorities such as supporting the Fisheries Protection Program in protecting habitat, the Canadian Shellfish Sanitation Program, and the protection of Species at Risk. These priorities often occur during the same periods as the salmon fisheries. In order to balance multiple program demands, C&P applies a risk-based integrated work planning process at the Regional and Area levels.

APPENDIX 5: FISHING VESSEL SAFETY

Vessel owners and masters have a duty to ensure the safety of their crew and safe operation of the vessel. Adherence to safety regulations and good practices by owners, masters and crew of fishing vessels will help save lives, prevent vessel damage and protect the environment. All fishing vessels must be in a seaworthy condition and maintained as required by Transport Canada (TC), WorkSafeBC, and other applicable agencies. Vessels subject to inspection should ensure that the certificate of inspection is valid for the area of intended operation.

In the federal government, Transport Canada (TC) is responsible for shipping, navigation, and vessel safety regulations and inspections. Emergency response is led by the Canadian Coast Guard (CCG) and DFO has responsibility for management of the fisheries resources. In B.C., WorkSafeBC also regulates health and safety issues in commercial fishing. This includes requirements to ensure the health and safety of the crew and safe operation of the vessel. DFO (Fisheries and Aquaculture Management (FAM) and CCG) and TC through an MOU have formalized cooperation to establish, maintain and promote a safety culture within the fishing industry.

Before leaving on a voyage, the owner, master or operator must ensure that the fishing vessel is capable of safely making the passage. Critical factors for a safe voyage include the seaworthiness of the vessel, vessel stability, having the required safety equipment in good working order, crew training, and knowledge of current and forecasted weather conditions. As safety requirements and guidelines may change the vessel owner, crew, and workers must be aware of the latest legislation, policies and guidelines prior to each trip.

There are many useful tools available for ensuring a safe voyage. These include:

- Education and Training Programs;
- Marine Emergency Duties;
- Fish Safe - Stability Education Course;
- Fish Safe – Safe on the Wheel Course;
- Fish Safe – Safest Catch Program;
- First Aid;
- Radio Operators Course;
- Fishing Masters Certificates;
- Small Vessel Operators Certificate;
- Publications:
 - Transport Canada Publication TP 10038 *Small Fishing Vessel Safety Manual* (can be obtained at Transport Canada Offices from their website at: <http://www.tc.gc.ca/eng/marinesafety/tp-tp10038-menu-548.htm>;
 - Gearing Up for Safety – WorkSafeBC;
 - Safe at Sea DVD Series – Fish Safe;
 - Stability Handbook – Safe at Sea and Safest Catch – DVD Series;
 - Safest Catch Log Book;
 - Safety Quick.

For further information see:

www.tc.gc.ca/eng/marinesafety/menu.htm;
www.fishsafebc.com

1 Important Priorities for Vessel Safety

There are three areas of fishing vessel safety that should be considered a priority. These are: vessel stability, emergency drills, and cold water immersion.

1.1 Fishing Vessel Stability

Vessel stability is paramount for safety. Care must be given to the stowage and securing of all cargo, skiffs, equipment, fuel containers and supplies, and also to correct ballasting. Fish harvesters must be familiar with their vessel's centre of gravity, the effect of liquid free surfaces on stability, loose water or fish on deck, loading and unloading operations and the vessel's freeboard. Know the limitations of your vessel; if you are unsure, contact a reputable naval architect, marine surveyor or the local Transport Canada Marine Safety Office.

Fishing vessel owners are required to develop detailed instructions addressing the limits of stability for each of their vessels. The instructions need to be based on a formal assessment of the vessel by a qualified naval architect and include detailed safe operation documentation kept on board the vessel. Examples of detailed documentation include engine room procedures, maintenance schedules to ensure watertight integrity, and instructions for regular practice of emergency drills.

The *Small Fishing Vessel Inspection Regulations* currently require, with certain exceptions, a full stability assessment for vessels between 15 and 150 gross tons that do not exceed 24.4 metres in length and are used in the herring or capelin fisheries. Once the proposed new *Fishing Vessel Safety Regulations* take effect, more vessels will be required to have a stability booklet.

