PACIFIC REGION

INTEGRATED FISHERIES MANAGEMENT PLAN

APRIL 1, 2021 - MARCH 31, 2022

SALMON

TRANSBOUNDARY RIVERS

Oncorhynchus kisutch

Fisheries and Oceans Canada
Pêches et Océans Canada

Canada

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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.

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DEPARTMENTAL CONTACTS

A more comprehensive list of contacts can be found online at:
http://www.dfo-mpo.gc.ca/contact/index-eng.htm

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Turn In Poachers (TIPP)..... Toll Free (800) 661-0525
Pacific Salmon Commission (PSC) Office.....(604) 684-8081
PSC Test Fisheries (Recorded, In-Season Information).....(604) 666-8200

Recreational Fishing: http://www.pac.dfo-mpo.gc.ca/fm-gp/rec/index-eng.html
Commercial Fishing: https://www.pac.dfo-mpo.gc.ca/fm-gp/salmon-saumon/comm-eng.html

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DFO Pacific: @DFO_Pacific
En Français: @MPO_Pacifique

Acts, Orders, and Regulations https://www.dfo-mpo.gc.ca/acts-lois/regulations-reglements-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, Pacific Fishery Regulations

National On-line Licencing System (NOLS)
Web: https://www.dfo-mpo.gc.ca/fisheries-peches/sdc-cps/licence-permis-eng.html

Email: fishing-peche@dfo-mpo.gc.ca (please include your name and the DFO Region in which you are located)

Telephone: 1-877-535-7307

Fax: 613-990-1866

TTY: 1-800-465-7735

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

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Waves (https://science-libraries.canada.ca/eng/fisheries-oceans/)

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

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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 (https://www-ops2.pac.dfo-mpo.gc.ca/fns-sap/index-eng.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.

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Species at Risk Act (SARA)
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A comprehensive glossary is available online at:
http://dev-public.rhq.pac.dfo-mpo.gc.ca/fm-gp/salmon-saumon/gloss-eng.html

LIST OF ACRONYMS USED IN THIS PLAN:

ACRONYM	PHRASE
AABM	Aggregate Abundance-Based Management
AAROM	Aboriginal Aquatic Resource and Oceans Management
AHC	Area Harvest Committee
AFS	Aboriginal Fisheries Strategy
ATP	Allocation Transfer Program
B_{MSY}	Biomass at Maximum Sustainable Yield
CCTAC	Canadian Commercial Total Allowable Catch
CTAC	Canadian Total Allowable Catch
CEDP	Community Economic Development Program
COHO ABM	Coho Abundance-Based Management
COSEWIC	Committee for the Status of Endangered Wildlife in Canada
CPUE	Catch Per Unit Effort
CSAB	Commercial Salmon Advisory Board
CSAP	The Centre for Scientific Advice Pacific
CSAS	The Canadian Science Advisory Secretariat
CSAF	Commercial Salmon Allocation Framework
CU	Conservation Unit
CWT	Coded Wire Tag

ACRONYM	PHRASE
DBE	Difference Between Estimates
DIDSON	Dual Frequency Identification Sonar
DU	Designatable Unit
EO	Economic Opportunity
ER	Exploitation Rate
ESSR	Excess Salmon to Spawning Requirements
FNFC	First Nations Fishery Council
FOS	Fishery Operating System
FRP	Fraser River Panel
FSC	Food, Social and Ceremonial
FSMB	Fraser Salmon Management Board
FSMC	Fraser Salmon Management Council
GN	Gill Net
HA	Harvest Agreement
HG	Haida Gwaii
iARC	Internet Annual Recreational Catch survey
ITQ	Individual Transfer Quota
IHPC	Integrated Harvest Planning Committee
IFR	Interior Fraser River
iREC	Internet Recreational Effort and Catch survey
ISBM	Individual Stock-Based Management
ISC	Inside Southern Chum

ACRONYM	PHRASE
LAER	Low Abundance Exploitation Rate
LGS	Lower Strait of Georgia
LRP	Lower Reference Points
MA	Management Adjustment
MCC	Marine Conservation Caucus
MPA	Marine Protected Area
MSY	Maximum Sustainable Yield
MU	Management Unit
MVI	Mid Vancouver Island
NMCAR	National Marine Conservation Area Reserve
NOLS	National On-line Licensing System
NWA	National Wildlife Area
PA	Precautionary Approach
pDBE	Proportional Difference Between Estimates
PICFI	Pacific Integrated Commercial Fisheries Initiative
PFMA	Pacific Fisheries Management Areas
pMA	Proportional Management Adjustment
PSC	Pacific Salmon Commission
PSM	Pre-Spawn Mortality
PST	Pacific Salmon Treaty
RCA	Rockfish Conservation Area
SARA	*Species at Risk Act*

ACRONYM	PHRASE
SCC	First Nations Salmon Coordinating Committee
SEG	Sustainable Escapement Goal
SEP	Salmonid Enhancement Program
SFAB	Sport Fishing Advisory Board
S_{GEN}	Spawner abundance required to get to S_{MSY} in 1 generation
SHMF	Selective Hatchery Mark Fishery
S_{MSY}	Spawners at Maximum Sustainable Yield
SN	Seine
TAC	Total Allowable Catch
TAM	Total Allowable Mortality
TR	Troll
WCVI	West Coast Vancouver Island
WSP	Wild Salmon Policy (Canada's Policy for Conservation of Wild Pacific Salmon)

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.

NEW FOR 2021/2022

Highlights/Key Changes for the 2021 Transboundary Salmon IFMP

The national public health emergency response to the COVID-19 pandemic has, and will continue to influence the delivery of programs that support fishery administration in 2021. Additional changes and adjustments to fishery opportunities may be required as a result.

a) Alsek River:

- Angling for salmon (including catch and release) prohibited effective April 1 to August 14.
- Retention of Chinook and Sockeye salmon prohibited at the start of the season. Changes to retention limits are contingent on (improved) abundance in-season.

b) Stikine River:

- No directed commercial fishery for Chinook salmon in 2021 as the forecast is below the minimum conservation threshold. Retention of Chinook salmon incidentally caught in commercial sockeye or coho fisheries is prohibited.
- No directed commercial fishery for Sockeye salmon anticipated in 2021. Directed fishery opportunities are contingent on (improved) abundance in-season.
- Directed commercial fishery opportunity for Coho salmon planned. Canadian fishery limited to 5,000 allocation (*Pacific Salmon Treaty* fixed allocation).
- Angling for salmon (including catch and release) is prohibited in the Tahltan River June 1 to August 31.
- Retention of Chinook and Sockeye salmon in the recreational fishery prohibited.

c) Taku River:

- No directed commercial fishery for Chinook salmon in 2021 as the forecast is below the minimum conservation threshold. Retention of Chinook salmon incidentally caught in commercial sockeye or coho fisheries is prohibited.
- Directed commercial fishery opportunities for Sockeye and Coho salmon planned. Retention of Chinook salmon incidentally caught in commercial sockeye or coho fisheries is prohibited.
- Retention of Chinook and Sockeye salmon in the recreational fishery prohibited.

d) General:

- The *National Online Licensing System* must be used to purchase commercial fishing licences. Commercial fishing licence fees are increasing by 2.0% for 2021 in accordance with the *Service Fees Act*.
- Recreational fishing licences for salmon must be purchased online. www.pac.dfo-mpo.gc.ca/fm-gp/licence-permis/index-eng.html#recreational

Pacific Salmon In 2021: Recent Environmental Trends Suggest Below Average Salmon Productivity (Adult Recruits Produced Per Adult Parental Spawner)

Environmental and biological data from 2016-2020 suggest that 2021 salmon productivity, defined as the number of adult recruits produced per adult parental spawner, will generally be below average. Specifically:

1) Higher river temperatures occurred from 2016 to 2020; summer river temperatures are increasingly exceeding upper thermal tolerances for salmon in many systems in southern and central BC;
2) BC snow packs were anomalously low by early May in 2015, 2016, 2018 and 2019, and by early June in 2017. In general this contributed to warmer spring/summer river and lake temperatures in snow-dominated systems in those years;
3) Record summer droughts occurred in 2017 and 2018; lower water levels can block passage to key spawning habitat, strand salmon, and increase their exposure to predators;
4) Unprecedented Northeast Pacific marine heatwaves were present from late-2013 to late-2020; this has negatively affected many physical and biological ocean processes relating to salmon growth and productivity;
5) Northeast Pacific Ocean zooplankton community composition continued to exhibit characteristics consistent with a warmer ocean from 2016 to 2019, and contributed a higher proportion of lower quality species near the base of the salmon food web.

Salmon productivities are generally expected to be below average, although responses will vary by species and population.

British Columbia Chinook – Additional Conservation Measures

Additional fishery management measures are proposed for 2021 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.
- 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;

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.

Licensing Services and Service Updates

All Fish harvesters/Licence Holders/vessel owners are now required to use the National Online Licensing System (NOLS) to view, pay for and print their commercial fishing licences, licence conditions and/or receipts.

Training materials, including step-by-step guides and a detailed user training manual, are available online (http://www.dfo-mpo.gc.ca/FM-GP/SDC-CPS/licence-permis-eng.htm) to guide users of the system in completing their licensing transactions. The Department also provides client support and assistance on how to use the system via e-mail at fishing-peche@dfo-mpo.gc.ca or by calling toll-free at 1-877-535-7307 (7:00 AM to 8:00 PM Eastern, Monday to Friday).

Recreational fishery participants are now required to use the National Recreational Licencing System to purchase salmon angling licences or salmon catch cards online (both British Columbia and Yukon). Further information on how to purchase a recreational salmon licence is available online (https://recfish-pechesportive.dfo-mpo.gc.ca/nrls-sndpp/index-eng.cfm)

For more information on how to register and use online licencing systems please visit the Department's websites contact licencing service client support at 1-877-535-7307.

1 OVERVIEW

1.1 Introduction

The Transboundary Rivers Salmon Integrated Fisheries Management Plan (IFMP) covers the period of April 1, 2021 to March 31, 2022 for stocks originating in the Alsek, Stikine and Taku rivers in southwestern Yukon and northwestern British Columbia.

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).

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 Central Government (TCG), the Taku River Tlingit First Nation (TRTFN), the Champagne and Aishihik First

Nations (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. Fisheries include those undertaken by First Nations as well as recreational and commercial fisheries.

In the 1990 Sparrow decision, the Supreme Court of Canada found that where an Aboriginal group has an Aboriginal right to fish for food, social and ceremonial purposes, it takes priority, after conservation, over other uses of the resource.

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 to modern commercial methods such as seine nets, fished from specialized vessels.

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

- Treaty arrangements.
- Rights-based commercial access for five Nuu-chah-nulth First Nations located on the West Coast of Vancouver Island (Ahousaht, Ehattesaht, Hesquiaht, Mowachaht/Muchalaht, and Tla-o-qui-aht). DFO has developed a Fishery Management Plan with the Five Nations to implement for the 2021/2022 season.
- Commercial fisheries access through communal commercial licences acquired through DFO relinquishment programs (e.g. Pacific Integrated Commercial Fisheries Initiative - PICFI or Allocation Transfer Program-ATP). These licences are fished in a manner that is comparable to the general commercial fishery.

- Negotiated economic opportunity fisheries (Lower Fraser and West Coast of Vancouver Island only) or demonstration fisheries (select locations, to date supported through licences relinquished from the commercial salmon fleet, primarily from the ATP and PICFI programs).
- Excess Salmon to Spawning Requirements (ESSR) fisheries may also be provided that permit the sale of fish in some highly terminal areas where spawner abundance is in excess of spawning requirements.

Fisheries and Oceans Canada regulates recreational fishing for Pacific salmon in both tidal and non-tidal waters. In B.C. tidal licences are issued by DFO and non-tidal licences are issued by the Province. Anglers wishing to retain salmon taken from either tidal or non-tidal waters in B.C. must have a valid salmon conservation stamp affixed to their licence. The proceeds from the sale of stamps are 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 hook styles, 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 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 (WSP), 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 Strategic Framework for Fishery Monitoring and Catch Reporting in the Pacific Fisheries. These policies are available at:
http://www.pac.dfo-mpo.gc.ca/fm-gp/species-especes/salmon-saumon/pol/index-eng.html

Canada's Policy for Conservation of Wild Pacific Salmon (the Wild Salmon Policy) 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:
https://www.pac.dfo-mpo.gc.ca/fm-gp/salmon-saumon/wsp-pss/policy-politique/index-eng.html

To communicate the work the Department is doing in support of the policy, Canada's Minister of Fisheries and Oceans and the Canadian Coast Guard released the Wild Salmon Policy 2018-2022 Implementation Plan in October 2018. This collaboratively developed plan was consulted on broadly throughout fall 2017, and lays out nine overarching approaches to implementation and 48 specific activities. The plan is organized under three key themes: Assessment; Maintaining and Rebuilding Stocks; and Accountability. In 2021, the third annual report on progress will be released.

For a copy of the Wild Salmon Policy, the *Wild Salmon Policy 2018-2022* Implementation Plan, information on what we heard during consultations and response, annual reports, and other Wild Salmon Policy related materials, please see: https://www.pac.dfo-mpo.gc.ca/fm-gp/salmon-saumon/wsp-pss/index-eng.html

The 1999 *An Allocation Policy for Pacific Salmon*, announced in 1999, sets out principles for allocating salmon in BC among the three harvest groups (First Nations food, social and ceremonial; commercial; and recreational) and within the commercial fishery among gear types (gillnet, seine and troll). It forms the basis for general decision guidelines outlined in Section 7 of this plan.

Since the Salmon Allocation Policy was first adopted twenty years ago, there have been significant changes to fisheries management, policy, and Aboriginal rights. Most recently, within the 2018 BC Supreme Court Ahousaht decision (Ahousaht Indian Band and Nation et al v. Canada (Attorney General) 2018 BCSC 633), the application of the SAP (1999) was found to be an unjustified infringement of the five Nuu-chah-nulth Nations' (Ahousaht, Ehattesaht/ Chinehkint, Hesquiaht, Mowachaht/Muchalaht, and Tla-o-qui-aht) Aboriginal rights to fish and sell fish insofar as the SAP accords priority to the recreational fishery over the Five Nations' right-based sale fishery for Chinook and Coho salmon. To the extent that the SAP applies to the Five Nations in the manner declared an unjustifiable infringement by the Court, the SAP is of no force and effect in its application to the Five Nations' exercise of their aboriginal right to fish and sell fish. DFO has responded to the court decision through the development of a Fisheries Management Plan for the Five Nations, which addresses the right to sell fish. Rather than designing a process solely to address the Court's findings in Ahousaht, DFO has also initiated a process to review and replace the SAP (1999).

The Department has embarked on a collaborative, phased process with First Nations and stakeholders to review and update the policy. This process of updating the Salmon Allocation Policy is being conducted in a manner that is intended to respect Canada's nation-to-nation relationship with Indigenous peoples and engage stakeholders. For more information on the SAP Review process, please visit our website (http://www.pac.dfo-mpo.gc.ca/consultation/smon/sap-prs/index-eng.html).

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, to addressing First Nations aspirations with respect to FSC and commercial access and involvement in management.

The 'Vision for Recreational Fisheries in BC' was approved in January 2010 by DFO, the Sport Fishing Advisory Board (SFAB), and the Province of BC. 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.

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 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 fisheries.

The Sustainable Fisheries Framework is a toolbox of existing and new policies for DFO to sustainably manage Canadian fisheries by conserving fish stocks while supporting the industries that rely on healthy fish populations. The Sustainable Fisheries Framework 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. These new policies include:

- Policy for Managing the Impacts of Fishing on Sensitive Benthic Areas;
- Policy on New Fisheries for Forage Species;
- A Fishery Decision-Making Framework Incorporating the Precautionary Approach;
- Guidance for the Development of Rebuilding Plans under the Precautionary Approach Framework: Growing Stocks out of the Critical Zone;
- Policy on Managing Bycatch; and
- Ecological Risk Assessment Framework (ERAF) for Coldwater Corals and Sponge Dominated Communities.
- Fishery Monitoring Policy

For more information on the Sustainable Fisheries Framework and its policies, please visit: https://www.dfo-mpo.gc.ca/reports-rapports/regs/sff-cpd/overview-cadre-eng.htm

Work is progressing on aligning the management of Pacific Herring with the Sustainable Fisheries Framework.

1.6.2 First Nations' Fisheries

Section 35(1) of the Constitution Act, recognizes and affirms the existing Aboriginal and treaty rights of the Aboriginal peoples in Canada. 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. Treaty Agreements signed between Nations and the Government of Canada also obligate Canada to provide these opportunities.

1.6.3 Fishery Monitoring and Catch Reporting

Robust fishery monitoring information is essential for stock assessment and to effectively implement management measures such as target and bycatch limits, quotas and closed areas. Fishery monitoring information is also needed to support the long-term sustainable use of fish resources for Food, Social, and Ceremonial and other Indigenous fisheries, commercial fisheries, recreational fisheries, and to support market access for Canadian fish products.

Following multi-sectoral consultations, DFO released the national Fishery Monitoring Policy in 2019, replacing the regional "Strategic Framework for Fisheries Monitoring and Catch Reporting in the Pacific Fisheries" (2012). The Fishery Monitoring Policy seeks to provide dependable, timely and accessible fishery information through application of a common set of procedural steps used to establish fishery monitoring requirements across fisheries. Policy principles include respecting Indigenous and Treaty rights, linkage of monitoring requirements to the degree of risk and complexity of fisheries, linkage of monitoring programs to fishery and policy objectives while accounting for cost-effectiveness and practicality of implementation, and shared accountability and responsibility between DFO, Indigenous groups and stakeholders.

To ensure consistent national application of the Fishery Monitoring Policy, further guidance is provided through the "Introduction to the Procedural Steps of Implementing the Fishery Monitoring Policy". Fisheries are first prioritized for assessment through collaboration with Indigenous groups and Stakeholders. Risk and data quality assessments are then conducted on priority stocks and associated fisheries and monitoring programs. Next, monitoring objectives are set in alignment with the Fishery Monitoring Policy, followed by specifying monitoring requirements and then monitoring programs are operationalized. Finally, a review and evaluation of the fishery monitoring programs against the monitoring objectives will be conducted and reported on.

The Fishery Monitoring Policy is part of DFO's Sustainable Fisheries Framework and is available at:

https://www.dfo-mpo.gc.ca/reports-rapports/regs/sff-cpd/fishery-monitoring-surveillance-des-peches-eng.htm

The "Introduction to the Procedural Steps of Implementing the Fishery Monitoring Policy" is available at:

https://www.dfo-mpo.gc.ca/reports-rapports/regs/sff-cpd/fmp-implementation-psp-mise-en-oeuvre-eng.htm

In cases where assessment of monitoring programs identifies a gap between the current and target level of monitoring, discussions will be held between DFO Indigenous groups and stakeholders to identify options to address the monitoring gap, and the feasibility of these options (e.g. cost, technical considerations, etc.).To support Fishery Monitoring Policy principles, a collaborative approach is required.

Where monitoring options are determined to be feasible, the monitoring and reporting regime will be revised to incorporate these options, providing resource managers with sufficient information to meet Fishery Monitoring Policy objectives. Where monitoring options are not feasible, alternative management approaches are required to reduce the risk posed by the fishery. If there is no gap between the current and target level of monitoring, the management approach will not require any change. Current status of the salmon risk assessments can be found in Appendix 8.

1.7 Consultation on 2021/22

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 Alsek, 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 Regional Director General – Pacific, Fisheries and Oceans Canada.

2 STOCK ASSESSMENT, SCIENCE AND TRADITIONAL ECOLOGICAL KNOWLEDGE

2.1 Biological Synopsis

Pacific salmon managed by DFO include five species belonging to the genus Oncorhynchus: 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, south-western Beaufort Sea and surrounding fresh waters. They occur in an estimated 1300 -1500 rivers and streams in BC and Yukon; notably, the Skeena River and Nass River in the north and the Fraser River in the south, collectively accounting for roughly 75% of the total salmon production in Canada.

Each Pacific salmon species has unique physical characteristics, life histories and spawning habits, with further variation observed among populations of each species. Table 1 provides a brief summary of the contrasts in life history characteristics among species of Pacific salmon (from Haig-Brown Kingfisher Creek Restoration Project, 1998-99).

Chinook salmon produce the largest adults of all the Pacific salmon species and typically live the longest (six or more years). Chinook salmon fry may go to sea soon after hatching or, after one to two years in fresh water. Chinook salmon generally mature at age three to seven years, but ”jacks” and occasionally “jills”, defined as two-year-old sexually mature males and females that return to spawn, are also common among some Chinook salmon populations (as well as some Coho and Sockeye salmon populations).

Adult Coho generally return from late summer and early fall. Most populations originate from streams close to the ocean, although some journey as far as 1,500 kilometers inland. In contrast to other Pacific salmon, most Coho fry remain in freshwater for a full year after emerging from the gravel. Their age at maturity is normally three years, though a number of northern stocks may spend two years in freshwater before returning to spawn as four year olds. Similarly, approximately ten percent of Interior Fraser Coho mature as four year olds due to a two-year juvenile freshwater residency period.

Sockeye salmon generally spawn in streams with lake outlets. Young Sockeye typically spend between one and three years in their “nursery lake” before migrating to sea, although there are populations which do not require nursery lakes as part of their life history. Upon entering the ocean, Sockeye salmon move rapidly out of the estuaries and travel thousands of miles into the Gulf of Alaska and the North Pacific to feed. They generally return to their natal spawning stream at ages three to six years.

Chum salmon generally spawn in early winter in lower tributaries along the coast, rarely more than 150 kilometers inland. Fry emerge in the spring and go directly to sea. Chum generally mature in their third, fourth, or fifth year.

Pink salmon live only two years, spending the majority of their life in ocean feeding areas. Pink salmon fry migrate to the sea as soon as they emerge from the gravel. Once mature, adults leave the ocean in the late summer and early fall and usually spawn in streams not fed by lakes, short distances from their ocean-entry point.

The numbers of Pacific salmon returning to BC waters varies greatly from year to year and decade to decade, often with pronounced population cycles. For example, populations of Pink salmon usually have a dominant odd-year or even-year cycle, and a number of Sockeye salmon populations are very abundant every 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 period.

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 BC 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 in First Nations and commercial net fisheries, but are also caught in recreational fisheries.

For more information, refer to the Fisheries and Oceans Canada Pacific Salmon Facts website. https://www.pac.dfo-mpo.gc.ca/index-eng.html

Table 1. Summary of general biological and life history characteristics for five species of Pacific salmon.