In 2006, Transport Canada Marine Safety (TC) issued Ship Safety Bulletin (SSB) 04/2006 ("Safety of Small Fishing Vessels: Information to Owners/Masters About Stability Booklets"), which provides a standard interpretation of the discretionary power available under Section 48 and the interim requirements prior to the implementation of the proposed *Fishing Vessel Safety Regulations*. The bulletin calls for vessels more than 15 gross tons to have a stability booklet where risk factors that negatively affect stability are present. The bulletin also suggests vessels less than 15 gross tons assess their risk factors. Every fishing vessel above 15 GRT built or converted to herring or capelin after 06 July 1977 and engaged in fishing herring or capelin must have an approved stability book. Additionally Transport Canada has published a Stability Questionnaire (SSB 04/2006), and Fishing Vessel Modifications Form which enable operators to identify the criteria which will trigger a stability assessment. A stability assessment is achieved by means of an inclining experiment, which has to be conducted by a naval architect. Please contact the nearest Transport Canada office if you need to determine whether your vessel requires one.

In 2008, TC issued SSB 01/2008, which sets out a voluntary record of modifications for the benefit of owners/masters of any fishing vessels. For vessels of more than 15 gross tons, the record of modifications was to be reviewed by TC inspectors during regular inspections and entered on the vessel's inspection record. However, information gathered

during the Transportation Safety Board's (TSB) Safety Issues Investigation into the fishing industry showed minimal recording of vessel modifications prior to this date.

The TSB has investigated several fishing vessel accidents since 2002 and found that vessel modifications and loading of traps have been identified as contributing factors in vessel capsizing's such as: M02W0102 - *Fritzi-Ann*; M05W0110 - *Morning Sunrise*; M07M0088 - *Big Sisters*; M08W0189 - *Love and Anarchy*; M09L0074 – *Le Marsouin I*; M10M0014 - *Craig and Justin*. In 2012, two prawn fishing vessels in BC, *Jessie G* and *Pacific Siren*, both capsized with prawn traps on deck and are currently under investigation.

Vessel masters are advised to carefully consider stability when transporting gear. Care must be given to the stowage and securing of all traps, cargo, skiffs, equipment, fuel containers, and supplies, and also to correct ballasting. Know the limitations of your vessel; if you are unsure contact a reputable marine surveyor or the local Transport Canada Marine Safety office.

1.2 Emergency Drill Requirements

The Canada Shipping Act 2001 requires that the Authorized Representative of a Canadian Vessel shall develop procedures for the safe operation of the vessel and for dealing with emergencies. The Act also requires that crew and passengers receive safety training. The Marine Personnel Regulations require that all personnel on board required to meet the minimum safe manning levels have received MED (Marine Emergency Duties) training to an A1 or A3 level, depending on the vessel's voyage limits, within 6 months of serving aboard. MED A3 training is 8 hours in duration and is applicable to seafarers on fishing vessels less than 150 GRT that are within 25 miles from shore (NC2). MED A1 training is 19.5 hours duration and is applicable to all other fishing vessels.

MED provides a basic understanding of the hazards associated with the marine environment; the prevention of shipboard incidents; raising and reacting to alarms; fire and abandonment situations; and the skills necessary for survival and rescue.

1.3 Cold Water Immersion

Drowning is the number one cause of death in B.C.'s fishing industry. Cold water is defined as water below 25 degrees Celsius, but the greatest effects occur below 15 degrees. BC waters are usually below 15 degrees. The effects of cold water on the body occur in four stages: cold shock, swimming failure, hypothermia and post-rescue collapse. Know what to do to prevent you or your crew from falling into the water and what to do if that occurs. More information is available in the WorkSafe Bulletin *Cold Water Immersion* (available from the WorkSafeBC website at www.worksafebc.com).

1.4 Other Issues

1.4.1 Weather

Vessel owners and masters are reminded of the importance of paying close attention to current weather trends and forecasts during the voyage. Marine weather information and forecasts can be obtained on VHF channels 21B, Wx1, Wx2, Wx3, or Wx4. Weather information is also available from Environment Canada website at:

http://www.weatheroffice.gc.ca/marine/index_e.html.

1.4.2 Emergency Radio Procedures

Vessel owners and masters should ensure that all crew are able to activate the Search and Rescue (SAR) system early, rather than later, by contacting the Canadian Coast Guard (CCG). It is strongly recommended that all fish harvesters carry a registered 406 MHz Emergency Position Indicating Radio Beacon (EPIRB). These beacons should be registered with the National Search and Rescue secretariat. When activated, an EPIRB transmits a distress call that is picked up or relayed by satellites and transmitted via land earth stations to the Joint Rescue Co-ordination Centre (JRCC), which will task and coordinate rescue resources.

Fish harvesters should monitor VHF channel 16 or MF 2182 KHz and make themselves and their crews familiar with other radio frequencies. All crew should know how to make a distress call and should obtain their restricted operator certificate from Industry Canada. However, whenever possible, masters should contact the nearest Canadian Coast Guard (CCG) Marine Communications and Traffic Services (MCTS) station (on VHF channel 16 or MF 2182 kHz) prior to a distress situation developing. Correct radio procedures are important for communications in an emergency. Incorrect or misunderstood communications may hinder a rescue response.

Since August 1, 2003 all commercial vessels greater than 20 metres in length are required to carry a Class D VHF Digital Selective Calling (DSC) radio. A registered DSC VHF radio has the capability to alert other DSC equipped vessels in your immediate area and MCTS that your vessel is in distress. Masters should be aware that they should register their DSC radios with Industry Canada to obtain a Marine Mobile Services Identity (MMSI) number or the automatic distress calling feature of the radio may not work. For further information see the Coast Guard website at: <http://www.ccg-gcc.gc.ca/e0003901>.

A DSC radio that is connected to a GPS unit will also automatically include your vessel's current position in the distress message. More detailed information on MCTS and DSC can be obtained by contacting a local Coast Guard MCTS centre (located in Vancouver, Victoria, Prince Rupert, Comox and Tofino) or from the Coast Guard website: www.pacific.ccg-gcc.gc.ca.

1.4.3 Collision Regulations

Fish harvesters must be knowledgeable of the *Collision Regulations* and the responsibilities between vessels where risk of collision exists. Navigation lights must be kept in good working order and must be displayed from sunset to sunrise and during all times of restricted visibility. To help reduce the potential for collision or close quarters situations which may also result in the loss of fishing gear, fish harvesters are encouraged to monitor

the appropriate local Vessel Traffic Services (VTS) VHF channel, when travelling or fishing near shipping lanes or other areas frequented by large commercial vessels. Vessels required to participate in VTS include:

- a) every ship twenty metres or more in length,
- b) every ship engaged in towing or pushing any vessel or object, other than fishing gear,
- c) where the combined length of the ship and any vessel or object towed or pushed by the ship is forty five metres or more in length; or
- d) where the length of the vessel or object being towed or pushed by the ship is twenty metres or more in length.

Exceptions include:

- a) a ship towing or pushing inside a log booming ground,
- b) a pleasure yacht *less than* 30 metres in length, and
- c) a fishing vessel that is *less than* 24 metres in length and not *more than* 150 tons gross.

More detailed information on VTS can be obtained by calling (604) 775-8862 or from the Coast Guard website: <http://www.ccg-gcc.gc.ca/e0003910#VTS>.

1.4.4 Buddy System

Fish harvesters are encouraged to use the buddy system when transiting, and fishing as this allows for the ability to provide mutual aid. An important trip consideration is the use of a sail plan which includes the particulars of the vessel, crew and voyage. The sail plan should be left with a responsible person on shore or filed with the local MCTS. After leaving port the fish harvester should contact the holder of the sail plan daily or as per another schedule. The sail plan should ensure notification to JRCC when communication is not maintained which might indicate your vessel is in distress. Be sure to cancel the sail plan upon completion of the voyage.

2 Fish Safe BC

Fish Safe encourages Vessel masters and crew to take ownership of fishing vessel safety. Through this industry driven and funded program Fish Safe provides fishing relevant tools and programs to assist fishermen in this goal. The Fish Safe Stability Education Course is available to all fishermen who want to improve their understanding of stability and find practical application to their vessel's operation. The Safe on the Wheel Course is designed to equip crewmen with the skills they need to safely navigate during their wheel watch. The Safest Catch Program along with fishermen trained Safety Advisors is designed to give fishermen the tools they need to create a vessel specific safety management system.

Fish Safe is managed by Gina McKay, Project Coordinator John Krgovich, Program Assistant, Connor Radil, and fishermen Safety Advisors. All activities and program development is directed by the Fish Safe Advisory Committee (membership is open to all interested in improving safety on board). The advisory committee meets quarterly to

discuss safety issues and give direction to Fish Safe in the development of education and tools for fish harvesters.