Life History Characteristic	Coho *O. kisutch*	Sockeye *O. nerka*	Pink *O. gorbuscha*	Chum *O. keta*	Chinook *O. tsawytscha*
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.	Ocean-type: 60-150 days Stream-type: 1-2 years
Primary rearing habitat	Stream	Lake/stream	Estuary	Estuary	Stream/Ocean
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 months to 4 years	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	Mid-summer to late autumn	July to September	July to October	Spring to fall; some rivers support more than one run.
Number of eggs/female	2,000–3,000	2,000–4,500	1,200–2,000	2,000–3,000	2,000-17,000 (generally 5,000-6,000)
Preferred spawning area	Small streams	Near and in lake systems.	Close to ocean	Above turbulent areas or upwellings	Very broad tolerances

Salmon Life Cycle

The Pacific salmon life-cycle includes periods in fresh water and the marine environment, with varying durations across species and populations. For all species, life begins in freshwater, when eggs deposited into gravel beds (called redds) the fall prior hatch as alevins by mid-winter. After surviving the rest of winter living in the gravel, young fry emerge in spring to reside in freshwater streams and lakes from a few hours (Pink and some Chum salmon populations) up to two years (some Coho and Chinook populations). Most fry then migrate to the sea to become smolts (transitioning to the salt water environment) and spend one to five years in the ocean, often undertaking prolonged (and sometimes distant) ocean-feeding migrations which are thought to be population-specific (Figure 1). (Notable exceptions include some Sockeye salmon that have developed a land-locked form—called kokanee–that do not go to sea). In the ocean, 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, Pacific salmon species attain the following average adult weights: 1 to 3 kg for Pink; 5 to 7 kg for Chum; 3.5 to 7 kg for Coho; 2 to 4 kg for Sockeye; and 6 to 18 kg for Chinook (the largest recorded Chinook was 57.27 kg). As

anadromous species, Pacific salmon migrate back into rivers and streams as adults to spawn (often to the same river and even gravel bed from which they hatched). The return migration to fresh water can occur from spring to fall (timing is species- and/or population-dependent), but spawning generally takes place through the fall and early winter. In general, Sockeye and Chinook travel the farthest upstream to spawn—some as far as 1,500 kilometres. Chum, Coho and Pink usually originate from spawning sites located closer to the ocean. A notable exception is Yukon River Chum salmon that travel 3,200 kilometres to their spawning grounds. Following courtship, spawning females release eggs that are fertilized by a spawning male; the eggs are then buried by the female to start the next generation. Both adults die after spawning. Total life spans range from two years (for Pink salmon populations) up to six or seven years (for some Sockeye and Chinook salmon populations).

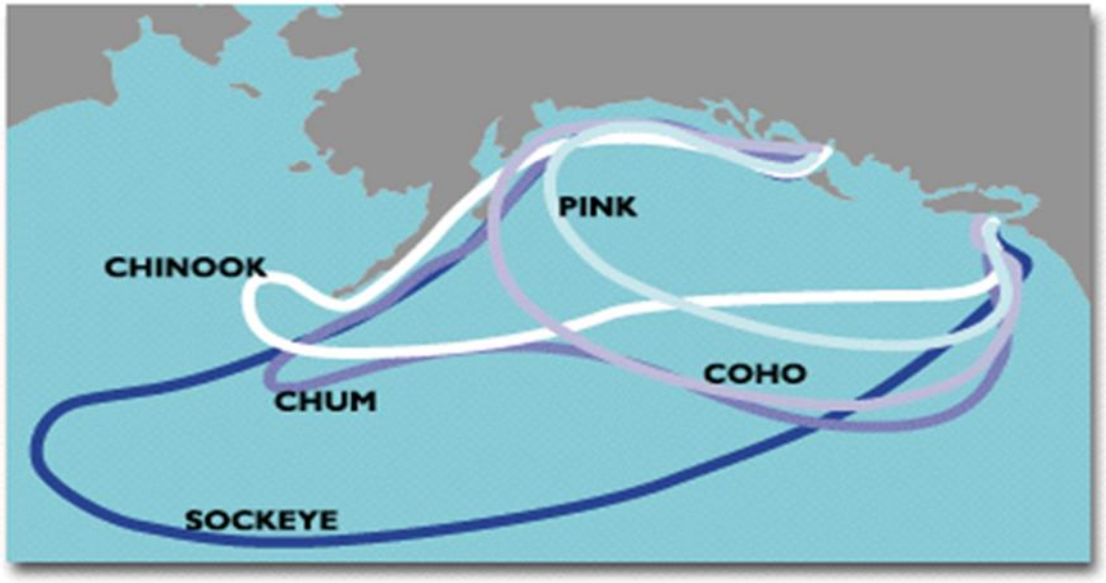

Figure 1. Generalized habitat of British Columbia Pacific salmon species in the North Pacific Ocean.

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 complex food webs in oceanic, estuarine, freshwater and terrestrial ecosystems by providing nutrients every year during their migration to the rivers and lakes to spawn.

DFO is moving away from management on a single species and moving towards an integrated ecosystem approach to science and management. Strategy 3 of the *Wild Salmon Policy* (WSP) (see Section 5.1.1), Inclusion of Ecosystem Values and Monitoring, states the Department's intent to progressively incorporate ecosystem values in salmon management. The main focus of this effort will be on developing ecosystem-related indicators and science-based tools to better understand the pressures on Conservation Units (CUs) of Pacific Salmon and for integrating salmon conservation and other planning

objectives. This strategy will include extraction of relevant information on environmental conditions in marine and freshwater ecosystems, in a risk-based framework.

In 2018, the Department introduced the Wild Salmon Policy Implementation Plan to provide a forward-looking blueprint for continuing to restore and maintain wild Pacific salmon populations and their habitats under the Wild Salmon Policy. The greatest challenge 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 (WSP Strategy 4) that will address the goals of the WSP while addressing the needs of people. Outcomes of these plans will include biological objectives for salmon production from CUs 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.

For strategic planning and successful management of Pacific salmon, it will be essential to link variation in salmon production with changes in climate and their ecosystems. Salmon productivity in the Pacific is clearly sensitive to climate-related changes in stream, 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. Information on these programs is available at:
http://www.pac.dfo-mpo.gc.ca/science/index-eng.html.

These programs include:

- The Strait of Georgia Ecosystem Research Initiative
- Fraser River Environmental Watch
- Monitoring of physical, biological, and chemical freshwater and marine conditions
- Chlorophyll and phytoplankton timing and abundance

The annual State of the Pacific Ocean Report describes changes and trends in atmospheric and oceanic conditions which have the potential to affect Pacific salmon (and other species) populations and informs science-based decision-making and DFO's management of fisheries and marine resources in the Pacific Region. It is available at:
http://www.dfo-mpo.gc.ca/oceans/publications/index-eng.html.

2.2.1 Environmental Conditions Influencing 2021 Salmon Returns

S.C.H. Grant, B.L. MacDonald, D. Lewis, N. Wilson, J.L. Boldt, J. King, T. Ross, R.I. Perry, D.A. Patterson, D.T. Selbie, C.G. Hannah, & M.L. Winston

Global Climate Change Context for Salmon Outlook

The planet is warming (Figure 2). Average land-ocean temperature has risen by 1°C over the last century (IPCC 2018), and the last six years were the warmest on record (NOAA 2020a). Global temperatures are projected to rise 1.5°C to 3.7°C above the 1850-1900 average by the end of this century. We are already approaching the 1.5°C global limit of warming that the IPCC recommends as critical if we are to avoid significant issues related to food, water, and other life support systems on the planet (IPCC 2014, 2018, UNEP 2019). Canada's warming is double the rate of the global average (Bush and Lemmen 2019).

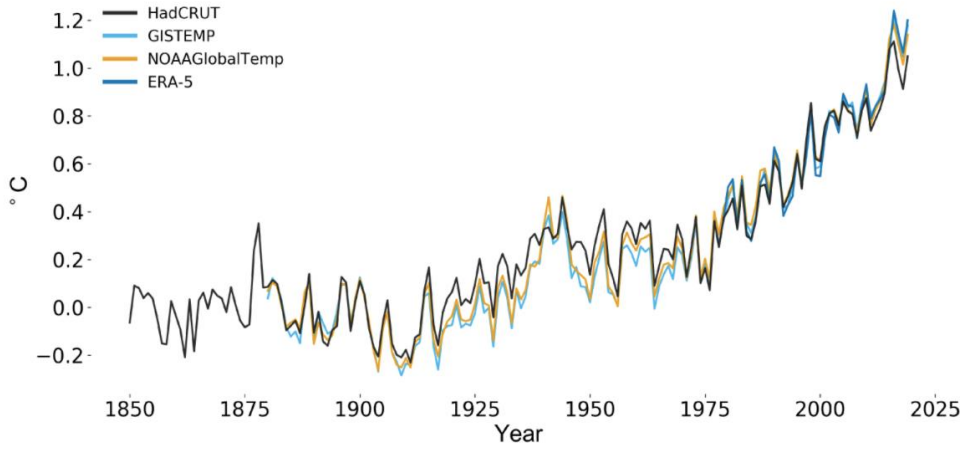

Figure 2. Global annual mean temperature difference from pre-industrial conditions (1850-1900). Canada's temperature increases are double this global rate of warming, typical of countries occupying northern latitudes.

Source: Met Office Hadley Centre and the Climatic Research Unit at the University of East Anglia, UK (HadCRU) presented in World Meteorological Organization, 2020. WMO Statement on the State of Global Climate Change in 2019 (WMO-No. 1248), Figure 1, Page 6).

Pacific salmon productivity and growth are impacted by this global climate shift through changes in their freshwater and marine environments (Holsman et al. 2018, IPBES 2018, Chandler et al. 2018, Boldt et al. 2020, Bush and Lemmen 2019, Grant et al. 2019).

British Columbia warmed by 1.4°C between 1948 to 2016 (White et al. 2016), well above the global average. Correspondingly, river temperatures have been higher. For example, peak summer water temperatures in the Fraser River increased by greater than 1.8 °C in the forty years preceding 2010 (Patterson et al. 2011). Temperatures increasingly are exceeding upper thermal optimums for salmon in summer months, affecting upstream salmon migration, egg incubation and juvenile rearing (D. Patterson, personal communication, 2019) although exact exposures to warm temperatures vary by system and salmon population. Temperature effects on salmon have been compounded in recent years

by early losses of snowpack in snow-dominated hydrological systems, and drought conditions. Increasing frequency of drought in recent years has lowered river flows, potentially blocking access to spawning habitat, stranding salmon, and increasing their exposure to predators.

Canadian North Pacific Ocean coastal sea-surface-temperatures increased linearly by 0.86°C over the past 100 years, resulting in substantial changes to ocean conditions and marine food webs recently (Chandler et al. 2018, Boldt et al. 2020). These changes in the ocean have affected physical and biological processes, most notably shifting zooplankton composition towards poorer quality prey species for salmon in these recent years.

Salmon returning in 2021 will have been exposed to varying freshwater and marine conditions during the years 2016-2020, usually reflected through warmer water temperatures. Pacific salmon exposure to environmental conditions will vary, depending on the unique characteristics of the various ecosystems they use in their lives, and their own life-histories and returning ages. Other factors can also contribute to salmon productivity including habitat alteration from natural and human activities, particularly in freshwater, hatchery contributions, disease, contaminants, predation, competition, and other local environmental conditions.

While we do not have relevant data for all species in all locations, we describe below what is known, and from available data predict that 2021 Canadian Pacific salmon productivity will generally be below average.

Freshwater indicators

Spawning, Egg Incubation, and Juvenile Rearing: 2016-2019

Overview: Canadian Pacific salmon returning in 2021 have lived during four of the five hottest years on record (NOAA 2020a). Overall, climate conditions during the freshwater stages of returning salmon were warm and dry, though some years were more variable than others, and included lengthy winter cold snaps. Spring peak discharge occurred earlier than normal in 2016. High volume freshets in 2017 may have disrupted early season salmon migrations, while 2016 saw extremely low spring flows. River temperatures are not available for most BC/Yukon systems, but in the Fraser River system, where data are available, summer temperatures regularly exceeded upper thermal thresholds for salmon from 2016 to 2019 (DFO 2016, 2017, 2018, 2019).

Effects of Warm Temperatures on Salmon: Salmon have challenges migrating upstream to their spawning grounds when rivers are too warm. Summer water temperatures in the Fraser River from 2016 to 2019 were generally too warm, exceeding salmon upper thermal tolerance levels. Temperatures above 18°C can result in decreased adult salmon swimming performance, and above 20°C can increase adult mortality, adult disease, egg viability, and legacy effects that have negative impacts on juvenile condition (Tierney et al. 2009, Burt et al. 2011, Eliason et al. 2011, Sopinka et al. 2016).

High in-river spawning and incubation temperatures can have population-specific negative effects on fertilization success and embryo survival, affect timing of hatch (Whitney et al. 2014), emergence (Macdonald et al. 1998), and reduce swimming endurance and impair swimming behavior of fry (Burt et al. 2012). For juveniles that rear in freshwater, warmer temperatures can improve juvenile growth rates

when prey are not limiting (Brett 1971, Edmundson & Mazumder 2001), and also increase the length of the growing season in some areas (Schindler et al. 2005). The exposure of a salmon population to these various temperature-related freshwater conditions will vary by system. As temperatures continue to increase from global climate change, the net effect is expected to be negative (Crozier et al. 2019).

Temperature: Air temperature has been warmer than average in BC and the Yukon in recent decades (Figure 3). Warmer temperatures anomalies have been even greater in the Yukon than BC, due to its more northern location (Figure 3; Bush and Lemmen 2019). Spring and summer months have been notably warmer from 2016 to 2019, with the exception of summer 2019 that was more variable and at times below average (PCIC 2020). Summer river temperatures increasingly exceeded the optimal temperature ranges of some salmon populations, particularly adult Sockeye that migrated to their upstream spawning grounds in the Fraser watershed from 2016-2018 (DFO 2016, 2017, 2018, 2019).

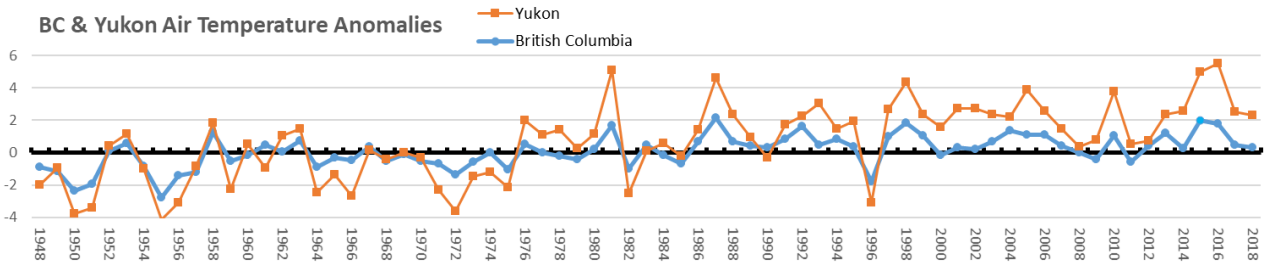

Figure 3. Canadian gridded temperature and precipitation anomalies (CANGRD) from the Government of Canada: https://climate-change.canada.ca/climate-data/#/historical-gridded-data.

Temperatures 2016 to 2018 years coincide with the freshwater residence period of 2021 salmon returns with the exception of Pinks that also used freshwater habitats in 2019. These data are interpolated from adjusted and homogenized climate station data at a 50km resolution. Anomalies represent the departure from a mean reference period (1961-1990). Temperature anomalies are expressed as degree Celsius (C).

Snowpack: Recently, the onset of snowmelt has begun several weeks earlier than normal, as was the case in 2016, 2018 and 2019. In these years, most regions of BC had below-average snowpacks by the second week of May, and in 2016, extremely low snowpacks set record lows relative to the ~ 30-year time series. In 2017, the onset of snowmelt began several weeks later than normal, with extreme hot temperatures resulting in rapid snow melt in the second half of May. By June 2017, snowpacks were anomalously low for this month in northern latitudes, and were closer to average in southern latitudes of BC. Early loss of snowpack reduces the cool water inputs into rivers and lakes from snowmelt in warmer summer months.

https://www2.gov.bc.ca/gov/content/environment/air-land-water/water/drought-flooding-dikes-dams/river-forecast-centre/snow-survey-water-supply-bulletin

Spring freshet timing: Spring freshets in various BC rivers, and ice-off in high latitude or altitude lakes, occurred several weeks earlier than normal in 2016. Warmer temperatures as well as rapid snow melt

contributed to the earlier timing. Freshet was closer to normal in 2017, 2018 and 2019. While the effects of these differences in timing on juvenile salmon survival are unclear, they are indicators of large changes in salmon ecosystems in recent years. https://www2.gov.bc.ca/gov/content/environment/air-land-water/water/drought-flooding-dikes-dams/river-forecast-centre/snow-survey-water-supply-bulletin

Summer drought: Recent years hit records for summer droughts in BC; 2015, 2017, and 2018 were particularly dry years. One of the most significant droughts on record occurred in 2017, during which records were set for the driest season, with almost no rain in southern BC from June to late October, and peak drought occurring in October. In 2018, a heatwave in early spring depleted snowpacks, and lack of precipitation from July to November created extensive dry conditions from July to November. In 2019, a spring heatwave created dry conditions across the province, and drove down streamflow levels. Heavy rains in July began to relieve the drought, and by October, most of the province had returned to normal. Only 2016 was an average year for precipitation.
https://governmentofbc.maps.arcgis.com/apps/MapSeries/index.html?appid=838d533d8062411c820eef50b08f7ebc

Marine indicators

Juvenile Rearing: 2017-2020

Overview: Marine heatwaves continued in the Northeast Pacific Ocean from 2018-2020. Winter mixing from the winter of 2017/2018 to 2019 was generally low, resulting in lower levels of nutrient inputs into surface waters, reduced primary production, and warmer ocean temperatures (Ross and Robert, 2019 and 2020).

These factors resulted in lipid-poor southern zooplankton species, typically centred 1,000 km south of the southern British Columbia coast, dominating lower levels of the salmon food web (see Table 16-2 in Galbraith & Young 2020). Shifts in species composition were observed in waters along the West and North Coast of Vancouver Island, and broadly in the NE Pacific (Boldt et al. 2019). These southern species are considered poorer quality food for the salmon food web. In cooler years, larger lipid-rich, higher-quality boreal copepods typically dominate zooplankton composition from the coast of Oregon up to the Bering Sea and subarctic copepods that inhabit deeper areas of the subarctic Pacific and Bering Sea from North America to Asia (Galbraith & Young 2020).

Effects of Ocean Temperature on Salmon: Salmon metabolic demands increase with temperature. Without a concurrent increase in prey quality or quantity, salmon growth and productivity will decrease under warming conditions (Holsman et al. 2018). In recent years Chinook body weight for a given length declined (Daly et al. 2017). Predation also can intensify in warmer ocean conditions, increasing salmon mortality (Holsman et al. 2012).

Effects of Food Web Changes on Salmon: Warm ocean temperatures may be harmful to salmon through their effect on zooplankton composition, a key pathway potentially linking reduced salmon productivity to temperatures in the Northeast Pacific Ocean (Mackas et al. 2007). Warmer temperatures cause shifts in the distribution of southern prey species northward, to occupy habitats previously too cold for them

(Mackas et al. 2004). Zooplankton communities near the base of the food web in the Northeast Pacific Ocean shifted in warm Blob years towards a greater abundance of lipid-poor southern copepods, as these animals moved northward, and fewer lipid-rich subarctic and boreal copepods (Galbraith and Young 2020, Young et al. 2018). The warmer water species are considered to be poorer quality food for species higher up the food chain, due to their smaller size and lower fat content (Mackas et al. 2007).

Ocean Temperatures: Water temperatures have been warmer than average in the Northeast Pacific Ocean in recent decades, and unusually warm from 2016-2020 (Figure 4). Marine records were set in these waters throughout this period (Leising and Bograd 2020).

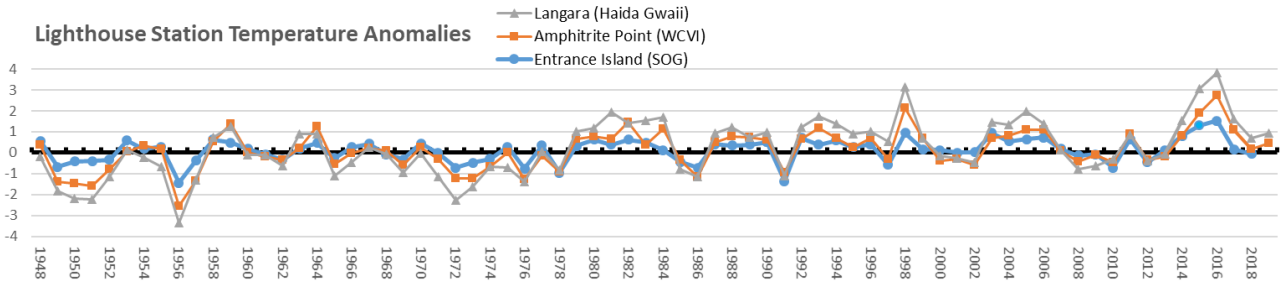

Figure 4. Annual average sea-surface-temperature anomalies from Fisheries & Oceans Canada lighthouse stations: https://www.dfo-mpo.gc.ca/science/data-donnees/lightstations-phares/index-eng.html

The 2018 and 2019 temperatures at the end of the time series coincide with the marine residence period of some Sockeye, Chum and Chinook salmon returning in 2021. Note there are gaps in the 2019 data points for these sites. Anomalies represent the departure from a mean reference period (1961-1990). Temperature anomalies are expressed as degree Celsius (C).

In the years prior to the marine residency of salmon returning in 2021, the notable warm Blob heat wave in the Northeast Pacific Ocean was present from the latter half of 2013 to the fall of 2016 (Bond et al. 2015), occurring in the years prior to the ocean entry timing of most of the salmon that will return in 2021. This marine heat wave was characterized by sea-surface-temperatures (SST) that were 3-5°C above seasonal averages, and extended down to depths of 100 m (Bond et al. 2015). A strong El Niño event occurred in late 2015 to early 2016, further increasing temperatures during this period to the hottest observed throughout the 137-year time-series.