Fish Safe also works closely with WorkSafe BC to improve the fishing injury claims process. For further information, contact:

Gina McKay	Phone: 604-261-9700
Program Manager	Cell: 604-339-3969
Fish Safe	Fax: 604-275-7140
#2, 11771 Horseshoe Way	Email: gina@fishsafebc.com
Richmond, BC V7A 4V4	www.fishsafebc.com

3 WorkSafeBC

Commercial fishing is legislated by the requirements for diving, fishing and other marine operations found in Part 24 of the Occupational Health and Safety Regulation (OHSR). Many general hazard sections of the OHSR also apply. For example, Part 8: Personal Protective Clothing and Equipment addresses issues related to safety headgear, safety foot wear and personal floatation devices. Part 15 addresses issues on rigging, Part 5 addresses issues of exposure to chemical and biological substances, and Part 3 addresses training of young and new workers, first aid, and accident investigation issues. Part 3 of the Workers Compensation Act (WCA) defines the roles and responsibilities of owners, employers, supervisors and workers. The OHSR and the WCA are available from the Provincial Crown Printers or by visiting the WorkSafeBC website: www.worksafebc.com

For further information, contact a regional Occupational Safety Officer.

Shane Neifer - Terrace	(250) 615-6640
Bruce Logan - Lower Mainland	(604) 244-6477
Wayne Tracey - Lower Mainland	(604) 232-1960
Pat Olsen - Courtenay	(250) 334-8777
Mark Lunny - Courtenay	(250) 334-8732
Mike Ross -Manager of Interest for Fishing	(250) 881-3419.

For information on projects related to commercial fishing contact Ellen Hanson (604) 233-4008 or Toll Free 1-888-621-7233 ext. 4008 or by email: Ellen.Hanson@worksafebc.com.

4 Transportation Safety Board

The Transportation Safety Board (TSB) is not a regulatory board. The TSB is an independent agency that investigates marine, pipeline, railway and aviation transportation occurrences to determine the underlying risks and contributing factors. Its sole aim is the advancement of transportation safety by reporting publicly through Accident Investigation Reports or Marine Safety Information Letters or Advisors. It is not the function of the Board to assign fault or determine civil or criminal liability. Under the TSB Act all information collected during an investigation is completely confidential.

In 2012, the TSB released the results of a three-year investigation into fishing safety in Canada. This report identifies 10 key factors and makes several suggestions to address the problems that persist throughout the industry.

For more information about the TSB, visit our website at www.tsb.gc.ca. For information about the TSB's investigation into fishing safety, or to view a brief video, visit: <http://www.tsb.gc.ca/eng/medias-media/videos/marine/m09z0001/index.asp>.

To view a brief video about some of the issues on the TSB's recent safety Watchlist, visit: <http://www.tsb.gc.ca/eng/medias-media/photos/index.asp>.

Reporting an Occurrence - TSB 1808 Form

After a reportable occurrence happens you can fill out the TSB 1808 Form or call the TSB at the contact information below.

Glenn Budden, Investigator, Marine - Fishing Vessels
Transportation Safety Board of Canada
4 - 3071 No. 5 Road
Richmond, BC, V6X 2T4
Telephone: 604-666-2712
Cell: 604-619-6090
Email: glenn.budden@tsb.gc.ca

APPENDIX 5: GLOSSARY

Note: a more comprehensive glossary with relevant terminology and additional information is available on the Salmon Homepage at: <http://www.pac.dfo-mpo.gc.ca/fm-gp/species-especies/salmon-saumon/gloss-eng.htm>

Aboriginal Traditional Knowledge (ATK) or Traditional Ecological Knowledge (TEK): Knowledge that is held by, and unique to Aboriginal peoples. It is a living body of knowledge that is cumulative and dynamic and adapted over time to reflect changes in the social, economic, environmental, spiritual and political spheres of the Aboriginal knowledge holders. It often includes knowledge about the land and its resources, spiritual beliefs, language, mythology, culture, laws, customs and medicines.

Abundance: Number of individuals in a stock or a population.

Acidification: As it relates to oceans, it is a growing threat to marine ecosystems due to the increasing acidity of the oceans caused by the uptake of carbon dioxide (CO₂) from the atmosphere. Increasing atmospheric CO₂ is linked to human-derived activities such as the burning of fossil fuels and is a major factor contributing to climate change.

Age Composition: Proportion of individuals of different ages in a stock or in the catches.

Anadromous: An anadromous species, such as salmon, which spends most of its life at sea but returns to fresh water to spawn (often to the spawning area it originated from).

By-catch: The unintentional catch of one species when the target is another.

Catch per Unit Effort (CPUE): The amount caught for a given standardized fishing effort. For example: the number of sockeye caught per fisher per day; tons of shrimp per tow; kilograms of fish per hundred longline hooks.

Communal Commercial Licence: Licence issued to Aboriginal organizations pursuant to the *Aboriginal Communal Fishing Licences Regulations* for participation in the general commercial fishery.

Committee on the Status of Endangered Wildlife in Canada (COSEWIC): Committee of experts that assess and designate which wild species are in some danger of disappearing from Canada.

Discards: Portion of a catch thrown back into the water after they are caught in fishing gear.

Ecosystem-Based Management: Taking into account of species interactions and the interdependencies between species and their habitats when making resource management decisions.

Escapement: Reference to salmon - the number of fish escaping the fishery and reaching the spawning grounds, or other defined location, e.g. border escapement.

Fishing Effort: Quantity of effort using a given fishing gear over a given period of time.

Fishing Mortality: Death caused by fishing, often symbolized in mathematical formulae by the symbol “F”.

Fixed Gear: A type of fishing gear that is set in a stationary position. These include traps, weirs, set gillnets, longlines and handlines.

Food, Social and Ceremonial (FSC): A fishery conducted by Aboriginal groups for food, social and ceremonial purposes.

Gillnet: Fishing gear: netting with weights along the bottom and floats along the top used to catch fish. Gillnets can be set at different depths and may/may not be anchored (e.g. as in set gillnets/drift gillnet).

Incidental Catch: The inadvertent or non-targeted harvest of a specified component within a particular species, e.g. stocks of concern having special management restrictions.

Maximum Sustainable Yield (MSY): Largest average catch that can continuously be taken from a stock.

Mesh Size: Size of the mesh of a net. Different fisheries have different minimum mesh size regulation.

Natural Mortality: Mortality due to natural causes, often symbolized in mathematical formulae by the symbol “M”.

Otolith: Structure of the inner ear of fish, made of calcium carbonate. Also called "ear bone" or "ear stone". Otoliths are used to determine the age of fish: annual rings can be observed and counted. Daily increments are visible as well on larval otoliths.

Population: Group of individuals of the same species, forming a breeding unit, and sharing a habitat.

Precautionary Approach: Set of agreed cost-effective measures and actions, including future courses of action, which ensures prudent foresight, reduces or avoids risk to the resource, the environment, and the people, to the extent possible, taking explicitly into account existing uncertainties and the potential consequences of being wrong.

Quota: Portion of the total allowable catch that a unit such as vessel class, country, etc. is permitted to take from a stock in a given period of time.

RCA: Rockfish Conservation Area, which is an area that is closed for the protection of various inshore rockfish species to fishing activities that negatively impact rockfish.

Recruitment: Amount of individuals produced from a single brood year becoming part of the exploitable stock that can be caught in a fishery.

Research Survey: Surveys allowing scientists to obtain information on the abundance and distribution of various species and/or collect oceanographic data. E.g.: bottom trawl survey, plankton survey, hydroacoustic survey, etc.

Species at Risk Act (SARA): The Act is a federal government commitment to prevent wildlife species from becoming extinct and secure the necessary actions for their recovery. It provides the legal protection of wildlife species and the conservation of their biological diversity.

Scale patterns analysis (SPA): spawning streams will create varying, unique scale patterns in salmon that allow specific point of origin assessments to be made.

Spawner: Sexually mature individual.

Spawning Stock: Sexually mature individuals in a stock.

Stock: Describes a population of individuals of one species found in a particular area, and is used as a unit for fisheries management. Ex: NAFO area 4R herring.

Stock Assessment: Scientific evaluation of the status of a species belonging to a same stock within a particular area in a given time period.

Sulk rate: Refers to the time it takes a fish to resume its upstream migration after being tagged and/or otherwise handled. In Transboundary mark-recapture (M-R) programs it is determined by the time it takes tagged fish to reach the recapture location after the tagging event. The sulk rate is used to adjust the number of tags available for recapture and hence has a bearing on the weekly population estimates based on M-R data.

Total Allowable Catch (TAC): The amount of catch that may be taken from a stock without compromising achievement of spawning goals/objectives.

Traditional Ecological Knowledge (TEK): A cumulative body of knowledge and beliefs handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment.

Trawl: Fishing gear: cone-shaped net towed in the water by a boat called a "trawler". Bottom trawls are towed along the ocean floor to catch species such as groundfish. Mid-water trawls are towed within the water column.

Validation: The verification, by an observer, of the amount and/or composition of fish landed.

Year-class: Individuals of a same stock born in a particular year. Also called "cohort".