There was a return to near-average temperatures in 2017 and 2018, likely due to the cooling effect of the La Niña that persisted until the second half of 2018 (Ross and Robert 2017 and 2018). In 2017 warmer than normal temperatures persisted below 100m, then returned near normal in 2018 (Ross and Robert 2017 and 2018). New heatwaves were observed in the late summer and fall of 2018 through 2020 (Hannah et al. 2019, Leising & Bograd 2020, Ross and Robert 2020). The 2019 MHW was the third largest and longest on record, and warmer than normal subsurface temperatures were observed once more at about 100m. The 2020 marine heatwave is still present based on data available to 12 December, 2020 (Leising & Bograd 2020). At its maximum size, it was the 2nd largest on record.

Physical oceanography: Normal winter mixing conditions occurred in the winter-spring of 2016/17, suggesting there would have been a normal nutrient supply in the NE Pacific during this period (Ross

2017, Ross & Robert 2018). However, upwelling of nutrient rich water in the spring 2017 was average to below average, and late seasonally, resulting in average to below average productivity (Hourston and Thomson 2017). The combined timing and magnitude of upwelling nutrient rich waters in 2018 show a mixed signal for upwelling-based productivity (Hourston & Thomson 2018). Winter mixing in subsequent years was weak during the winter (Ross & Robert 2018), likely also reducing the nutrient supply in 2019 and 2020 (Ross and Robert 2020).

Phytoplankton: Phytoplankton composition and biomass off the west coast were largely similar to pre-Blob conditions in both 2017, 2018 and 2019 (Batten 2018, 2019, Peña and Nemcek 2018, 2019, Galbraith and Young 2020).

Zooplankton: The zooplankton community continued to exhibit characteristics consistent with warmer ocean temperatures from 2016 to 2019, characterized by high abundances of gelatinous taxa and low abundances of crustaceans (Batten 2018, 2019, Galbraith & Young 2018, 2019, 2020) . Among those crustaceans, higher than average abundance of southern, lipid-poor, copepod species, and low abundance of lipid-rich, subarctic copepods were found in samples (Galbraith and Young 2018, 2019, 2020). However, the trend of decreasing subarctic copepods slowed in 2018, while the biomass of boreal copepods increased (Galbraith and Young 2019), indicating improvements to the quality of food near the base of the salmon food web. In 2019 boreal/subarctic zooplankton community were much like 2017-18, but still not average (Galbraith and Young 2020).

Summary

Quantitative models predicting salmon returns are becoming increasingly uncertain, since current conditions are becoming exceptional due to climate change. Freshwater and marine temperatures have been anomalously warm in recent years, making predicting future returns using past data a challenge.

Environmental conditions that can negatively affect salmon varied from 2016-2020, depending on latitude and year, but generally included:

- Higher river, lake, and ocean temperatures
- Earlier snowmelt in snow-dominated freshwater habitats
- Summer drought
- Ocean food web changes, with higher proportions of poorer quality zooplankton at lower trophic levels

The effect of these climate-related challenges on 2021 returning salmon populations will depend on specific conditions encountered and their life-histories, with more southern BC populations and species that spend more time in freshwater showing the most impact. Environmental conditions will interact with landscape changes in freshwater that have occurred from natural events like forest fires or mountain pine beetle kills, and human activities, such as logging, agriculture, and development.

Overall, below-average salmon returns are predicted for 2021 as a result of environmental conditions between 2016-2020, though some exceptions in abundance will occur.

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2.3 Indigenous Knowledge Systems (IKS)

As defined herein, Indigenous Knowledge Systems (IKS) are cumulative and gathered over generations by First Nation, Métis or Inuit individuals and communities, which encompass regional, local and spiritual connections to ecosystems and all forms of plant and animal life. Indigenous Knowledge (IK) has also been referred to, at times, as Aboriginal Traditional Knowledge (ATK) and Traditional Ecological Knowledge (TEK). IK is holistic and viewed in terms of the interconnectedness of whole systems.

Indigenous Knowledge is needed to inform and fill knowledge gaps related to the health of salmon stocks and to aid decision making related to development and resource use. The Government of Canada and the scientific community acknowledge the need to access and incorporate IK in meaningful and respectful ways. 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.

The Wild Salmon Policy (2005) and Wild Salmon Policy Implementation Plan (2018) both acknowledge the importance of integrating IKS and Traditional Ecological Knowledge (TEK) into the strategic planning process. The Department is exploring best practices to develop an approach for incorporating IKS into WSP integrated planning. The Department may identify potential partnerships with First Nations organizations to develop an approach for integrating IKS into WSP, particularly in planning initiatives.

The Species at Risk Act 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 Interior Fraser River Coho and Cultus Lake Sockeye salmon species recovery strategies. The Department utilized Indigenous knowledge about traditional fisheries, and the historical distribution and relative abundance of salmon in local watersheds in the selection of index streams for escapement monitoring of Interior Fraser Coho (Decker and Irvine 2013), and also for determining historical abundance ranges of Kitwanga and Morice Lake Sockeye.

In 2019, the Fisheries Act was amended to include provisions for the where the Minister may, or shall consider provided Indigenous Knowledge in making decisions pertaining to fisheries, fish and fish habitat, as well as provisions for the additional protection of that knowledge when shared in confidence. The Department is working to develop a process to improve how DFO receives and provides the knowledge to the Minister for their consideration. This will be an iterative process done in collaboration with First Nations, Indigenous groups and knowledge holders, to ensure the protection of the knowledge provided.

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 sound scientific information to inform activities relating to the conservation and management of salmon resources. Stock assessment

describes the past and present state of salmon stocks and may provide forecasts of future states. Stock assessment programs contribute information to the fisheries management process, from the initial setting of objectives (and policies) to providing expert advice in the implementation of management plans. Stock assessment information also supports First Nations and Treaty obligations, integrated ocean management planning, development of marine 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, as well as biological and population processes such as growth, reproduction, recruitment and mortality. As DFO moves to implementation of an ecosystem approach, populations must be considered in a broader context and all activities impacting status, not just fishing, must be considered.

In the Pacific Region, salmon stock assessment advice is provided through the Salmon Assessment Section within each Area (Yukon and Transboundary, North Coast, South Coast and Fraser and Interior Area), in conjunction with core Salmon Stock Assessment staff in the Stock Assessment and Research Division of Science Branch. External partners and clients play an increasing role in delivery of stock assessment activities. Some First Nations, recreational and commercial harvesters contribute directly through data collection and reporting. First Nations and community groups conduct field data collection projects. Universities and non-government organizations (NGOs) are active in analytical and peer review processes. Stock assessment staff collaborate with other regional, national and international organizations 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 Salmon Stock Assessment Framework is shaped by the WSP Strategy 1 which specifies requirements for standardized monitoring, status & 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 just over 450 discreet Conservation Units.

DFO has developed criteria to assess CUs and identified a range of metrics for setting upper and lower CU benchmarks of status, dependent on data quality and availability (Holt et al. 2009; Holt et al. 2018). For each metric, lower and upper benchmarks will delimit three status zones of a CU. Management actions will be determined based on a CUs biological status relative to these benchmarks. Management will be focused on conservation measures for CUs in the red zone (i.e. below the lower benchmark), shift to cautionary management in the amber zone (between the lower and upper benchmark), and emphasizes sustainable use in the green zone (i.e., above the upper benchmark).

A key requirement of the WSP is ongoing monitoring and assessment of the status of 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, assessment monitoring plans are updated by the Salmon Assessment Coordinating Committee (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.

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 required on an ongoing 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 (e.g., 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.

2.5 Science Information Sources

The Canadian Science Advisory Secretariat (CSAS) serves as the primary departmental forum for peer review and evaluation of scientific research and literature, including TEK, relating to 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.

Additional information about CSAS, the peer review process and meeting schedule, as well as reports on the status of salmon, environmental and ecosystem overviews prior to 2014, and existing research documents are available from CSAS web site:
http://www.dfo-mpo.gc.ca/csas-sccs/index-eng.htm

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 (Grant et al. 2011), initial status assessed in 2011 (Grant and Pestal 2013) and updated in June 2017 (DFO 2018a) through CSAS Regional Peer Review (RPR) processes. DFO completed a CSAS RPR process of WSP benchmarks and status assessment for Southern BC Chinook in February 2014 (DFO 2016). An assessment of WSP benchmarks and status assessment for Interior Fraser Coho was completed in November 2014 (DFO 2015a). Additionally, results are available from review of a habitat-based approach to determine benchmarks for Strait of Georgia and Lower Fraser River Coho Conservation Units (DFO 2015b). Finally, a process for evaluating biological benchmarks for data-limited populations (Conservation Units) of Pacific salmon with a focus on Chum Salmon in Southern BC was reviewed in a July 12-13, 2017 CSAS RPR process (Holt et al. 2018).

Other recent research projects and Science advice processes include:

estimates of a biologically-based spawning goal and biological benchmarks for the Canadian-origin Taku River Coho stock aggregate (DFO 2015c);

an evaluation and update of biologically-based targets for enhanced contributions to Chinook populations (DFO 2018b);

review of a proposed framework for determination of Pacific Salmon Commission reference points for status determination and associated allowable exploitation rates for select Canadian southern Coho Salmon management units (DFO 2018c);

Science information to support Chinook Salmon management measures in 2018 (DFO 2018d); and

development of a framework for reviewing and approving revisions to Wild Salmon Policy Conservation Units (October 2018; http://www.dfo-mpo.gc.ca/csas-sccs/Schedule-Horraire/2018/10_25-26-eng.html).

Annually, DFO provides a preliminary qualitative outlook of status for salmon management, the Salmon Outlook, for planning purposes prior to formal forecasts of abundance. The Preliminary Salmon Outlook for the current year is available on the DFO website:
http://www.pac.dfo-mpo.gc.ca/fm-gp/species-especes/salmon-saumon/index-eng.html.
Formal salmon abundance forecasts are generally completed by April.

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 development of a 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, Georgia Strait Mainland, East Vancouver Island 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 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 their 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. 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/rp-pr/accasp-psaccma/index-eng.html

State of Salmon Program (SOS): this program integrates information on Pacific salmon (abundance, productivity, size, fecundity, run timing, etc.) and their freshwater and marine ecosystems (water temperatures, river discharge, ocean upwelling, etc.) to understand the state of Pacific salmon, and the factors that contribute to these states. Collaboration across DFO Science, DFO Areas, and other Sectors is foundational to this program.

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.

On-going research related to improving forecasting ability for salmon stocks and CUs is being conducted by DFO Stock Assessment and the Fisheries & Oceanography Working Group. The annual State of the Pacific Ocean Reports was published by the Canadian Science Advisory Secretariat (CSAS) until 2012. Recent reports are available at: http://www.dfo-mpo.gc.ca/oceans/publications/index-eng.html.

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. http://www.pac.dfo-mpo.gc.ca/science/habitat/frw-rfo/index-eng.html

DFO scientists in collaboration with other organizations including the North Pacific Anadromous Fisheries Commission (NPAFC), the Pacific Salmon Commission (PSC), and the Pacific Salmon Foundation (PSF) are studying salmon production, distribution and survival in the North Pacific Ocean including the Salish Sea, and developing leading indicators of salmon returns.

Annual juvenile salmon surveys monitor the distribution, migration, and survival of salmon in their freshwater and early marine life history.

On-going collaborative research between DFO and 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)

Research carried out in the freshwater and marine environments is being considered to provide a biological context as Supplementary Information for the forecast of Fraser River Sockeye. http://www.dfo-mpo.gc.ca/csas-sccs/Publications/ScR-RS/2016/2016_047-eng.html

On-going development of quantitative tools to inform rebuilding plans for depleted (red-status) CUs given climate/oceanographic change and variability and constraints from mixed-CU fisheries.

Added Reference:

Holt, C.A., Davis, B, Dobson, D., Godbout, L., Luedke, W., Tadey, J., Van Will, P. Evaluating Benchmarks of Biological Status for Data-limited Populations (Conservation Units) of Pacific Salmon, Focusing on Chum Salmon in Southern BC. Can. Sci. Advis. Sec. Res. Doc. 2018/11

3 Stewardship, Co-Management, Consultation and Advisory Boards

Stewardship refers to the care, supervision or management of something, especially the careful and responsible management of something entrusted to one's care.[1]

[1]As defined in the Atlantic Fisheries Policy Review (AFPR): http://www.dfo-mpo.gc.ca/fm-gp/policies-politiques/afpr-rppa/framework-cadre-eng.htm

3.1 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). The PST includes several "fishing chapters" contained in Annex IV which set out the specific conservation and harvest sharing (allocation) arrangements for migratory salmon stocks subject to the Treaty. These chapters are critical to the functioning of the Treaty and are periodically renegotiated by the Parties, normally on a 10-year cycle. The bilateral Pacific Salmon Commission (PSC), established under the Pacific Salmon Treaty, consists of four Commissioners and four Alternates from each country, supported by several bilateral panels and technical committees. The PSC provides regulatory and policy advice as well as recommendations to the Governments of Canada and the United States (U.S.) with respect to interception salmon fisheries. Under the terms of the Treaty, 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 support from the Pacific Salmon Commission Secretariat staff.

Coded-wire tag (CWT) data are essential to the management of Chinook and Coho salmon stocks under the Pacific Salmon Treaty. On August 13, 1985, the United States and Canada 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 recognize 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.

In August 2018, the PSC recommended new provisions, under Annex IV of the PST, to the Governments of Canada and the U.S. for review and ratification. Both governments agreed to the provisional application of the new agreements as of January 1, 2019 while the ratification process was completed. Effective May 3, 2019, the Annex IV amendments came fully into force through the exchange of diplomatic notes between Canada and the U.S., and will remain in place for 10 years.

The renewed chapters are: **Chapter 1 (Transboundary Rivers)**, Chapter 2 (Northern British Columbia and Southeast Alaska), Chapter 3 (Chinook), Chapter 5 (Coho) and Chapter 6 (Chum). Chapter 7 (General Obligations) does not have an expiry date; however, the PSC recommended minor updates to "Attachment E" containing general provisions on salmon habitat.

Chapter 4 (Fraser River Sockeye and Pink) expired on December 31, 2019. The negotiating team, made up of Canadian and U.S. representatives on the PSC's Fraser River Panel, met regularly between November 2018 and February 2019 to discuss proposed amendments to Chapter 4. In February 2019, agreement-in-principle was reached and the proposed amendments were referred to the Governments of Canada and the U.S. for review and ratification. Both governments agreed to the provisional application of the amendments as of January 1, 2020 while the ratification process is completed. The new amendments are expected to come into force in Spring 2021 and will remain in place for 9 years, bringing Chapter 4 into alignment with the five other fishing Chapters under the PST.

In addition to direct involvement and representation in the PSC process, the Department consulted extensively with First Nations and stakeholders leading up to, and throughout, the negotiations. Moving forward, DFO will continue to engage in dialogue on the structure and implementation of Chapter 1.

Key elements from the renewed chapters, under Annex IV, are identified, below:

Chapter 1 (Transboundary Rivers): Covers in-river and terminal (marine) fisheries in northwestern British Columbia and southeast Alaska "transboundary" rivers. Specifically the Chapter defines the conservation, harvest sharing, management and enhancement arrangements for Canadian-origin Alsek River Chinook and Sockeye salmon as well as Stikine and Taku River Chinook, Sockeye and Coho salmon stocks. 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)

Chapter 2 (Northern Boundary): Covers marine fisheries for sockeye, pink and chum stocks in Northern B.C. and Southeast Alaska, including the Nass and Skeena rivers. The new chapter includes a joint technical review of escapement goals for Nass River and Skeena River sockeye, new management measures in Alaska to reduce harvest impacts on Canadian Nass and Skeena sockeye in years of low abundance, a joint technical review of the impacts of the Alaskan District 4 pink salmon fishery on Skeena and Nass sockeye abundances, and a joint review of the effectiveness of the new chapter after five years (to inform a decision by the Commission as to whether further changes may be required for

the balance of the regime). This chapter along with Chapter 3 (Chinook) and Chapter 5 (Coho), govern fisheries covered in the North Coast Salmon Integrated Fisheries Management Plan.

Chapter 3 (Chinook salmon): Provides a framework for bilateral conservation and coordination of chinook fisheries coastwide from Oregon to Alaska. In response to conservation concerns for chinook in both countries, several changes were made to the chapter, including targeted harvest reductions in both Canadian and U.S. fisheries, adoption of a new metric to manage and evaluate performance in specific Canadian and U.S. individual stock-based management or "inside" fisheries (the calendar year exploitation rate), a renewed commitment (and investment) in the coastwide stock assessment program for chinook (including the Coded-Wire Tag program), a 10-year Catch and Escapement Indicator Improvement program to provide more robust and timely information for managing chinook, and enhanced fishery monitoring.

The harvest reductions are:

For the U.S., up to a 7.5 per cent reduction in the Southeast Alaska aggregate abundance-based management or "outside, mixed-stock" fishery, as well as reductions of up to 15 per cent from 2009-2015 harvest levels for individual stocks in Washington and Oregon individual stock-based management fisheries.

For Canada, up to a 12.5 per cent reduction in the West Coast Vancouver Island aggregate abundance-based management fishery and reductions of up to 12.5 per cent from 2009-2015 levels in Canadian individual stock-based management fisheries.

Chapter 4 (Fraser River Sockeye and Pink Salmon): The 2019 amendments are largely operational in nature designed to ensure the long-term sustainability of Fraser River Sockeye and Pink salmon stocks while supporting an economically viable fishing industry on both sides of the Canada-U.S. border. Key adjustments to the Chapter allow for the Panel to make management decisions considering sub-components of the four Fraser River Sockeye management groups, which provides greater flexibility to address stock-specific conservation or harvest objectives; the maintenance of Canada's share of Fraser River Sockeye and Pink salmon; and the ability of the Panel to consider both the Sockeye and Pink salmon Total Allowable Catch throughout the season for best use of the fisheries resource. Other changes include new language that enables Canada to identify concerns, if they arise, regarding incidental catches of Fraser River Sockeye in Alaska as well as updates to how the Aboriginal Fisheries Exemption is distributed across the Sockeye management groups. 2019 was the final year under the previous 2014 arrangement with changes to Chapter 4 language provisionally applied starting January 1, 2020 until formal ratification is completed by the countries (expected Spring 2021).

Chapter 5 (Coho Salmon, Southern BC and Washington State): Addresses two geographically defined groupings of Coho salmon stocks originating from British Columbia, Washington and Oregon. For northern-origin stocks (those originating from waters between Cape Caution (in north-central British Columbia) and Cape Suckling (in southeast Alaska), the Northern Panel's Technical Committee (Coho sub-Committee) has been tasked with developing a state of knowledge report which describes the current status and recent trends in spawning, production and harvest. This technical report is to be

presented to the Northern Panel and Commissioners in advance of the 2020 fishing season to inform the Parties with respect to future management actions or recommended conservation measures. For southern-origin stocks (those origination from Treaty-area waters south of Cape Caution), proposed changes to the chapter include the amalgamation of two southern Canadian Coho management units into a single Strait of Georgia management unit, commitment to develop a new status-based management approach for southern Canadian management units (i.e., classification of Canadian Coho management units as low, moderate or abundant), and improvements in the stock assessment used to determine the status of southern-origin Coho stocks subject to the Treaty.

Chapter 6 (Chum Salmon, Southern BC and Washington State): Covers Chum salmon stocks in Southern B.C. and Washington. The revised chapter includes new management thresholds ("break points") for Canadian (Fraser River) Chum stocks, lower U.S. catch ceilings in years of moderate abundance for Fraser Chum with higher catch ceilings in years of high abundance, and new requirements related to stock assessment and escapement monitoring to inform decision-making.

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 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.

All management regimes under Annex IV continue to be implemented by Fisheries and Oceans Canada and U.S. agencies for the 2021 season.

3.2 Shared Stewardship

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), Pacific Fisheries Reform, Aboriginal Aquatic Resource and Oceans Management (AAROM) Program, and the Aboriginal Fisheries Strategy (AFS).

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

3.3 Salmonid Enhancement Program

The Salmonid Enhancement Program (SEP) produces Pacific salmon at enhancement facilities, restores habitat, and undertakes projects that include public participation by local communities and First Nations in fisheries and watershed stewardship activities. Enhanced salmon enable economic, social and cultural harvest opportunities for commercial, recreational and First Nations harvesters, support vulnerable stock rebuilding, and contribute to Canada's stock assessment commitments under the Pacific Salmon Treaty with the United States. Projects with community partners include stewardship activities and the development of integrated local and area watershed plans. SEP also support school education and public awareness projects.

With respect to projects that undertake fish culture, about 150 projects release fish annually from sites throughout British Columbia and the Yukon. Projects range in size from spawning channels releasing nearly 100 million juveniles annually to school classroom incubators releasing fewer than one hundred juveniles. SEP enhances Chinook, Coho, Chum, Pink, and Sockeye salmon, as well as small numbers of steelhead and cutthroat trout. Project types include hatcheries, fishways, spawning and rearing channels, habitat improvements, flow control works, lake fertilization, and small classroom incubators. Projects are operated by SEP staff or contracted with some SEP support to First Nations and community and volunteer groups.

The program is delivered through three components:

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

- SEP Planning and Assessment (SPA) that reviews data, analyses returns and incorporates these details into a draft production planning along with major operation facility information.

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. Production planning meetings involve SEP, Science, and Fisheries Management, and external consultation and involvement is achieved through the IFMP process. The production planning cycle establishes maximum numbers of eggs to be collected and juveniles to be released for each enhanced system, 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. SEP priorities are established annually based on the national and regional priorities using a consistent approach across the program.

The information available at the link below addresses production from major DFO Operations (OPS) facilities, contracted Community Economic Development Program hatcheries (CEDP), Public Involvement Projects (Public, and Designated Public Involvement (PIP, and DPI) operated by volunteers, and Aboriginal Fisheries Strategy (AFS). There are two datasets available at the link below:

Post-Season Production from the 2019 brood year (i.e. 2020 releases, and #'s on hand for 2021 release)

Draft SEP Production Plan, which include proposed targets for the 2021 brood year. The Production Plan dataset is preliminary, and the final version will be available upon the final publication of the IFMP in July 2021.

http://www.pac.dfo-mpo.gc.ca/sep-pmvs/projects-projets/ifmp-pgip-eng.html

Significant production adjustment proposals for 2021 are incorporated into the *Enhancement Information* in each Species Overview of APPENDIX 1, APPENDIX 2, and APPENDIX 3.