APPENDIX 6: ACRONYMS

AABM: Aggregate Abundance Based Management
AAROM: Aboriginal Aquatic Resources and Oceans Management
ABM: Abundance-Based Management
AC: Allowable Catch
ACCASP: Aquatic Climate Change Adaptation Services Program
ADFG: Alaska Department of Fish and Game.
AFS: Aboriginal Fisheries Strategy.
AI: Abundance Indices
AMAC: Aquaculture Management Advisory Committee
ATK: Aboriginal Traditional Knowledge
ATP: Allocation Transfer Program
BLC: Base-Level Catch
BNA: Basic Needs Allocations
BTR: Base Terminal Run
BWW: Be Whale Wise
CAFN: Champagne and Aishihik First Nation
C&P: Conservation and Protection Unit of DFO
CEDP: Community Economic Development Program
CGSB: Canadian General Standards Board
CN: Chinook salmon
CO: Coho salmon
COSEWIC: Committee On the Status of Endangered Wildlife In Canada
CPUE: Catch per unit effort.
CSAB CMWG: Commercial Salmon Advisory Board Catch Monitoring Working Group
CSAP: Centre for Science Advice Pacific
CSAS: Canadian Science Advisory Secretariat
CTC: Chinook Technical Committee
CU: Conservation Unit
CWT: Coded-Wire Tag
CYFN: Council of Yukon First Nations
DFO: Department of Fisheries and Oceans (Fisheries and Oceans Canada).
DPI: Dedicated Public Involvement
EBM: Ecosystem-Based Management
EC: Environment Canada
ESSR: Excess Salmon to Spawning Requirements.
FN: First Nation
FNFC: First Nation Fishery Council
FSC: Food, Social and Ceremonial
GSI: Genetic Stock Identification
IFMP: Integrated Fisheries Management Plan
IHNV: Infectious Hematopoietic Necrosis Virus
IHPC: Integrated Harvest Planning Committee
IMAP: Integrated Management of Aquaculture Plan
IPSO: International Programme on the State of the Ocean
ISBM: Individual Stock Based Management
MSY: Maximum Sustained Yield
MPA: Marine Protected Area
NBC: Northern British Columbia
NGO: Non-Government Organization
NMCA: National Marine Conservation Area
NOAA: National Oceanic and Atmospheric Administration
NOLS: National Online Licencing System
NPAFC: North Pacific Anadromous Fish Commission
NWA: National Wildlife Area
OHEB: Oceans, Habitat and Enhancement Branch.

ORR: Observe, Record, Report program of DFO's Conservation and Protection unit
PAR: Pacific Aquaculture Regulations
PFMA: Pacific Fishery Management Area
PICFI: Pacific Integrated Commercial Fisheries Initiative
PIP: Public Involvement Program
PNCIMA: Pacific North Coast Integrated Management Area
PP: British Columbia Provincial Park
PSARC: Pacific Scientific Advice Review Committee.
PSC: Pacific Salmon Commission
RPR: Regional Peer Review
RRC: Renewable Resource Council
PST: Pacific Salmon Treaty
SACC: Stock Assessment Coordinating Committee
SARA: Species At Risk Act
SCC: Salmon Coordinating Committee
SCMM: Stikine Chinook Management Model
SEAK: Southeast Alaska
SEP: Salmonid Enhancement Program
SEPP: Stikine Enhancement Production Plan
SFAB: Sport Fish Advisory Board
SFF: Sustainable Fisheries Framework
SFI: Sport Fishing Institute
SFMM: Stikine Forecast Management Model
SIRE: Salmon In Regional Ecosystems
SK-B MPA: SGaan Kinghlas-Bowie Seamount Marine Protected Area
SMM: Stikine Sockeye Management Model.
S_{MSY}: Number of spawners required to produce maximum sustained yield
SO: Sockeye salmon
SPA: Scale patterns analysis
SRSMAC: Stikine River Salmon Management Advisory Committee
SVOP: Small Vessel Operator Proficiency
SW: Statistical week
TAC: Total Allowable Catch
TEK: Traditional Ecological Knowledge
TEPP: Taku Enhancement Production Plan
TFN: Tahltan First Nation
TRP: Transboundary Rivers Panel of the Pacific Salmon Commission
TRSMAC: Taku River Salmon Management Advisory Committee
TRTFN: Taku River Tlingit First Nation.
TTC: Transboundary Technical Committee.
UFA: Umbrella Final Agreement
USFWS: United States Fish and Wildlife Service.
WCVI: West Coast of Vancouver Island
WSP: Wild Salmon Policy
YSSC: Yukon Salmon Sub-Committee
YTG: Yukon Territorial Government