3.4 Rebuilding Plans

Amendments to the *Fisheries Act* (Bill C-68) were passed into legislation in 2019 and include new authorities to amend the *Fishery (General) Regulations* and requirements to maintain major fish stocks at sustainable levels, and develop and implement rebuilding plans for stocks that have declined to their critical zone. The proposed regulatory amendments draw upon the 2013 Guidance for the development of rebuilding plans under the Precautionary Approach Framework: Growing stocks out of the critical zone.

Information on the regulatory proposal regarding fish stocks and rebuilding plans is available at: http://www.dfo-mpo.gc.ca/fisheries-peches/consultation/consult-maj-pri-eng.html

The regulatory proposal was consulted on from December 2018 to March 2019 with pre-publication of the regulation in Canada Gazette Part 1 on January 2, 2021 to February 2, 2021 to provide further opportunity for feedback on the proposed regulation. We anticipate that the regulation will come into effect in spring 2021.

WCVI Chinook, Haida Gwaii Herring and Bocaccio, Inside Yelloweye and Outside Yelloweye Rockfish are major stocks proposed to be prescribed in the regulatory amendment (Proposed list of major stocks for Batch 1), but as a result of the Commissioner of the Environment and Sustainable Development report, Sustaining Canada's Major Fish Stocks—Fisheries and Oceans Canada, DFO has already committed to developing rebuilding plans for these stocks by the end of the 2020/21 fiscal year. Rebuilding plans for Bocaccio, Inside and Outside Yelloweye Rockfish and Haida Gwaii Herring have been completed, or are anticipated to be completed by the end of 2020/21; but a delay in the completion of the WCVI Chinook rebuilding plan is anticipated.

3.5 Consultation

In Pacific Region, DFO consults with and engages First Nations and other interests through a wide range of processes. 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.

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). In addition to the legal duty, consultation supports good governance, sound policy and effective decision making.

In addition, Canada is committed to implementing the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) and recognizes the right of Indigenous peoples to participate in decision-making in matters that affect their rights through their own representative institutions and the need to consult and cooperate in good faith with the aim of securing their free, prior, and informed consent.

Consultation and engagement with First Nations takes place at a number of levels and through a variety of processes. 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 the 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 Treaty Nations, consistent with the Cabinet Directive on the Federal Approach to Modern Treaty Implementation, DFO consults on a broad suite of fish and fishery related items, including shared stewardship arrangements, through formal processes such as Joint Fisheries Committees

3.6 Co-Management Agreements

3.6.1 Fraser Salmon Collaborative Management Agreement

The Fraser Salmon Collaborative Management Agreement (FSCMA; Agreement) was signed in July 2019 by Fisheries and Oceans Canada (DFO) and the Fraser Salmon Management Council (FSMC) (the Parties). The Agreement is the culmination of decades of foundational work, and sets out a collaborative

governance structure between the Parties to support the collaborative management of Fraser River salmon (see Figure 5).

The FSMC contains 76 signatory First Nations from the Fraser watershed and marine approach areas with access to Fraser salmon. As part of Agreement implementation, the Fraser River Aboriginal Fisheries Secretariat (FRAFS) has ceased its operations, and the expectation is that much of the support provided to First Nations by FRAFS in previous years will continue to be provided through the FSMC.

While the Agreement provides a structure for discussions between the Parties regarding Fraser River salmon, it does not replace or alter DFO's obligations and commitments with respect to bilateral consultation (particularly with First Nations non-signatory to the Agreement), nor does it affect Aboriginal or Treaty rights of any Indigenous peoples.

Since the Agreement was signed in 2019, the Parties have been working to populate positions within the governance structures identified in the Agreement and to develop a work plan. The annual work plan for 2021-2022 is in the final stages of approval by the Parties, and several items of work have been identified, including: FSC access and allocation for Fraser salmon, Fraser River Chum management, test fishing, Sockeye enhancement, Fraser River Sockeye management (including pink interactions), Fisheries Related Incidental Mortality (FRIM) rates for Fraser River Chinook, Fraser River Chinook management, Chinook rebuilding and recovery, implementation work for the FSMCA governance process, and development of a joint communications plan.

The Fraser Salmon Management Board (FSMB) has also jointly identified an Independent Chair, a neutral third party to help guide the work of the Parties through facilitating and mediating discussions, identifying options for dispute resolution, and developing meeting agendas and other supporting documents.

More information on the FSMCA can be found at https://frasersalmon.ca/.

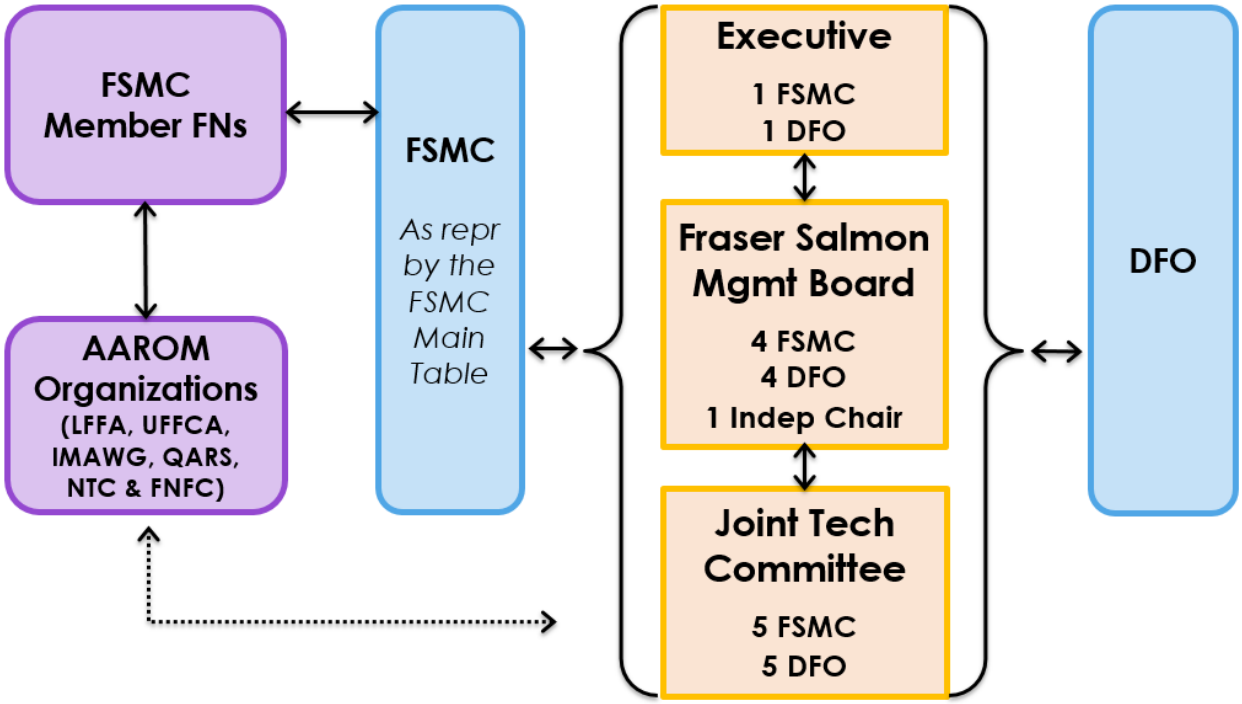

Figure 5. Governance structures established within the Fraser Salmon Collaborative Management Agreement (FSCMA).

3.7 Advisory Committees and Boards

3.7.1 Salmon Coordinating Committee

The First Nations Salmon Coordinating Committee (SCC) facilitates dialogue between First Nations and DFO. First Nations representatives from 13 geographical areas within the Pacific Region meet with DFO resource management to discuss priority issues among BC First Nations as they relate to salmon. SCC priorities include advancing Indigenous fisheries; building First Nations capacity and fisheries governance; and advising on salmon conservation and rebuilding, and the sustainability of pacific salmon fisheries concerns.

3.7.2 Integrated Harvest Planning Committee

At a broad, Province-wide level, the Integrated Harvest Planning Committee (IHPC) was developed to bring together First Nations, commercial and recreational harvesters, and environmental interests to review and provide input on the IFMP, as well as co-ordinate 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 the IFMP.

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 consults with the Pacific Marine

Conservation Caucus, an umbrella group representing nine core environment groups (http://www.mccpacific.org/).

3.7.3 Commercial Salmon Advisory Board

The Commercial Salmon Advisory Board (CSAB) consists of two representatives from each Area Harvest Committee (AHC A-H), as well as representatives from the Native Brotherhood of BC (2), the processing sector (2), and the UFAWU (2). The CSAB serves as the consultative body on issues that affect commercial salmon fisheries. Two representatives from each area are nominated to sit on the DFO Integrated Harvest Planning Committee. The current CSAB members list is available at: https://www.pac.dfo-mpo.gc.ca/consultation/smon/csab-ccpcs/membs-eng.html

3.7.3.1 Area Harvest Committees

Area Harvest Committees (AHC) consist of representatives nominated and elected by salmon licence eligibility holders. Elections are normally held every year where half of the board will be up for re-election. AHCs provide pre-season and in-season advice and recommendations on fishing related matters to DFO as appropriate to the area and gear type. Two representatives from the AHC are elected to represent the interests of the specific area and gear type on the CSAB. The current AHC members list is available at: https://www.pac.dfo-mpo.gc.ca/consultation/smon/csab-ccpcs/ahc-ces-membs-eng.html

3.7.4 Sport Fishing Advisory Board

The Sport Fishing Advisory Board has been an advisory body to Fisheries and Oceans Canada (DFO) on recreational issues since 1964. The Board's role is to provide advice and make recommendations to DFO on matters affecting tidal waters fisheries and non-tidal anadromous fisheries and in tidal waters on matters affecting all species and forms of recreational fishing. A terms of reference for this board is available at:

https://www.pac.dfo-mpo.gc.ca/consultation/smon/sfab-ccps/index-eng.html

3.8 Whale, Turtle and Basking Shark Incident and Sight reports

3.8.1 Incident Reporting

Marine Mammal Incident Reporting Hotline

The Department is responsible for assisting marine mammals and sea turtles in distress. If your vessel strikes a whale, or if you observe an entangled, sick, injured, distressed, or dead marine mammal in B.C. waters, please contact the B.C. Marine Mammal Response Network Incident Reporting Hotline immediately:

1-800-465-4336 OR VHF CHANNEL 16

What to report:

- Your name and contact information
- Date and time of incident
- Location: Latitude/Longitude coordinates, landmarks
- Species
- Animal alive/dead (animal condition)
- Nature of injury and supporting details (if possible)
- Pictures/Video taken

3.8.2 Sighting Reporting

The Department appreciates your assistance in tracking the sightings of live cetaceans (whales, dolphins and porpoises), sea turtles and Basking Sharks. While there are many whale species found in Pacific Canadian waters, sightings of Basking Shark and Leatherback Sea Turtles are infrequent. The collection of sighting data is useful to scientists in determining population size and species distribution and aids in recovery efforts under the *Species at Risk Act* (SARA).

To report whale or turtle sightings, contact the BC Cetacean Sightings Network:

Toll free: 1.866.I.SAW.ONE (1-866-472-9663)

Email: sightings@ocean.org

Website: http://wildwhales.org/

App: WhaleReport

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

Toll free: 1-877-50-SHARK (1-877-507-4275)

Email: BaskingShark@dfo-mpo.gc.ca,

Website: www.pac.dfo-mpo.gc.ca/SharkSightings

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 and Yukon. 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 recreational fishery, and commercial fishery (harvest, processing and

export activity including that generated by the Aboriginal communal commercial fishery). This section does not provide measures of economic value (i.e. consumer and producer surplus), rather it focuses on activity. 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

Fisheries and Oceans Canada recognizes that the following section does not reflect Indigenous perspectives on the economic, social and cultural importance of salmon fisheries to First Nations, and is considering a process for the inclusion of Indigenous perspectives for future Integrated Fisheries Management Plans for salmon.

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.

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 has also indicated the duty to consult with Aboriginal Peoples when their fishing rights might be affected.

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:

- To provide a framework for the management of fishing by Aboriginal groups for food, social and ceremonial purposes.
- To provide Aboriginal groups with opportunities and increased capacity to participate in the management of fisheries, thereby improving conservation, management and enhancement of the resource.
- To contribute to the economic self-sufficiency of Aboriginal communities.
- To provide a foundation for the development of self-government agreements and treaties.

In the region in 2020-21, there were approximately 85 AFS agreements. AFS fisheries agreements may identify the amounts of species including salmon that may be fished for FSC purposes, terms and conditions that will be included in the communal fishing licence and fisheries management arrangements including, but not limited to, FSC fishery arrangements in British Columbia and Yukon.

Fisheries chapters in modern treaties may articulate a treaty fishing right for domestic purposes that are protected under Section 35 of the *Constitution Act*, 1982. Negotiated through a side agreement, some

modern treaty First Nations have been provided commercial access either through the general commercial fishery or a Harvest Agreement outside of the constitutionally protected treaty.

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.[1]

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*.

4.2 Recreational Fishery

Recreational fishing for salmon occurs to provide food for personal use, as a leisure activity, or as a combination of the two. These activities provide non-quantifiable benefits to the individual participants

[1] Details of the Yukon Umbrella Final Agreement and Yukon First Nation Final Agreements can be found at: https://yukon.ca/en/agreements-first-nations#modern-treaties-comprehensive-land-claims-agreements . The Nisga'a Final Agreement can be found at Nisga'a Final Agreement and Background Information (rcaanc-cirnac.gc.ca). Details of the TFA and MNA agreements can be found on the B.C. Treaty Commission website at www.bctreaty.net.

as well as contribute directly and indirectly to the economy through fishery related expenditures. This section focuses on economic activity rather than the economic benefits to individual anglers or businesses. Catch levels in the recreational fishery are managed using area specific openings and retention levels.

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 Pacific 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 experience[2]. 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 angling[3]. 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 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.

[2] 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.

[3] 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%).

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 2010[4].

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 (for Yukon portion of the Alsek River), 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.

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] DFO Internal analysis

4.3 Commercial Fishery

In BC, the salmon fishery is a limited access fishery, mostly managed as a competitive fishery (Other names for this style of fishery include derby and Olympic style fishery); however, several parts of the fishery are operated under individual quotas. Since 2005, five areas using seine, troll or gill net gear have 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. Commercially-harvested salmon supports BC's seafood processing sector, much of which is ultimately exported, bringing new money into the province.

Between 2013 and 2019, salmon contributed an average of 17% of the landed value and 15% of the total volume of BC wild caught seafood (DFO Official Catch, 2013-2019). The real value, in 2019 constant dollars (2019$), ranged from a high of $127.0 million in 2014 to a low of $17.6 million in 2019 (Figure 6, below). Although landings increased by 85% from 2019-2020, landed value only rebounded slightly in 2020, increasing by 18% to $20.7 million. This was the result of majority of 2020 landings being Pink salmon, which is the lowest valued salmon in terms of price per kg, and the total landings of the other four salmon species remaining the same as the previous year. In most years, Pink salmon accounts for an average of 18% of total salmon catch. However, in 2013 and 2020, Pink made up nearly 63% of salmon catch contributing to a low landed value total for each year. (Figure 6)

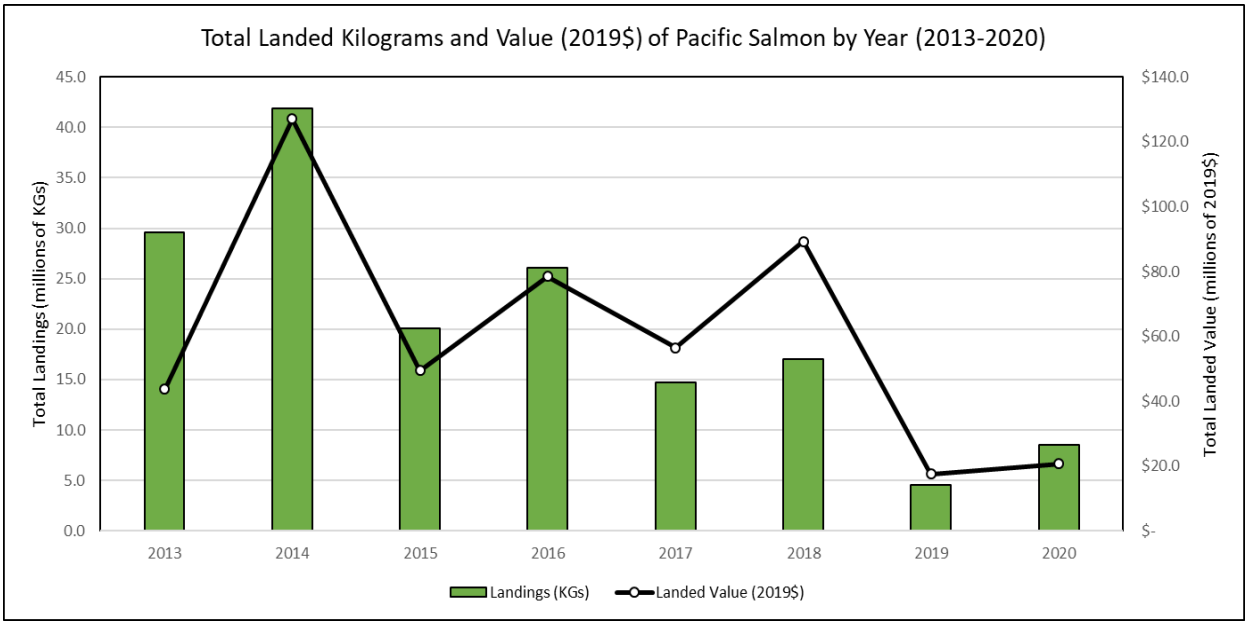

Figure 6. Total Landed Kilograms and Value (2019$) of Pacific Salmon by Year (2013-2020*)
Source: DFO Official Catch matched to the best available price from sales slips.
*Estimates for 2020 are to be treated as preliminary and value is in nominal terms.

Note: Salmon landed value estimates may differ slightly from other sources due to varying price estimates. Prices used here are "best available" based on matching criteria using date, gear and area.

On average from 2013-2020, Chinook (27.2%) was the most important species in terms of landed value, followed closely by Sockeye (26.7%) and Chum (25.6%) (Figure 7 to Figure 11 below).

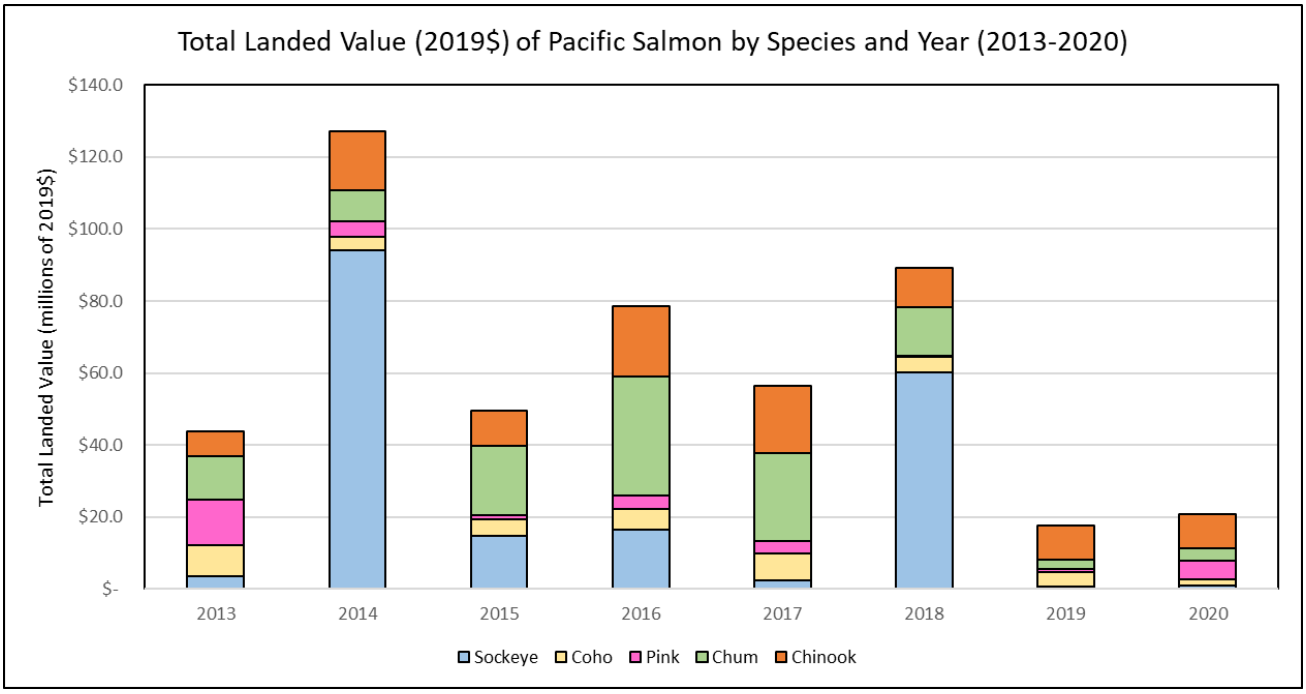

Figure 7. Total Landed Value (2019$) of Pacific Salmon by Species by Year (2013-2020*)
Source: DFO Official Catch matched to the best available price from sales slips.
*Estimates for 2020 are to be treated as preliminary and value is in nominal terms.

Note: Salmon landed value estimates may differ slightly from other sources due to varying price estimates. Prices used here are "best available" based on matching criteria using date, gear and area.

Between 2013 and 2020, the South Coast fishery was responsible for an average of 51% (with the North Coast representing 49%) of the total volume of salmon landings and 53% (47%) of the total landed value. The record Fraser River Sockeye run in 2014 meant that the South Coast accounted for 71% and 78% of the landed volume and landed value in that year, respectively. With another Sockeye boom in 2018, the South Coast again accounted for 71% and 74% of the landed volume and value, respectively. In non-Sockeye bump years, the North Coast catches more salmon than the South Coast, but the South coast has secured most of the benefits of the large salmon runs in years like 2014 and 2018.

Salmon licence values declined steadily from 2005 to 2010, reflecting poor returns to the fleets (Nelson, various years). Seine licences have recovered somewhat since then, while gillnet and troll licences have been steady with troll showing improvements in 2014. A 2007 snap shot of the financial performance of the fleet indicated negative overall returns for gill net and seine fleets in the absence of diversification into other fisheries (Nelson, 2009); this was reiterated in the 2009 financial snapshot (Nelson, 2011). The results also suggested a positive financial performance for the troll fleet, which was enhanced further by participation in other fisheries. It should be noted that these analyses of the Pacific's commercial fisheries occurred in years of particularly low harvest of high-value species for the salmon fisheries and are not representative of the salmon fleet's performance over the past decade. The salmon fleet's financial performance is best reviewed over several years, given the fisheries significant annual swing in

harvest. Detailed tables for each fleet (gill net, seine and troll) are available within both documents (Nelson, 2009 & 2011), and are available by licence area (Gislason, 2011).

4.3.1 Processing Sector

From 2014-2018, wild salmon accounted for an average of 26% of the total wholesale value from the processing of wild caught seafood in BC (SYIR, 2014-2018).

The latest study on linkages between seafood harvesting and processing prepared by GS Gislason & Associates in August 2017 allows estimation of the total labour wages in salmon processing sector in 2016, per salmon species. Applying this to 2020 DFO logbook information, processing of salmon species delivered about $2.1M (Pink), $0.9M (Chum), $0.6M (Chinook), $0.2M (Sockeye), and $0.2M (Coho) in processing sector labour wages as displayed in Figure 8.

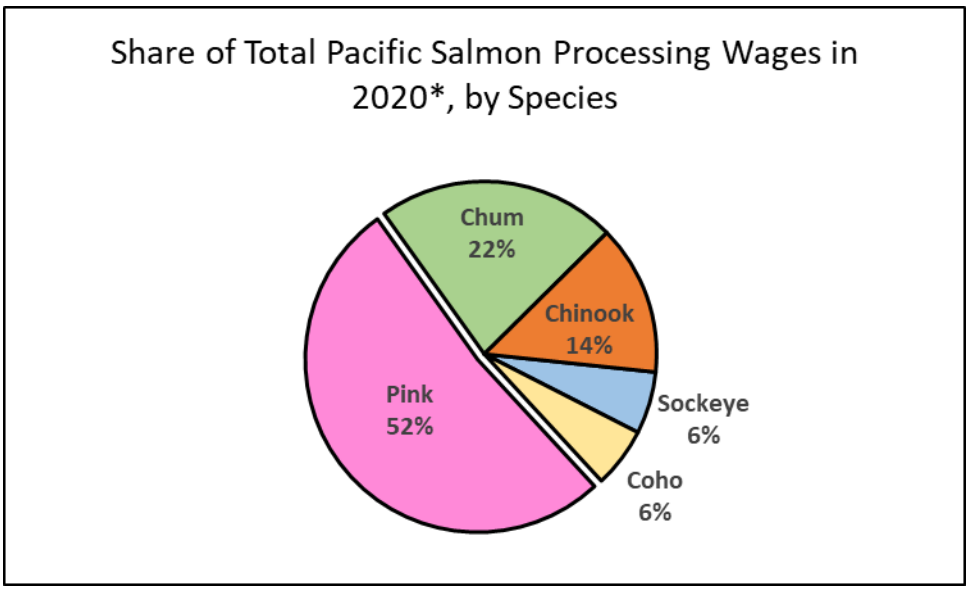

Figure 8. Share of the total value of processing sector wages in 2020 (per salmon species)
Source: GS Gislason and Associates (2017), DFO Official Catch
*Estimates for 2020 are to be treated as preliminary and value is in nominal terms

While Pink was the most processed salmon species by volume and total value of processing sector labour wages among all BC wild salmon in 2020, Sockeye remains the most labour intensive species in processing with a labour intensity of about 34 hours per metric tonne (MT) (GSGislason & Associates, 2017).

The GSGislason 2017 study also indicates that salmon processing is frequently pursued in a different region than the area where landings are loaded off the fishing vessels. While Chinook landings occur mostly on the North Coast, its processing happens mainly in the Lower Mainland (about 65% of all processed Chinook). Similarly, landings of Coho also happen mainly on the North Coast (80%), but its processing is pursued mainly in the Lower Mainland (74%). Pink salmon is landed mainly in the North Coast (about 60%) and is processed in the North Coast and Lower Mainland (45% and 40%, respectively). Chum landings (63%) and processing (75%) occurs mostly in Lower Mainland. Sockeye landings and

processing occurs mostly on Vancouver Island (58% and 55%, respectively) (GSGislason & Associates, 2017).

4.4 Export Market

The province of British Columbia benefits from strong seafood exports that in 2020 were valued at about $1.2 billion, a 14% decrease when compared to 2019 (Statistics Canada EXIM Database; value in nominal terms.) This total value was realized via a combination of seafood that was supplied by domestic wild harvest and aquaculture (Statistics Canada EXIM Database). Chinook, Pink, and Sockeye salmon were among the most widely exported wild salmon species in 2020 (by volume). They constituted 34%, 33% and 14% of the total volume of wild salmon exports from BC, respectively. In 2020 Chum was shipped to 11 countries, down from 23 countries the previous year, with the US and France being the biggest importers of this salmon species (by value). Pink salmon was exported to 13 countries, with China and the US constituting the most significant importers (by value), and Sockeye was exported to 13 countries, with the US and Hong Kong being the biggest Sockeye importers (by value).

The value of all wild caught salmon exports in 2010-2020 averaged $126M annually (in 2019$). In that period, on average, Chinook (spring) accounted for about 35% of this value; Sockeye for 30%; Chum for 15%; Pink for 13%; Coho for about 6%, and 1% originated from the sale of unspecified salmon. For more details, please refer to Figure 9 below.

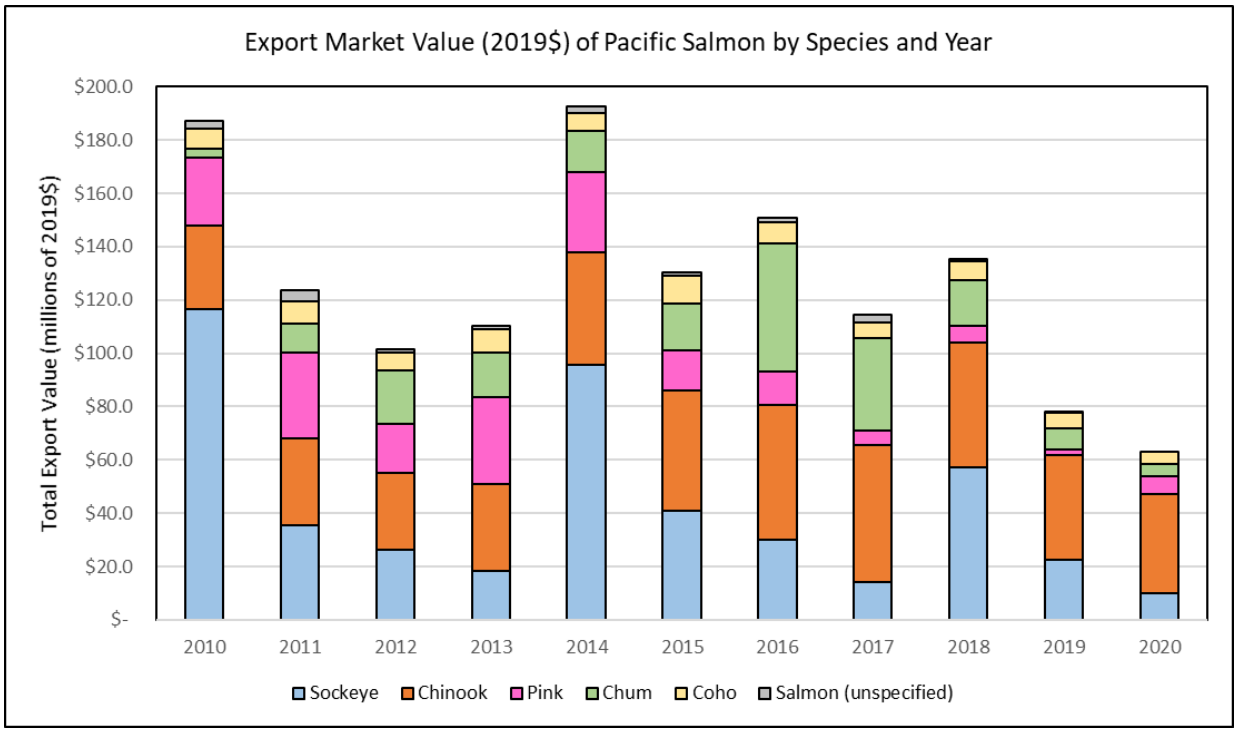

Figure 9. Total value of wild salmon exports (in 2019 constant dollars), 2010-2020*

Source: Statistics Canada EXIM database accessed on January 20, 2020.

*Estimates for 2020 are to be treated as preliminary and value is in nominal terms.

Note: this total includes all exports of wild Pacific salmon and exports of all farmed Pacific salmon. There might be slight differences in total export value when comparing exports in previous versions/previous years of IFMP due to changing products definitions in EXIM data. In this data only Pacific salmon was included.

Overall, during the five-year period (2016 to 2020), BC exported wild salmon to 55 countries. The US accounted for about 62% of the total export value in that period, followed by Japan (12%) and China (5%). France was the fourth biggest individual importer of BC wild salmon in that period (3%). For more details, please refer to Figure 10, below.

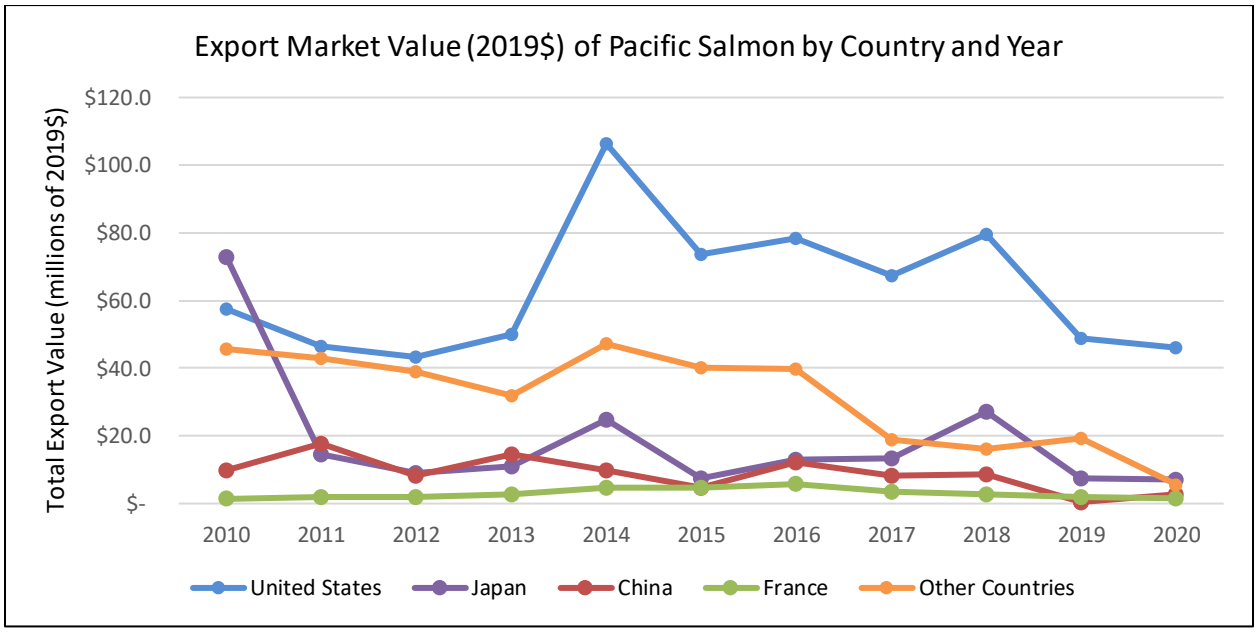

Figure 10. Total value of wild salmon exports from BC per main importers, 2010-2020* (in 2019$)
Source: Statistics Canada EXIM database accessed on January 20, 2020.
*Estimates for 2020 are to be treated as preliminary and value is in nominal terms.

Figure 11, Below shows the proportions of Pacific Salmon exported by value (in 2020$) by destination country in 2020. In 2020, approximately $63.1m worth of wild and farmed Pacific salmon was exported from BC. The export value (2019$) has been decreasing over the past 5 years falling by 58% since 2016, and experiencing a decrease of 19% from 2019. Of the total $63.1m, about 73% of the total export value of Pacific salmon is attributable to the United States ($46.2m), 11% to Japan ($7.1m), 4% to China ($2.6m), 3% to France ($1.6m), and the remaining 9% to all other countries ($5.6m).

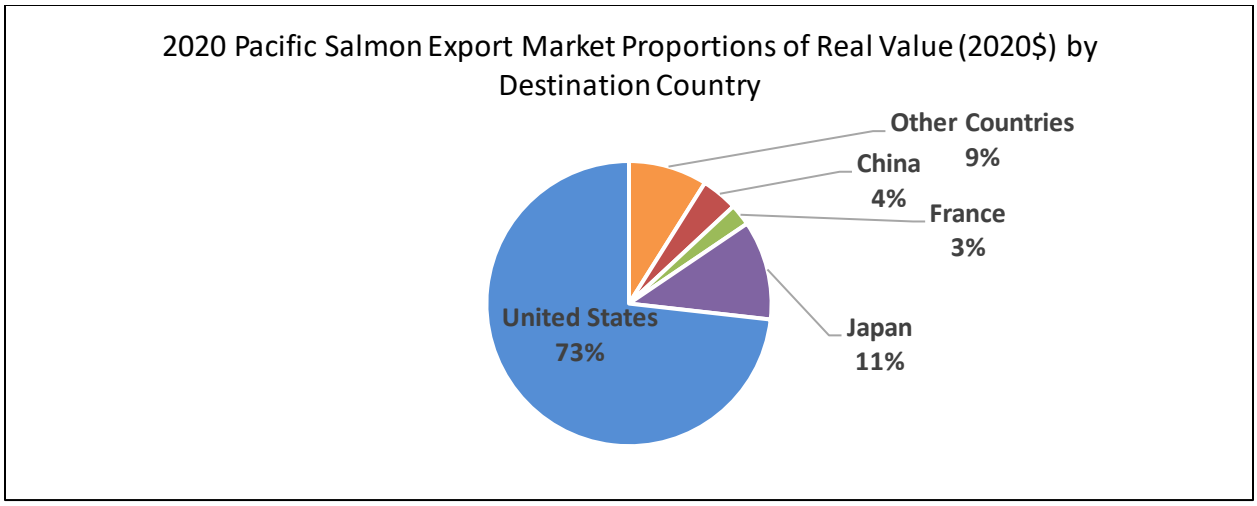

Figure 11. Total value of wild salmon exports from BC per main importers, 2010-2020* (in 2019$)
Source: Statistics Canada EXIM database accessed on January 20, 2020.
*Estimates for 2020 are to be treated as preliminary and value is in nominal terms.

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.

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 as well as changes in harvester behaviour 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

Canada's Policy for Conservation of Wild Pacific Salmon (the Wild Salmon Policy) 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 at:
https://www.pac.dfo-mpo.gc.ca/fm-gp/salmon-saumon/wsp-pss/index-eng.html

To communicate the work the Department is doing in support of the policy, Canada's Minister of Fisheries and Oceans and the Canadian Coast Guard released the *Wild Salmon Policy 2018-2022 Implementation Plan* in October 2018. This collaboratively developed plan was consulted on broadly throughout fall 2017, and lays out nine overarching approaches to implementation and 48 specific activities. The plan is organized under three key themes: Assessment; Maintaining and Rebuilding Stocks; and Accountability. In 2021, the third annual report on progress will be released.

For a copy of the Wild Salmon Policy, the *Wild Salmon Policy 2018-2022 Implementation Plan*, information on what we heard during consultations and response, annual reports, and other Wild Salmon Policy related materials, please see: https://www.pac.dfo-mpo.gc.ca/fm-gp/salmon-saumon/wsp-pss/index-eng.html.

5.1.2 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".

To view the list of endangered, threatened and special concern species currently listed under Schedule 1 of SARA, please visit: http://dfo-mpo.gc.ca/species-especes/sara-lep/identify-eng.html.

In addition to the existing prohibitions under the *Fisheries Act*, it is illegal to kill, harm, harass, capture, take, possess, collect, buy, sell or trade any SARA-listed extirpated, 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, any part of its critical habitat, or the residences of its individuals. These prohibitions do not apply to species listed as special concern.

5.2 Protection Of Marine And Non-Tidal Habitat

5.2.1 Oceans Act and Marine habitat initiatives

In 1997, the Government of Canada enacted the *Oceans Act*. This legislation provides a foundation for an integrated and balanced national oceans policy framework which includes provisions for the designation of Marine Protected Areas (MPAs); and is 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.

In May of 2019, Bill C-55 received Royal Assent—amending both the *Oceans Act* and the *Canada Petroleum Resources Act*. The amendments allow for interim protections for conservation through the use of a ministerial order, require the precautionary principle be applied when deciding to establish any *Oceans Act* MPA, and strengthen enforcement powers and fines to align with current provisions in other legislation, such as the *Environmental Enforcement Act*.

In Pacific Region, DFO manages three MPAs: SGaan Kinghlas – Bowie Seamount MPA, Endeavour Hydrothermal Vents MPA, and Hecate Strait and Queen Charlotte Sound Glass Sponge Reefs MPA. In addition, DFO has initiated marine spatial planning processes that cover much of Canada's Pacific Ocean waters.

For more information on the *Oceans Act*, marine spatial planning, MPAs and Canada's Ocean Strategy, please visit:

https://www.dfo-mpo.gc.ca/oceans/index-eng.html

5.2.2 Non-Tidal Habitat Protection and restoration

On June 21, 2019, Bill C-68 received Royal Assent resulting in an amended *Fisheries Act* which included enhanced Fish and Fish Habitat Protection Provisions as well as Fish Stocks Provisions. This amendment establishes the requirements for rebuilding plans of stocks of which includes habitat restoration. DFO programs support habitat restoration across the Pacific Region that are carried out by government, community groups and Indigenous peoples. DFO Restoration Biologists and Engineers directly support over a 100 habitat restoration projects annually to target habitats supporting stocks of concerns.

5.3 Conservation of Species that May be affected by Salmon Fisheries

5.3.1 Rockfish

2020/2021: The management objective for Bocaccio and inshore rockfish species (which include Yelloweye, Quillback, Copper, China, and Tiger) is to continue conservation strategies that will ensure stock rebuilding over time. **These inshore rockfish species are currently non-retention in the commercial salmon troll fisheries.**

In 2002, an inshore rockfish conservation strategy was established with initial measures introduced for recreational and commercial fisheries. The strategy addresses four areas under the fisheries management and stock assessment regime:

a) Protect a part of inshore rockfish populations from harvest through the use of rockfish conservation areas.

b) Collect information on total fishery mortalities through improved catch monitoring programs.

c) Reduce harvests to levels that are less than the estimates of natural mortality (i.e. less than two percent).

d) Improve the ability to assess the status of inshore rockfish populations and monitor changes in abundance.

5.3.1.1 Rockfish Conservation Areas

There are 162 Rockfish Conservation Areas (RCAs) in British Columbia, covering roughly 4,350km^2 of the Canadian Pacific Coast. These areas are closed to a range of recreational and commercial fisheries to protect inshore rockfish and their habitat.

DFO is currently undertaking a multi-year review of the conservation effectiveness of RCAs, including meeting the national criteria and standards for marine refuges to better conserve sensitive areas and contribute towards Canada's Marine Conservation Targets (MCT). To meet these standards, the risks to inshore rockfish, their habitat, and benthic communities will need to be avoided or mitigated. Peer-reviewed science advice also recommends that boundary changes to some RCAs will improve their spatial design by better capturing rockfish habitat features. RCAs in the Northern Shelf Bioregion have been selected for the first phase of engagement to align with the MPA network planning process in that area. Workshops with First Nations and stakeholders and online consultations were held in 2019. A summary of what we heard is available online at: https://www.pac.dfo-mpo.gc.ca/consultation/ground-fond/rca-acs/2020-heard-entendu-eng.html#6. There will be more opportunities to provide feedback on Rockfish Conservation Areas in the Northern Shelf Bioregion in the near future. We're also planning to review Rockfish Conservation Areas in other regions of British Columbia at a later date.

Further information on RCAs and the boundary proposals are available online at: http://dfo-mpo.gc.ca/rockfish-conservation or for further information on this, please contact DFO.RCA-ACS.MPO@dfo-mpo.gc.ca.

5.3.1.2 Rockfish Rebuilding Plans

Fisheries and Oceans Canada (DFO) has developed "A Fisheries Decision-Making Framework Incorporating the Precautionary Approach" (PA Framework) under the auspices of the Sustainable Fisheries Framework. It outlines the departmental methodology for applying the precautionary approach (PA) to Canadian fisheries. A key component of the PA Framework requires that when a stock has reached or fallen below a limit reference point (LRP), a rebuilding plan must be in place with the aim of having a high probability of the stock growing above the LRP within a reasonable timeframe.

The purpose of rebuilding plans is to identify the main objectives and requirements for any species below an LRP (i.e., in the "critical zone" of the PA Framework), as well as the management measures that will be used to achieve these objectives. The Integrated Fisheries Management Plan for Groundfish outlines rebuilding plans for groundfish species that (a) have been identified by peer reviewed stock assessments as currently in the critical zone under the PA framework and (b) are not covered by other management planning tools for depleted species, such as Species At Risk Act-listed species that require a recovery plan or management plan.

The primary objective of any rebuilding plan, outlined in the PA Framework, is to:

Promote stock growth out of the critical zone (B > 0.4 Bmsy) by ensuring removals from all fishing sources are kept to the lowest possible level until the stock has cleared this zone. There will be no

tolerance for preventable decline. This objective remains the same whether the stock is declining, stable, or increasing.

More information on the Bocaccio and Yelloweye Rockfish Rebuilding Plans is available in Appendix 9 of the Groundfish IFMP, which will be linked in the final salmon IFMP once available.

5.3.2 Glass Sponge Reefs

Strait of Georgia and Howe Sound Glass Sponge Reef Marine Refuges:
Effective April 1st, 2019 all commercial, recreational and Indigenous food, social and ceremonial (FSC) bottom-contact fishing activities for prawn, shrimp, crab and groundfish, as well as the use of downrigger gear for recreational salmon trolling (restricted via Condition of Licence) are prohibited within portions of Subareas 28-2 and 28-4 to protect nine Howe Sound glass sponge reefs, as marine refuges. This includes prohibition of the following fishing activities:

- prawn and crab by trap
- shrimp and groundfish by trawl
- groundfish by hook and line
- use of downrigger gear in recreational salmon trolling

These eight closures are in addition to the nine areas closed to all commercial, recreational and Indigenous FSC bottom-contact fishing activities in the Strait of Georgia and Howe Sound, established in 2015. In 2019, nine remaining areas in Howe Sound were ground-truthed to assess their ecological significance. The presence of five new live glass sponge reefs has been confirmed. A sixth site within an existing reef complex where only dead reef habitat was observed may have recovery potential. Consultations are underway on restrictions to all commercial, recreational and Indigenous FSC bottom-contact fishing activities, and the use of downrigger gear for recreational salmon troll in these reefs, with new management measures anticipated in-season in Spring 2021.

For further information on this, please contact Lindsay Klopp at Lindsay.Klopp@dfo-mpo.gc.ca.

Current closure locations and more information are available at:

https://www.dfo-mpo.gc.ca/oceans/ceccsr-cerceef/closures-fermetures-eng.html

5.3.3 Marine Mammals

In order to address the conservation concerns with marine mammals, it is important that measures are taken to reduce the harm to and mortality of marine mammals resulting from primary threats they face, including those that may be associated with fishing activity, as well as to improve data quality of any interactions. As such, commercial fishing licenses have been amended to include a Condition of License for Marine Mammals that specify mitigation measures and new reporting requirements. This includes mandatory reporting of all interactions with marine mammals, requirement for minimum approach distances to marine mammals as set out under the Marine Mammal Regulations (see Section 5.7),

prohibition of encirclement of marine mammals in purse seine fisheries, and prohibition against the lethal removal of nuisance seals.

5.3.4 Seabirds

Environment Canada is looking for your help to measure gill net fishing's impact on local seabird populations.

Populations of a number of seabird species around the world have declined in recent years; seabird bycatch is a part of the reason.

Seabird bycatch has been reported in all types of fisheries in BC and in fisheries in Alaska and Washington State. However, the number of local seabirds getting entangled in gill nets as a result of the BC salmon gill net fishery is not well known.

Environment Canada wants to know how, when and where gill net fishing may impact local seabirds and to find ways to reduce impacts. Environment Canada, with Fisheries and Oceans Canada, fishermen, First Nations, non-government organizations, and other coastal communities, have 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 benefit both the fishery and healthy bird populations.

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

For additional information, please contact:

Laurie Wilson
Wildlife Biologist, Environment Canada
Canadian Wildlife Service, Delta, BC
Telephone: (604) 862-8817
Email: laurie.wilson@canada.ca

5.3.5 Sharks

Out of the fourteen shark species in Canadian Pacific waters, three species are listed under SARA. The Basking Shark *(Cetorinus 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 bycatch 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, 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:
https://www.dfo-mpo.gc.ca/species-especes/publications/sharks/coc/coc-sharks/index-eng.html

Code of conduct for Basking Sharks:
https://www.dfo-mpo.gc.ca/species-especes/publications/sharks/coc/coc-basking/index-eng.html

5.3.6 SARA Listed Species

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.

The Species at Risk Act (SARA) came into force in 2003. Within the Act, COSEWIC was established as an independent body of experts responsible for identifying and assessing wildlife species considered as being at risk. This is the first step towards protecting wildlife species which are potentially at risk. Subsequent steps include COSEWIC reporting its results to the Canadian government and the public, and the Minister of the Environment's official response to the assessment results. Wildlife species that have been designated by COSEWIC may then be listed under Schedule 1 of SARA and receive legal protection and recovery or management plans.

For a full list of species identified and assessed by COSEWIC, please visit:
http://cosewic.ca/index.php/en-ca/.

The purposes of SARA 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:
https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/species-list.html

In addition to the existing prohibitions under the Fisheries Act, if a species is listed under SARA it is illegal to kill, harm, harass, capture, take, possess, collect, buy, sell or trade any listed extirpated, 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. These prohibitions do not apply to species listed as special concern.

To view the list of endangered, threatened and special concern species currently listed under Schedule 1 of SARA, please visit: http://dfo-mpo.gc.ca/species-especes/sara-lep/identify-eng.html

In the Pacific Region, the following SARA-listed species may be encountered by salmon fisheries:

BIRDS

1) Ancient Murrelet – Special Concern
2) Marbled Murrelet – Threatened
3) Black-footed Albatross – Special Concern
4) Short-tailed Albatross – Threatened
5) Pink-footed Shearwater – Threatened

FISH

6) Basking Shark, Pacific population – Endangered
7) Bluntnose Sixgill Shark – Special Concern
8) Green Sturgeon – Special Concern
9) Longspine Thornyhead – Special Concern
10) Rougheye Rockfish Types I & II – Special Concern
11) Tope Shark – Special Concern
12) White Sturgeon – Upper Columbia River population – Endangered
13) White Sturgeon – Upper Fraser River population – Endangered
14) White Sturgeon – Nechako River Population – Endangered
15) White Sturgeon – Upper Kootenay River population – Endangered
16) Yelloweye Rockfish, Pacific Ocean inside waters and outside waters populations – Special Concern

MAMMALS

17) Blue Whale, Pacific population – Endangered
18) Fin Whale, Pacific population – Threatened
19) Grey Whale – Eastern North Pacific Population – Special Concern
20) Harbour Porpoise, Pacific Ocean population – Special Concern
21) Humpback Whale, North Pacific population – Special Concern
22) Killer Whale, Northeast Pacific – northern resident population – Threatened
23) Killer Whale, Northeast Pacific – southern resident population – Endangered
24) Killer Whale, Northeast Pacific – offshore population – Threatened
25) Killer Whale, Northeast Pacific – transient population – Threatened
26) North Pacific Right Whale – Endangered
27) Sea Otter – Special Concern
28) Sei Whale, Pacific population – Endangered
29) Steller Sea Lion – Special Concern

REPTILES

30) Leatherback Sea Turtle – Endangered

Marine or anadromous species assessed by COSEWIC that are currently under consideration for listing under SARA include:

FISH

31) Bocaccio – assessed as Endangered
32) Canary Rockfish – assessed as Threatened
33) Darkblotched Rockfish – assessed as Special Concern
34) Eulachon – Fraser River Designatable Unit – assessed as Endangered
35) Eulachon – Central Pacific Coast Designatable Unit – assessed as Endangered
36) Eulachon – Nass/Skeena Rivers Designatable Unit – assessed as Special Concern
37) North Pacific Spiny Dogfish – assessed as Special Concern
38) Salmon, Chinook (Okanagan population) – assessed as Endangered
39) Salmon, Coho (Interior Fraser population) – assessed as Threatened
40) Salmon, Sockeye (Sakinaw population) – assessed as Endangered
41) Salmon, Sockeye (15 Fraser River Designatable Units; DU) – assessed as Endangered (8 DUs), Threatened (2 DUs), Special Concern (5 DUs)
42) Salmon, Chinook (Southern BC Designatable Units)- assessed as Endangered (8 DUs), Threatened (4 DUs),Special Concern (1 DU)
43) Salmon, Chinook (Southern BC *hatchery enhanced* Designatable Units) – assessed as Endangered (4 DUs), Threatened (3 DUs), Special Concern (1 DU)
44) Interior Fraser Steelhead (Chilcotin & Thompson populations) – assessed as Endangered (2 DUs)
45) Quillback Rockfish – assessed as Threatened
46) White Sturgeon- Lower Fraser River Designatable Unit- Threatened

MAMMALS

47) Northern Fur Seal – Threatened
48) Grey Whale, Pacific Coast Feeding Group population – Endangered (reclassification from Special Concern, single Pacific population)
49) Grey Whale, Western Pacific population –Endangered

5.3.6.1 Salmon and Steelhead SARA Listing Processes

Over 60 salmon and two anadromous trout designatable units (DUs) have been recently, or will soon be, assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). COSEWIC's submission of its assessments to the Government of Canada, via its annual report, initiates the process to determine whether or not to list a species under the *Species at Risk Act* (SARA). For regular (non-emergency) processes, the Governor in Council (Cabinet) may, on the recommendation of the Minister

of Environment and Climate Change, add the species to the List of Wildlife Species at Risk; decide not to add the species to the List; or refer the matter back to COSEWIC. To inform the recommendation and final listing decision, DFO prepares the following regional information: a Recovery Potential Assessment (science advice); management scenarios (outlining measures to potentially be taken if the species is, or is not listed); Indigenous Cultural Significance information; a Cost-Benefit Analysis; and, consultations with First Nations, stakeholders, and the general public. More details on timelines and opportunities for engagement will be provided at a later date.

Species	COSEWIC Assessment	# of DUs*	COSEWIC Assessment Date	COSEWIC Annual Report Date
Sakinaw Sockeye	EN	1	April 2016	Oct 2016
Interior Fraser Coho	TH	1	November 2016	Oct 2017
Okanagan Chinook	EN	1	April 2017	Oct 2017
Fraser Sockeye (Group I)	8 EN, 2 TH, 5 SC, 9 NAR	24	November 2017	Oct 2018
Southern BC Chinook (Group I)	8 EN, 4 TH, 1 SC, 2 DD, 1 NAR	16	November 2018	Oct 2019
Interior Fraser Steelhead (Thompson & Chilcotin) – Regular Assessment	2 EN	2	November 2020	Expected Fall 2021
Southern BC Chinook (Group II)	4 EN, 3 TH, 1 SC, 2 DD, 2 NAR	12	November 2020	Expected Fall 2021
Fraser Sockeye (Group II)	Assessment not yet performed	7	Expected April 2021	Expected Fall 2021

EN – Endangered; TH- Threatened; SC- Special Concern; DD- Data Deficient; NAR – Not at Risk
*DU refers to "designatable unit" or population.
Further information on the SARA listing process can be found at:
http://www.dfo-mpo.gc.ca/species-especes/publications/sara-lep/policy-politique/index-eng.html

DFO has co-developed the following conservation strategies for species that were previously declined for SARA listing:

1. *Conservation Strategy for Coho Salmon, Interior Fraser River Populations*: https://waves-vagues.dfo-mpo.gc.ca/Library/329140.pdf
2. *National Conservation Strategy for Cultus Lake Sockeye Salmon (Oncorhynchus Nerka):* https://waves-vagues.dfo-mpo.gc.ca/Library/337479.pdf
3. *Conservation Strategy for Sockeye Salmon (Oncorhynchus nerka), Sakinaw Lake Population:* http://waves-vagues.dfo-mpo.gc.ca/Library/347720.pdf

In addition to these documents, this IFMP identifies specific conservation objectives for these and other salmon stocks, found in Section 6, Fishery Management Objectives for Stocks of Concern.

5.3.6.2 Thompson and Chilcotin Steelhead Emergency SARA listing PROCESS

Spawning escapement of Interior Fraser Steelhead has been on a downward trend for several years, with recent years' escapements reaching historic lows. In January 2018, COSEWIC performed an Emergency Assessment on Thompson and Chilcotin Steelhead under S.28(1) of SARA to assess whether they face an imminent threat to survival, for the purpose of informing an Emergency Listing decision under S.29(1) of SARA. The assessment found that both the Thompson and Chilcotin Designatable Units (DUs) were Endangered, and as such an emergency listing process was initiated to determine whether or not to list the DUs under SARA on an emergency basis.

On July 11, 2019, the Government of Canada announced the decision not to add the Thompson and Chilcotin Steelhead populations to Schedule 1 of SARA. The Government of Canada determined that an emergency listing would not produce the best ecological, social, and economic outcomes for these populations and Canadian people. The decision not to list these populations under SARA was formalized in Canada Gazette II on July 24, 2019. Accompanying this decision, the Government of Canada and the Province of BC released the BC-DFO Steelhead Action Plan (https://www.canada.ca/en/fisheries-oceans/news/2019/07/backgrounder-government-of-canada-and-province-of-british-columbia-partner-to-take-bold-action-to-conserve-steelhead-trout.html), which contains new conservation measures targeted at reducing fishing mortality, improving habitat protection, and increasing science activities. Additional information on the decision not to add the Steelhead Trout populations to the List of Wildlife Species at Risk, is available on the Government of Canada website.

5.4 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 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. It is prohibited to approach marine mammals to feed or attempt to feed them under s. 7 of the *Marine Mammal Regulations*. 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. DFO link:
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 at DFO.ORR-ONS.MPO@dfo-mpo.gc.ca or by calling 1-800-465-4336. Reporting all incidents will assist DFO and fish harvesters in understanding this problem and help in developing strategies to avoid it.

5.5 Resident Killer Whale

Two distinct populations of Resident 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 on Schedule 1 of the *Species at Risk Act*. Broad strategies for recovery are identified in the *Recovery Strategy for the Northern and Southern Resident Killer Whales (*Orcinus orca*) in Canada*, which was finalized in March 2008, and amended in 2011and 2018. The Recovery Strategy also identifies key threats to Resident Killer Whales as (1) reduced prey availability, (2) physical and acoustic disturbance, and (3) environmental contaminants. It can be viewed at: https://sararegistry.gc.ca/virtual_sara/files/plans/Rs-ResidentKillerWhale-v00-2018dec-Eng.pdf.

Critical habitat and its associated features, functions, and attributes have been identified for both populations in the Recovery Strategy, and are protected from destruction through Critical Habitat Orders made under SARA sections 58(4) and (5). The update to the Recovery Strategy for Resident Killer Whales in 2018 resulted in the identification and protection of two additional areas of critical habitat: the waters on the continental shelf off southwestern Vancouver Island, including Swiftsure and La Pérouse Banks (important for both Northern and Southern Resident Killer Whales), and the waters of west Dixon Entrance, along the north coast of Graham Island from Langara to Rose Spit (important for Northern Resident Killer Whales). The *Action Plan for Northern and Southern Resident Killer Whale (*Orcinus orca*) in Canada* (DFO 2017) supports the strategic direction set out in the Recovery Strategy, and outlines measures that provide the best chance of achieving the population and distribution objectives for the species, including the measures to be taken to address the threats and monitor the recovery of the species.

The *Marine Mammal Regulations* under the *Fisheries Act* and prohibitions under SARA specifically prohibit the disturbance and harm of Killer Whales. Non-compliance may lead to charges under the *Marine Mammal Regulations* and/or SARA.

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 *Be Whale Wise (BWW): Marine Wildlife Guidelines for Boaters, Paddlers and Viewers*, which are available from local Fishery Offices or on-line at: https://www.bewhalewise.org/marine-wildlife-guidelines/.

Key Threat: Reduced Prey Availability

Northern and Southern Resident Killer Whales are dietary specialists and feed primarily on salmon. The seasonal distribution and movement patterns of Resident Killer Whales are strongly associated with the availability of their preferred prey, Chinook salmon (Oncorhynchus tshawytscha), and secondarily, Chum salmon (O. keta) during summer and fall. There is less known about the winter and spring diet and winter distribution of Resident Killer Whales, but recent and ongoing research will further our understanding and provide more information about the principal threats facing the population.

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, particularly in the Salish Sea with southern BC Chinook stocks experiencing poor returns in recent years.

Key Threat: Environmental 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, including polychlorinated biphenyls (PCBs) and certain fire-retardant persistent organic pollutants which have been banned in Canada. Canadian and U.S. researchers continue to monitor the health of the Resident Killer Whale populations.

Key Threat: Physical and Acoustic Disturbance:

All cetaceans, including Resident Killer Whales, have been subjected to increasing amounts of disturbance from vessels, aircraft and anthropogenic noise in recent years. This includes chronic noise from shipping, and acute noise from industrial activities such as dredging, pile driving, and construction, as well as seismic testing, military sonar, and other vessel use of low and mid-frequency sonars. The means by which physical and/or acoustic disturbance can affect Resident Killer Whales at both the individual and population level is not well understood, and research is ongoing to determine the short and longer-term impacts of disturbance to individuals and their populations.

5.6 Southern Resident Killer Whale Management Measures

The Government of Canada is taking important steps to protect and recover the Southern Resident Killer Whale population, in keeping with direction provided in Species at Risk Act (SARA) recovery documents. In May 2018, the Minister of Fisheries, Oceans and the Canadian Coast Guard and Minister of Environment and Climate Change determined the Southern Resident Killer Whale population faces imminent threats to its survival and recovery. Given the status of the population and ongoing threats to Southern Resident Killer Whale recovery, DFO implemented a number of measures in 2018 through 2020, including measures aimed at increasing prey availability and accessibility for Southern Resident Killer Whales - particularly Chinook salmon—and reducing threats related to physical and acoustic disturbance in key foraging areas within Southern Resident Killer Whale critical habitat.

Since 2018, Indigenous groups, the Indigenous and Multi-Stakeholder Advisory Group (IMAG), Technical Working Groups (TWGs) and stakeholders have provided recommendations and feedback to Ministers and Departments on a range of measures (including measures related to increasing prey availability, sanctuaries, vessel disturbance [both noise and physical disturbance], and contaminants).

The fishery management measures for the 2020 season included area-based fishery closures for recreational and commercial salmon fishing in the Strait of Juan de Fuca and the southern Gulf Islands in effect August 1 to October 31, 2020, and Interim Sanctuary Zones in portions of Swiftsure Bank and off the coasts of North Pender Island and Island prohibited vessels from entering and fishing within their boundaries (with some exceptions) from June 1 to November 30, 2020. These measures were to support

Chinook salmon availability for Southern Resident Killer Whales by decreasing potential fishery competition, as well as minimizing physical and acoustic disturbance.

These closures did not apply to individuals or vessels being used to fish for food, social or ceremonial purposes, or for domestic purposes pursuant to a treaty, under a license issued under the Aboriginal Communal Fishing License Regulations.

The Government of Canada is asking vessel operators to respect the following voluntary measures:

- Stop fishing within 1,000 metres of killer whales and let them pass;
- Respect a "Go Slow" zone around whales by reducing speed to less than 7 knots when within 1,000 metres of a marine mammal; and
- Reduce noise by turning echo sounders and fish finders off when not in use, and turning engines to neutral idle when within 400 metres of a killer whale.
- For more information on the best ways to help whales while on the water, when on both sides of the border, please visit: bewhalewise.org

The Department intends to ensure that any updates to actions for the 2021 season can be implemented beginning in spring 2021 to coincide with the return of Southern Resident Killer Whales in typically greater numbers to the Salish Sea. Further discussion on the potential measures that may be considered will occur as part of the Southern Resident Killer Whale TWGs and IMAG, and consultation with Indigenous groups and stakeholders, including the Salmon IFMP process. Specific management measure information will be updated in the final IFMP.

For information regarding the Southern Resident Killer Whale management measures to support recovery, please contact the Marine Mammal Team (DFO.SRKW-ERS.MPO@dfo-mpo.gc.ca) or visit www.pac.dfo-mpo.gc.ca/southern-resident-killer-whale)

5.7 U.S. Marine Mammal Protection Act Provisions

In 2016, the U.S. published new regulations (80 FR 54390) pursuant to the Marine Mammal Protection Act which focus on the reduction of marine mammal bycatch in foreign commercial fishing operations. Under these regulations, harvesting nations intending to continue to export fish and fish products to the USA after January 1, 2023, must apply to the U.S. National Oceanic and Atmospheric Administration (NOAA) for a comparability finding for each of its commercial fisheries listed in the US List of Foreign Fisheries. The harvesting nation must demonstrate: 1) the prohibition of intentional mortality or serious injury of marine mammals in the course of commercial fishing operations; and 2) the implementation of a regulatory program comparable in effectiveness to the US, including mandatory reporting of marine mammal bycatch, monitoring programs and management/mitigation measures where appropriate.

Depending on information provided, Foreign commercial fisheries that export fish and fish products to the United States can be classified as either “export” or “exempt” based on the frequency and likelihood of incidental mortality and serious injury of marine mammals. On October 8, 2020, the 2020 US List of Foreign Fisheries was published on the NOAA public registry. For the Pacific Region, all Salmon Gillnet

fisheries are classified as Export (LOFF pg.97), all Salmon Trolling Line fisheries are classified as Exempt (LOFF pg.31), and all Salmon Purse Seine fisheries are classified as Exempt (LOFF pg.48).

DFO will continue to share information about the U.S. Marine Mammal Protection Act Import Provisions and the process for ensuring continued access to US markets. Further information can be found on the NOAA website, or by contacting the Regional Fisheries Coordinator or the DFO Marine Mammal Unit (MMU) (Contact: Lee Harber, Marine Mammal Advisor; Lee.Harber@dfo-mpo.gc.ca).

5.8 Marine Mammal Regulations Requirements to Maintain Distance

On June 22, 2018 the amended Marine Mammal Regulations came into force. These amendments include requirements for boats to maintain a minimum approach distance of 100 m for whales, dolphins or porpoises, 200m when whales, dolphins or porpoises are in a resting position or with a calf, and 200m from all Killer Whales in Pacific Canadian waters except when in the southern BC coastal waters between Campbell River and just north of Ucluelet where vessels must maintain a 400 minimum approach distance from all Killer Whales.

Please note that the 400m approach distance is in effect until May 31, 2021, with consideration of extending this throughout the rest of 2021. There is an exception for Authorized Vessels under the Interim Order as per the Canada Shipping Act, 2001, to approach non-Southern Resident Killer Whales up to 200m [as indicated on the water by the purple AV flag]).

The amended regulations also provide clarification on what it means to disturb a marine mammal, including feeding, swimming or interacting with them; moving them (or enticing/causing them to move); separating a marine mammal from its group or going between them and a calf; trapping marine mammals between a vessel and the shore, or between boats; and tagging or marking them.

As per the recent amendments, accidental contact between a vehicle or fishing gear and a marine mammal must be reported.

Further information regarding the Marine Mammal Regulations can be obtained by contacting your Regional Fisheries Coordinator or the DFO Marine Mammal Unit (MMU) (Contact: Paul Cottrell, Marine Mammal Coordinator; Paul.Cottrell@dfo-mpo.gc.ca).

5.9 Aquaculture Management

REGULATORY REGIME:

In December 2010 the Pacific Aquaculture Regulations (PAR) came into effect, giving DFO the authority to govern the management and regulation of aquaculture activities at marine finfish, shellfish, freshwater/land-based and enhancement facilities. The Aquaculture Activities Regulations (AAR), which

came into force in 2015, further clarify conditions under which aquaculture operators may treat their fish for disease and parasites, as well as deposit organic matter.

DFO also administers the provisions of the Fishery (General) Regulations (FGRs) including sections 54 to 57 in regard to licencing introductions and transfers of fish. These provisions include requirements relating to disease. All aquaculture operators must be authorized under the FGRs to bring fish onto the farm site, whether it is on land or in the marine environment. After fish are introduced to the farm site, fish health is addressed through conditions of licence under the PARs throughout the rearing process. The Framework on the Transfer of Live Fish developed in 2019 provides further guidance related to licencing under the FGRs. This is nested under the Framework for Aquaculture Risk Management.

As part of adaptive management, DFO Aquaculture Management continues to refine management approaches. The marine finfish aquaculture conditions were amended in March 2020 to improve sea lice management. Ongoing review and improvements to licence conditions are underway for the planned 2022 licence re-issuance. DFO Aquaculture Management is also exploring an Area-based Aquaculture Management approach, with a goal of managing aquaculture in a way that ensures environmental, social, and economic factors are considered.

In response to 2019 mandate commitments, DFO is developing a responsible plan to transition from open net-pen salmon farming in coastal British Columbia waters by 2025 and is working to introduce Canada's first-ever Aquaculture Act.

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 FrontCounter 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 industry, and the department also conducts additional monitoring, audits, and investigations (where warranted) to verify information submitted by licence holders and to obtain samples for analysis. Public reporting on the environmental performance of the aquaculture sector in BC is undertaken to ensure the transparency and accountability of the industry. Associated reporting can be found on this DFO web page: 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 ongoing basis. The Program provides oversight and works to ensure the orderly management of the industry, including planning and licensing, linkages with national and regional policy, as well as consultation and communications. Contact information for staff with responsibilities related to aquaculture management within DFO can be found in the Departmental Contacts section of this plan.

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 on the DFO Consultations web pages: http://www.pac.dfo-mpo.gc.ca/aquaculture/regs-eng.html.

IMAPs complement IFMPs and the two are reviewed periodically to ensure consistency of management approaches.

More information on IMAPs is available through: IMAPS@dfo-mpo.gc.ca.

5.10 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 2 for more information.

5.11 Catch Monitoring

Effective fishery monitoring and catch reporting programs are important to support fishery planning by First Nations, stakeholders, all levels of government and to meet Canada's international and other reporting obligations on fisheries. Further, timely and accurate information on harvest and harvesting practices is essential to properly assess the status of fish stocks and to support resource management for the conservation and the long term sustainability of fish resources.

Risk assessments are performed using an Excel-based tool that provides a consistent approach to a structured conversation regarding ecological risk and other resource management considerations. Draft risk assessments will be initially completed by DFO, then presented to harvesters for review, comment, and revision through existing advisory processes established for fisheries management purposes. Where no advisory process exists, engagement will occur through alternative means.

Should the risk assessment indicate a gap between the current level and target level of monitoring identified through the risk assessment, options to address the monitoring gap are to be identified through discussion between DFO and harvesters. The feasibility of these options (e.g. cost, technical considerations) is also to be considered through these discussions. The Strategic Framework directs that monitoring and reporting programs are both cost-effective and tailor-made for a fishery. As such, a collaborative approach is required.

Where monitoring options are determined to be feasible, the current monitoring and reporting program is to be revised to incorporate these options so the program provides sufficient information to resource managers to manage the ecological risk of the fishery effectively. Where monitoring options are not feasible, alternative management approaches are required to reduce the ecological risk posed by the fishery. If there is no gap between the current and target level of monitoring, then the management approach would not require any change.

Appendix 8 outlines the initial draft Catch Monitoring and Reporting Risk Assessments for Pacific Salmon completed to date, which are required under the current *Strategic Framework for Fishery Monitoring and Catch Reporting in the Pacific Fisheries*.

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 River. 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 2021 include: Stikine Chinook salmon, and Stikine-Mainstem Sockeye salmon (Stikine); Alsek Chinook salmon; 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 can be found at the Pacific Salmon Commission (PSC) website at: https://www.psc.org/.

Review of the performance of the PST provisions occurs annually at two bilateral meetings of 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 2019 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 constitutional protection provided to existing aboriginal and treaty rights and An Allocation Policy for Pacific Salmon.

An Allocation Policy for Pacific Salmon can be found on-line at:
http://www.dfo-mpo.gc.ca/Library/240366.pdf

An Allocation Policy for Pacific Salmon sets out principals for allocation between the recreational and commercial sectors and also identifies sharing arrangements for commercial fisheries. An explanation of some of the features of Allocation planning is set out in Section 6.4.

6.4 Allocation Guidelines

Allocation decisions are made in accordance with An Allocation Policy for Pacific Salmon:
https://waves-vagues.dfo-mpo.gc.ca/Library/240366.pdf

An update on the review of the Salmon Allocation Policy can be found in Section 1.6.1.

Table 4. Allocation guidelines for Salmon in the Pacific Region

	Low Abundance		**High Abundance**		
First Nations FSC	Non-retention / closed	Bycatch Retention	Directed	Directed	Directed
Recreational	Non-retention / closed	Non-retention	Bycatch Retention	Directed	Directed
Commercial	Non-retention / closed	Non-retention	Bycatch Retention	Bycatch 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 An Allocation Policy for Pacific Salmon on non-target stocks is case specific. The inadvertent harvest of different species is referred to as bycatch. 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 bycatch 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.

The Department does not allocate bycatch 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 bycatch and incidental catch.

6.4.1 First Nations - Food, Social and Ceremonial (FSC) and Treaty Domestic Harvest

An Allocation Policy for Pacific Salmon provides that after requirements for conservation, the first priority in salmon allocation is to treaty rights for harvest opportunities for domestic purposes (consistent with Treaty Final Agreements) and for FSC for harvest opportunities (under communal FSC licences issued to First Nations). The Department has announced plans to review *An Allocation Policy for Pacific Salmon*; further details can be found in Section 1.6.1.

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 marine areas or approach areas. The general guideline is that fishing plans 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

6.4.2 Recreational Fisheries

Recreational fisheries are managed to maintain opportunity wherever stock status allows and to allow fisheries to be managed in a predictable manner, where possible. Under An Allocation Policy for Pacific Salmon, after FSC fisheries, the recreational sector has priority to 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.

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 a directed commercial fishery on specific Chinook and Coho stocks, the fishing plan will provide for full daily and possession limits for the recreational sector on those stocks. Decision guidelines may also identify considerations for changing the area of the fishery, modifying dates or changing daily limits.

6.4.3 Commercial Fisheries

Commercial fisheries are managed to optimize the economic performance of the fisheries, to provide certainty to participate where possible and to optimize harvest opportunities. However,

stocks of concern will continue to constrain opportunities in many fisheries resulting in less than optimal opportunities.

An 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 and recreational priorities are considered to have been addressed.

The ability to achieve allocations is often limited by conservation constraints and other factors. Low impact fisheries (limited number of vessels) often 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.

6.4.4 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 GENERAL DECISION GUIDELINES AND SPECIFIC MANAGEMENT MEASURES

The following comprehensive decision guidelines outline management responses that will be invoked under a range of 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 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 5 below.

Table 5. Status criteria for Pacific salmon.

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.

7.2 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.

7.3 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.

7.4 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 6. 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 6. Estimated Post-Release Mortality Rates

Fishery	**Pre 2001 Post-Release Rates (for historical comparison)**	**2001 Post Release Rates**
First Nations Fisheries	Note: 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% same as commercial below Beach seine – 5% for Sockeye and Coho in river Fraser. Modified Shallow Seine – 10% for Sockeye and Coho in-river Fraser. Tooth Tangle net – 3.5" mesh is 10% Sockeye and 15% Coho 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.	10% for Coho in South Coast areas; 15% for Chinook in all areas
Commercial gill net (South Coast)	60% to 70%	60% with provision for rates as low as 40% where selective techniques warrant

Commercial seine – South Coast (Areas 11 to 29)	15% to 25%	25% Johnstone Strait; 50%* Area 20 – Coho; 25% all areas for Sockeye
Commercial Troll – All Areas	26%	10% Sockeye, 15% Coho and Chinook.
Commercial tooth tangle net 3.5" mesh	n/a	10% Sockeye, 15% Coho

*Recent work by researchers from Carleton University and the University of British Columbia and the Area B Harvest Committee has been undertaken in 2012 and 2013 to re-evaluate the release mortality rates for Coho caught using purse seine gear in Area 20. Results to date indicate that short-term release mortality rates are less than the current 70% estimate. For the 2021 fishery, the Department will use a 50% release mortality estimate for planning purposes subject to at-sea-observer coverage to assess Coho encounter rates and fish condition during any commercial fishery openings.

DFO will review the post-release mortality rates currently used for salmon fisheries in Canadian waters and update Table 6 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.

7.5 Chinook – AABM/ISBM Management

Chinook salmon fisheries in BC are managed under the umbrella of the Pacific Salmon Treaty (PST). Domestic considerations are also in place for stocks of concern, allocation between sectors of the fishery, and application of selective fishing practices.

With the exception of the Transboundary Rivers, the basis for managing fisheries impacting Chinook salmon from Alaska to Oregon is the Chinook abundance-based management system 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 outlines the abundance-based management framework established under the 1999 Agreement for management of Chinook fisheries. This chapter expired in 2018 and renewed provisions are in effect as of January 1, 2019.

Further explanation and the text of the Chinook salmon agreements can be found on the PSC website at: http://www.psc.org/publications/pacific-salmon-treaty/S. 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.

Chinook salmon fisheries under the PSC are accounted for during the Chinook year which begins on October 1 in one calendar year, to September 30 in the next calendar year.

Two types of fisheries are identified in the PST under Chapter 3:

- Aggregate Abundance Based Management (AABM) fisheries; and
- Individual Stock Based Management (ISBM) fisheries.

Within the PST Chinook management framework, Canadian domestic policy further defines fishing opportunities. The domestic objectives or policies which will most affect fishing opportunities include: conservation, Canada's constitutional obligations to First Nations, the WSP, and *An Allocation Policy for Pacific Salmon*, and the *Policy for Selective Fishing in Canada's Pacific Fisheries*.

Overview Of Northern Chinook Conservation Concerns

Escapement of northern Chinook salmon declined dramatically in recent years. Reduced survival rates, and productivity, have been observed across British Columbia and South East Alaska. This led to unprecedented declines of northern Chinook in 2017 and triggered significant management measures that were implemented for 2018 salmon fisheries and again in 2019. Post season evaluation of Skeena Chinook returns in 2019 were weaker than expected. For 2020, management measures will be put in place to support conservation and promote rebuilding of Skeena Chinook.

Overview: AABM Fisheries

Chinook salmon fisheries implemented under the PST AABM management regime include three mixed-stock fisheries:

- Southeast Alaska recreational, net and troll (SEAK)
- Northern British Columbia troll and Haida Gwaii (Queen Charlotte Islands) recreational (NBC); and
- West Coast of Vancouver Island troll and outside recreational (WCVI).

These fisheries are managed to an annual total allowable catch (TAC) based on the forecast abundance of the aggregate of stocks that contribute to each fishery. Annual quotas for each AABM fishery are developed by prediction of Chinook salmon abundance based upon a Cohort analysis model. For NBC fisheries, a single AABM quota is applied to troll fisheries Pacific Fishery Management Areas (PFMA) 1 to 5, 101 to 105 and 142 and to recreational fisheries in PFMA's 1, 2, 101, 102 and 142.

In Canada, conservation is the first priority in fisheries management. Once conservation obligations are met, priority access is given to First Nations for food, social, ceremonial, and treaty requirements. Once those obligations are met, priority access to Chinook salmon is provided to the recreational fishery, with commercial fisheries next in priority. Once the AABM quota is defined for the combined troll and recreational fishery, the projected recreational catch is subtracted from the TAC, with the remainder allocated to the troll fishery. Thus, the troll fishery is the first fishery to be impacted if stocks of conservation concern require management

actions in NBC fisheries. Management constraints to the fishery include management for stocks of conservation concern, minimizing encounters of undersized Chinook salmon and non-target species and minimizing fisheries where legal and sublegal-sized Chinook salmon have to be released.

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 7.

Table 7. 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

Canadian Chinook fisheries in all other areas of the North and Central Coast are managed as ISBM fisheries.

Overview: ISBM Fisheries

Under the PST, an ISBM fishery is an abundance-based regime that constrains to a numerical limit the total catch or the total adult equivalent mortality rate within the fisheries of a jurisdiction for a naturally spawning Chinook salmon stock or stock group. For Canadian ISBM fisheries, the agreement identifies a general obligation that limits the total adult equivalent mortality rate across all fisheries for individual stock groups to 63.5% of that which occurred in the 1979 to 1982 base period.

ISBM management regimes apply to all Chinook salmon fisheries subject to the PST that are not AABM fisheries and include marine and freshwater salmon fisheries from northern British Columbia to northern Oregon coast. ISBM fisheries for Chinook salmon in the North and Central Coast include all First Nations fisheries in both marine and fresh waters, all commercial gillnet and seine fisheries, all freshwater recreational fisheries, marine recreational fisheries in PFMA's 3 to 10, 103 to 110 and 130, and troll fisheries in PFMA's 6 to 10, 106 to 110 and 130.

7.5.1 Northern Chinook Enhancement Information

The major BC North Coast DFO operation enhancement facilities that produce Chinook are:

- Kitimat River hatchery
- Snootli Creek hatchery

There are two Chinook salmon exploitation rate indicator stocks in the North Coast that rely on hatchery production of coded wire tagged fry. The Atnarko River Chinook indicator stock is produced at the Snootli Creek hatchery and the Kitsumkalum River Chinook indicator stock is

produced at the Deep Creek hatchery. Deep Creek hatchery does not appear in the list above since it is not a production facility and the fish are raised for assessment purposes only.

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.

NOTE: the following plans are not available at the time of the publication of this draft document. Updates will be provided to the IHPC when available.

There are two datasets available: **Post-Season Production** from the 2018 brood year (i.e. 2019 releases, and numbers on hand for 2020 release), and the **Production Plan**, which includes proposed targets for the upcoming 2020 brood year. These are available at the following website:

http://www.pac.dfo-mpo.gc.ca/sep-pmvs/projects-projets/ifmp-pgip-eng.html

8 COMPLIANCE PLAN

8.1 Compliance and Enforcement 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;
- 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 Fish and Fish Habitat 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

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, Whale initiative/response 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.

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. 2019 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, 2021.

1 INTRODUCTION

The Alsek River originates in the southwest Yukon 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 12). 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.* 2004[5]). 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 occur in the lower reaches of 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 the 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 and Aishihik First Nations (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 River counts and genetic stock identification results. Estimates based on these data have ranged from 2,400 to 4,400 Chinook salmon. The run generally enters the river mouth in early May, peaks early June and has vacated the lower river by early July. The run reaches accessible areas of the Canadian portion of the drainage in late June, peaks in late July, with spawning mostly completed by end of August.

[5] 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.

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, in 2007 and 2011 to 2015 (as calculated from genetic stock identification (GSI) data), the Klukshu River count on average accounted for 48% of the total escapement. Based on total counts, the spawning escapement in the Klukshu River over the past decade (2010-2019) 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 averages half of the late 1970's, 1980's and 1990's (Figure 14).

1.1.2 Sockeye Salmon

Estimates of the total in-river run size of Alsek Sockeye salmon have averaged approximately 96,000 fish over the past decade. Since 2011 the estimates have been based on a combination of Klukshu River counts and GSI data. The run generally enters the river mouth in early June, peaks early July and has vacated the lower river by early August. The run reaches accessible areas of the Canadian portion of the drainage in late July, peaks in late August, with spawning mostly completed by end of September.

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. Improved understanding of population run timing characteristics is ongoing, for example, the early Klukshu River Sockeye run that peaks in mid-July is dominated by river-type fish, and the generally more abundant later Klukshu River Sockeye run that peaks in early-to-mid September is dominated by lake-type fish.

The status of Alsek Sockeye salmon is monitored primarily through the assessment program located on the Klukshu River where the recent 10-year (2010-2019) average escapement is approximately 12,080 Sockeye salmon (historical range since 1976: 2,741 in 2008, to, 32,120 in 2003). On average (2000-2019), Klukshu Sockeye escapement accounts for approximately 18% of the above border drainage escapement (determined by mark-recapture or GSI programs). Smoothed counts (10-year moving averages) indicate a waning trend in the total count with early time series declining by approximately 40% to current levels. Inter-annual counts are highly cyclic characterized by un-sustained highs and deep lows.

1.1.3 Coho Salmon

System-wide population estimates for Alsek Coho salmon are not available. For management purposes, Alsek Coho salmon are treated as one stock. One Coho CU has been identified (Alsek)

based on ecotypic characteristics. Information regarding Coho spawning distribution in the Alsek-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 River assessment program have averaged 2,138 fish over the (2010-2019) period and have ranged from 30 (1978) to 9,921 (2002) since 1976. Unfortunately, these Coho salmon counts constitute an incomplete record of total abundance into the Klukshu River since the assessment program is terminated due weather conditions before the migration is completed. 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 2.5.

1.1.4 Pink and Chum Salmon

Little information exists for Alsek 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 Alsek Pink or Chum salmon CU's have been identified.

1.1.5 Steelhead

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

1.2 Description of Alsek-Tatshenshini River Salmon Fisheries

There are two fisheries that target salmon in the Canadian section of the Alsek River: the First Nation (FSC) fishery and the recreational fishery (Figure 12). The principal U.S. fishery that targets Alsek stocks is a commercial set gillnet fishery that operates in Dry Bay, Alaska near the mouth of the Alsek River. A small subsistence fishery also operates in Dry Bay. Alsek 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 Alsek 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 12). Recent 10-year average (2010-2019) catches include 54 Chinook salmon, 1,027 Sockeye and 12 Coho salmon. Catches have declined over the past 3-4 decades. Although catches have been low, traditionally the preferred Sockeye salmon are the early run fish due to their good condition and arrival earlier in the summer which makes them more 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/snagging have become more popular over time. In some years, special harvest arrangements for elders have occurred through the Klukshu River assessment program.

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 13). 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 2020 only 33 recreational anglers participated in the Alsek River recreational fishery in the Yukon portion of watershed due to the weak Chinook and Sockeye salmon run; this was down considerably from 2012 when 280 anglers reported fishing there.

2 RUN OUTLOOKS FOR ALSEK RIVER SALMON IN 2021

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 salmon escapements in 2015 and 2016, which are the two principle brood years that contribute to the 2021 run, were 1,388 and 646 respectively. The returns from principle brood years were above and below the escapement goal range of 800 to 1,200 established by the PSC Transboundary Panel. Based on these primary brood year escapements, the pre-season stock-recruit outlook for Klukshu River Chinook salmon in 2021 is 1,000 fish. This includes a 51% adjustment (reduction) to account for the recent 5-year forecast model error. The 2021 forecast is below to the recent 10-year average (2011-2020) run size of approximately 1,400 Chinook salmon but within the escapement goal range.

2.2 Sockeye Salmon

The 2021 overall Alsek River Drainage Sockeye salmon run is expected to be approximately 44,000 fish, which is below the recent 10-year average (2010-2019) run size of approximately 72,000 Sockeye salmon. The outlook for 2021 is based on a predicted run of 10,000 Klukshu River Sockeye salmon derived from a Klukshu River stock-recruitment model (2011 Eggers et al.) and represents a 23% component of the Alsek River run. The outlook was adjusted by 36%

(reduced) to reflect recent variability in marine survival of Sockeye salmon. Principal contributing brood years were 2016 (Klukshu River escapement of 7,391 Sockeye salmon) and 2017 (Klukshu River escapement of 3,711 Sockeye salmon). An escapement goal range of 7,500 to 11,000 has been established by the PSC Transboundary Panel for the Klukshu River Sockeye salmon stock.

2.3 Coho Salmon

The Coho salmon primary brood year escapements through the Klukshu River weir in 2017 (966 fish) and 2018 (728 fish) were well below the 10-year average of 2,138 adult fish, which suggest that the 2021 run will be below average.

3 SPAWNING ESCAPEMENT GOALS FOR ALSEK SALMON

3.1 Chinook Salmon

The escapement goal range for the Klukshu River Chinook salmon stock is 800 to 1,200 fish, with a management objective (SMSY) of 1,000 fish. The drainage wide escapement goal range for Alsek River Chinook salmon is 3,500 to 5,300 with a management objective (SMSY) of 4,700 fish. The analyses and rationale for this goal were submitted for peer-reviewed to the Canadian Science Advisory Secretariat (CSAS) in 2010 and results published in 2011 (https://www.dfo-mpo.gc.ca/csas-sccs/Publications/SAR-AS/2011/2011_019-eng.html). This escapement goal range was recommended by the PSC TTC, the Transboundary Panel and adopted by Canada and the United States in 2013.

3.2 Sockeye Salmon

The escapement goal range for the Klukshu River Sockeye salmon stock is 7,500 to 11,000 fish, with a management objective (SMSY) of 9,700 fish. The drainage wide escapement goal range for t he Alsek is 24,000 - 33,500 fish with a management objective (SMSY) of 29,700 fish. The analyses and rationale for this goal were submitted for peer-reviewed to the Canadian Science Advisory Secretariat (CSAS) in 2010 and results published in 2011 (https://www.dfo-mpo.gc.ca/csas-sccs/Publications/SAR-AS/2011/2011_018-eng.html). This escapement goal range was recommended by the PSC TTC, the Transboundary Panel and adopted by Canada and the United States in 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 Fishery Manager

experience. 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 and Aishihik First Nations (CAFN) Final Agreement was signed May 29, 1993 and ratified in 1995 (https://www.rcaanc-cirnac.gc.ca/eng/1294331836730/1542812214590). 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.

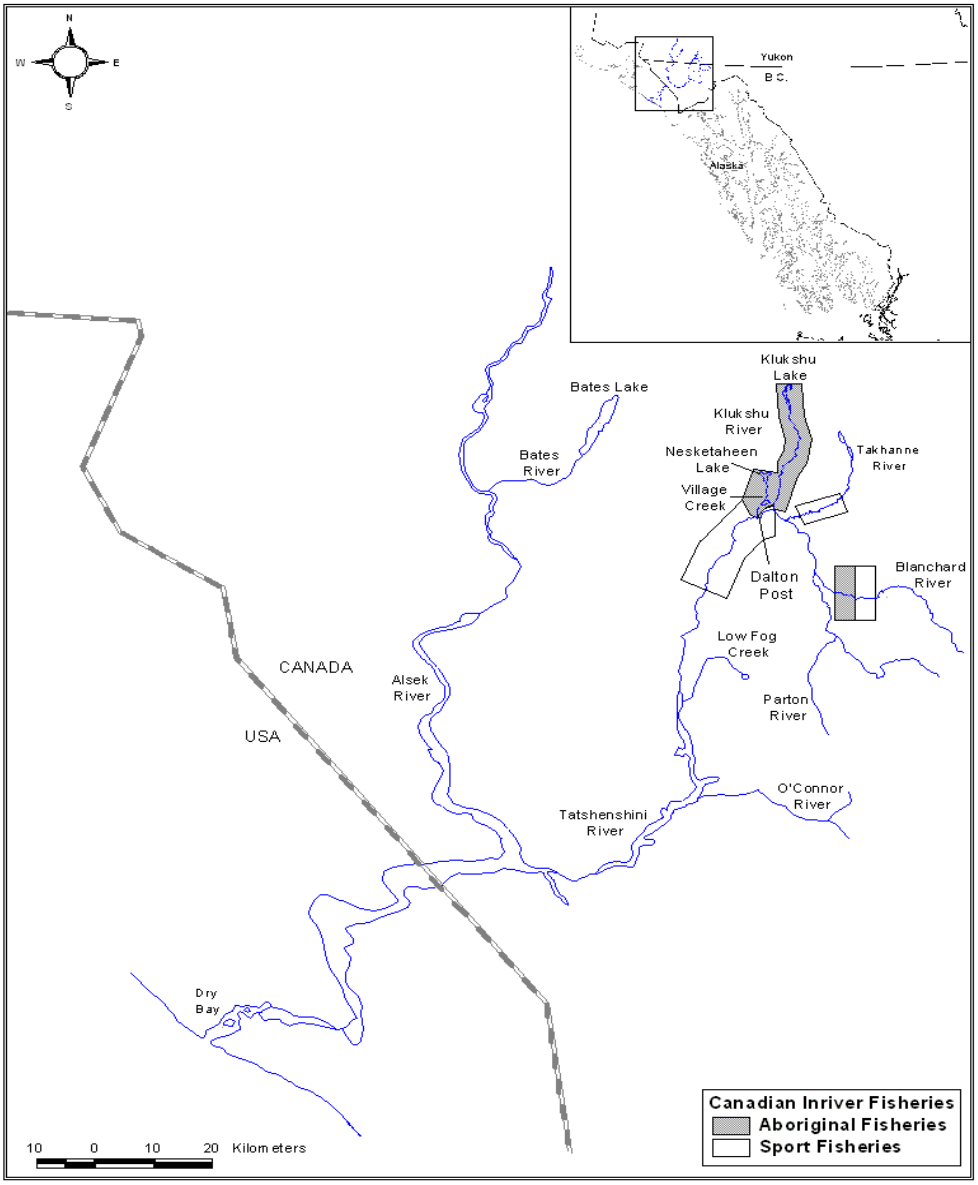

Figure 12. The Alsek River and principal Canadian fishing areas.

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 primarily 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 2021 season, the YSSC has recommended:

- No allocation to the public (recreational) Chinook and Sockeye angling fishery, dependent on in-season projections; and,
- Normal allocation to the public (recreational) Coho angling fishery, dependent upon in-season projections.

The Minister of Fisheries and Oceans Canada has accepted the YSSC's recommendation.

4.3 Transboundary 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 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 2021 season.

5 ALSEK-TATSHENSHINI DECISION GUIDELINES FOR 2021

Although Canada/U.S. harvest sharing arrangements for Alsek Chinook and Coho salmon have yet to be negotiated, provisions 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 assessment information is used to inform fishery 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 8 (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 8. Alsek-Tatshenshini salmon management thresholds for conservation actions.

Run Component	First Nation Triggers	Recreational Triggers	Date	Potential First Nation Harvest
Chinook	800	N/A	July 18	10% of Klukshu count
Chinook	800	1,000	Aug. 14	10% of Klukshu count
Early Sockeye	1,500	N/A	July 18	10% of Klukshu count
Sockeye	1,500	4,500	Aug. 14	10% of Klukshu count
Total Sockeye	7,500	12,700	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 only consider restrictions to the First Nation fishery if the lower end of respective biological escapement goal range 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 12,700 for overall Sockeye management, is the sum of the management target of 9,700 plus the BNA for CAFN of 3,000 Sockeye.

In addition to fishery management measures intended to achieve escapement targets, several additional factors may influence salmon fisheries management measures 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. Any short-notice or emergency actions will involve engagement with the YSSC and CAFN as per the requirements established in the CAFN Final Agreement.

6 ALSEK-TATSHENSHINI FISHERY PLANS FOR 2021

6.1 First Nation Fishery

6.1.1 Champagne and Aishihik First Nations 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 forecast, a Chinook salmon harvest in the FSC fishery is anticipated to occur in 2021. 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 with CAFN and the Yukon Salmon Sub-Committee. Action triggers and subsequent management actions for CAFN 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, fishing time restrictions and or area closures will be recommended. In the event of abundance below the lower end of the escapement goal range, 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, fishing time restrictions and or area closures will be recommended. In the event of abundance below the lower end of the escapement goal range, and contingent on the operation of the Klukshu assessment program, up to 10% of the in-season count of Sockeye salmon may be harvested for CAFN 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 short-notice in-season restrictions to the FSC fishery are required, management actions will be implemented following notification of CAFN and the YSSC.

Harvest monitoring in the FSC fishery is conducted by CAFN, which includes harvest reporting to the YSSC per Paragraph 16.7.20 of the CAFN Final Agreement.

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

As portions of the Alsek River drainage which are inhabited by adult salmon occur in both the Yukon and British Columbia, both the *British Columbia Sport Fishing Regulations* and *Yukon Territory Fishery Regulations,* apply to recreational angling in respective areas of the Alsek-Tatshenshini watershed.

Recreational angling restrictions and requirements are subject to change in-season should 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: https://www.dfo-mpo.gc.ca/fisheries-peches/recreational-recreative/index-eng.html.

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: 2021-2022, 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: https://yukon.ca/en/yukon-fishing-regulations-summary). 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 at the start of the 2021 fishing season are as outlined in Table 9.

Table 9. Species Daily Catch limit and Possession Limit (Yukon Recreational Fisheries).

Species	Daily Catch Limit	Possession Limit
Chinook	0	0
Sockeye	0	0
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 2021-2022 Yukon Fishing Regulations Summary booklet will apply to the recreational fishery (in-season changes available online).

The following specific provisions apply to recreational Chinook and Sockeye salmon fisheries in the Alsek River watershed (Yukon portion) in 2021:

a) **A salmon angling (including catch and release) closure will be in effect April 1 through August 14, 2021;**

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 estimates of abundance;**

c) **The pre-season outlook projects an below average return of Sockeye salmon in 2021. The daily catch and possession limits will be varied to 0 at the start of the season and remain in effect unless in-season abundance projections exceed management triggers (4,500 by August 15 or 10,500 by September 6);**

Angling for, retention or possession of Chinook and Sockeye salmon will not be permitted in the recreational fishery prior to August 15, 2021 unless in-season assessment programs identify that spawning escapement needs will be met and First Nation BNA harvests levels are accounted for prior to this date. 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 2021:

- 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 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
- single hook and artificial fly only restrictions are applicable in specified waters.

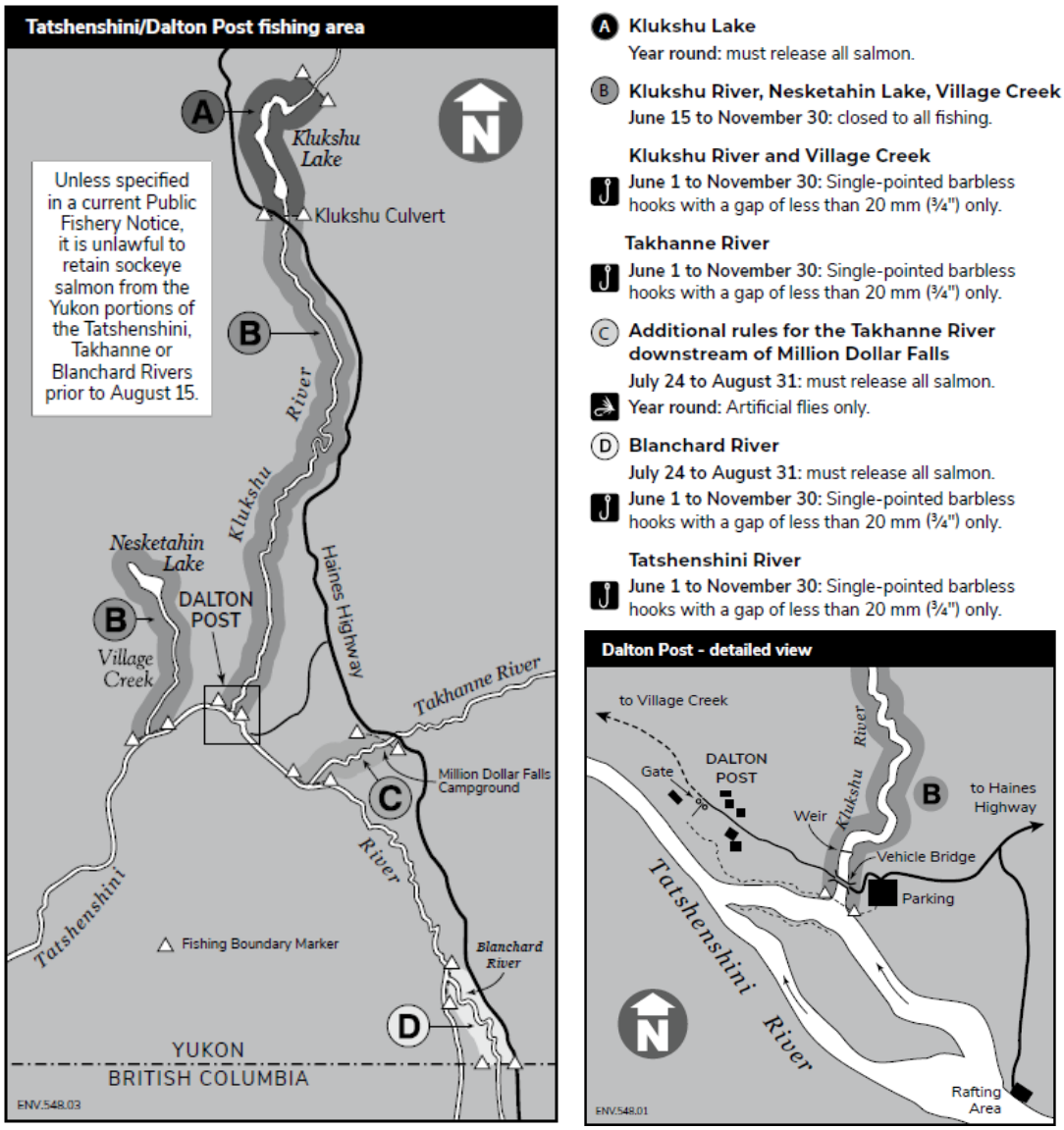

Figure 13. Area closures and gear restrictions on the Tatshenshini River and tributaries in the Alsek drainage in the Yukon Territory.
[see: https://yukon.ca/en/yukon-fishing-regulations-summary].

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 *2021-2023 B.C. Freshwater Fishing Regulations Synopsis* or online (see: https://www2.gov.bc.ca/assets/gov/sports-recreation-arts-and-culture/outdoor-recreation/fishing-and-hunting/freshwater-fishing/region_6_skeena.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 2021 include:

- **Angling for 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 (closed to Chinook, Sockeye and Coho fishing).

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

Compliance monitoring and enforcement will be undertaken by Fisheries and Oceans Canada and BC Provincial enforcement personnel.

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 2021

The Alsek stock assessment program planned for 2021 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 12 – 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 Figure 14, Figure 15 and Figure 16. The assessment program includes enumeration and the collection of limited biological data (sex and size estimates). Attempts have been made since 2018 to gather this data in the headwaters from post-spawn fish.

Sockeye salmon will also be enumerated using a video counter at Village Creek, another Tatshenshini River tributary, which drains Nesketahin Lake (Figure 12). Snorkel survey assessments on the Takhanne River and the Chinook salmon sonar assessment pilot project on the Blanchard River are planned in 2021. 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) requires 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 Genetic Stock Identification (GSI) and biological information on Chinook salmon. Due to low forecast abundance and overall conservation concerns, the (U.S.) commercial salmon fishery will be administered to avoid Chinook salmon harvest in 2021. In this regard in-river abundance of Chinook salmon will be estimated based on an expansion of the Klukshu River run. 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.

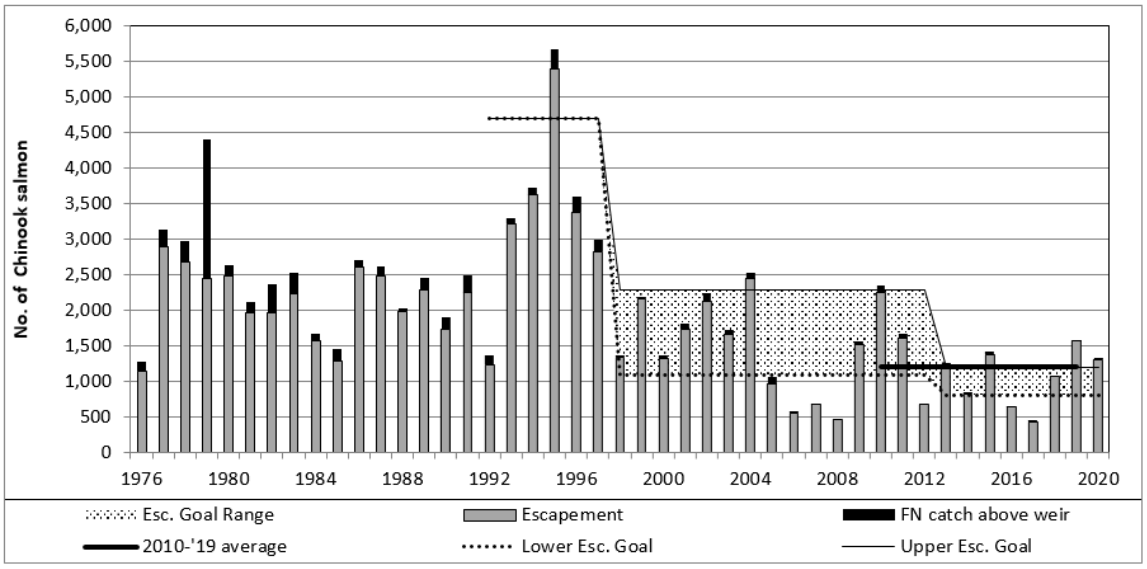

Figure 14. Weir counts of Klukshu River Chinook salmon, 1976 to 2020 (including jacks). [Note: Annual weir counts are represented by the stacked bars which include escapement plus the First Nation catch that occurred upstream of the weir].

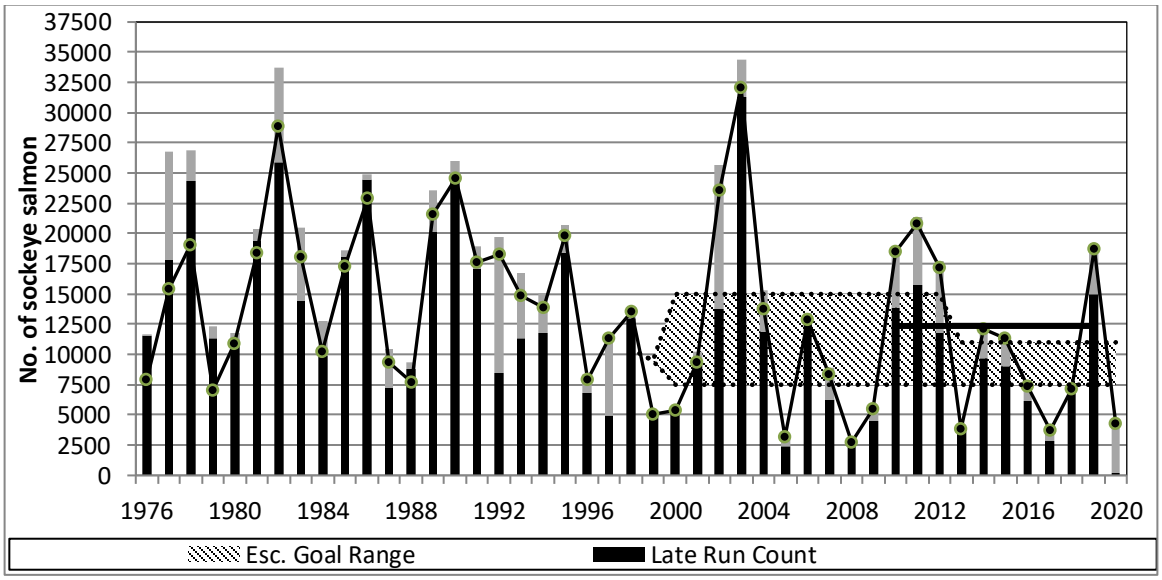

Figure 15. Weir counts of Klukshu River Sockeye salmon, 1976 to 2020. Total weir counts are portrayed by the stacked bars which include the early (<15 August) count plus the late count (≥15 August). Escapement is the total weir count minus fish harvested upstream of the weir.

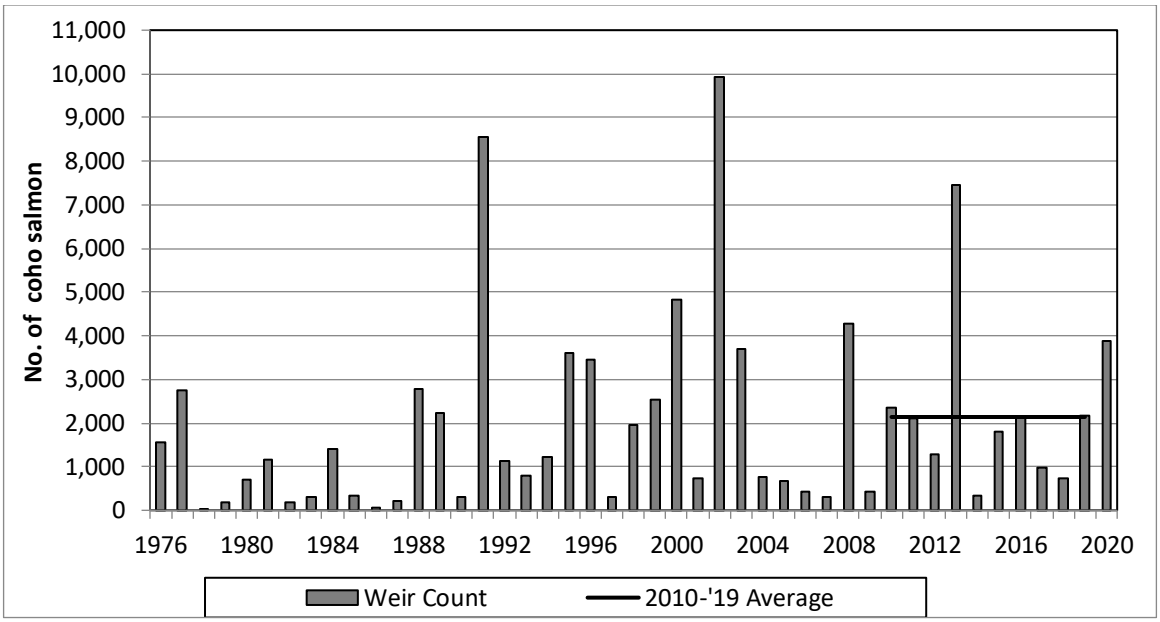

Figure 16. Weir counts of Klukshu River Coho salmon, 1976 to 2020. [Note: due to the timing of weir removal, counts do not cover the entire Coho salmon run].

8 ALSEK-TATSHENSHINI POST SEASON REVIEW

8.1 Conservation

The 2020 Klukshu Chinook salmon weir count of 1,327 fish was above the Klukshu escapement goal range of 800 - 1,200 fish (Table 10). The counts of 2020 Klukshu Sockeye salmon of 4,396 was very poor and one of the lowest counts to date. The resulting Klukshu Sockeye salmon escapement was well below the lower end of the escapement goal range of 7,500 - 11,000 (Figure 15). The Klukshu Coho salmon weir count of 3,869 was well above average (Figure 16)

Table 10. Salmon counts and escapement through the Klukshu River weir enumeration site in 2020.

Species	2020 Pre-season Outlook	Weir Count (Total)		Estimated Spawners (Total)		Escapement Goal Range	Esc./Management Target Achieved?
		2020	2010-19 Avg.	2020	2010-19 Avg.		
Chinook	>average	1,327	1,203	1,316	1,175	800 – 1,200	Exceeded
Sockeye	<average	4,396	12,361	4,287	9,457	7,500 - 11,000	Not met
Coho	NA	3,869	2,138	NA	NA	NA	NA

8.2 First Nation Fishery

Due to the absence of a harvest monitor in 2020, catches in the FSC were estimated from reported catches of fish taken at the DFO assessment sites combined with estimates of the catches taken upstream and downstream of the weir based on the relationship between

historical catches and weir counts. The CAFN harvested an estimated 22 Chinook, 218 Sockeye salmon and 6 Coho salmon.

8.1 Recreational Fishery

In 2020, the Tatshenshini River recreational fishery was closed to all salmon angling (including live release) prior to August 15. On August 15, the recreational fishery was opened with Chinook salmon limits set at 0 daily and 0 in possession, Sockeye salmon 0 daily and 0 in possession , and Coho salmon limits at 2 daily and 4 in possession. On October 9, Coho salmon limits were increased to 4 daily and 12 in possession.

A preliminary estimate of 12 Coho salmon were harvested in the recreational fishery, and additional estimated of 2 Sockeye and 10 Coho salmon were released.

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 count of 4,396 Sockeye salmon past the Klukshu assessment site in 2020, there was not a sufficient 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.

Harvest of Chinook salmon in the U.S. Alaskan Dry Bay fisheries was 182 fish in the commercial fishery and 21 in the subsistence fishery. The 2010-2019 average catches for these fisheries were 354 and 33 Chinook salmon respectively. Sockeye salmon harvest was 2,518 fish in the commercial fishery and 188 fish in the subsistence fishery; respective 10-year averages were 13,509 and 193 Sockeye salmon.

The 2020 Canadian salmon harvest was limited in both the First Nation and recreational fisheries. Combined fishery catches of 22 Chinook and 218 Sockeye, and 18 Coho salmon were below respective 2010-2019 averages of 102 Chinook and 1,043 Sockeye salmon.

APPENDIX 2: STIKINE RIVER INTEGRATED SALMON FISHERIES MANAGEMENT PLAN, 2021

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 km^2 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/soe/indicators/land/protected-lands-and-waters.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 17).

Salmon stocks returning to the Stikine River drainage are jointly managed by DFO, the Tahltan Central Government (TCG) and the Alaska Department of Fish and Game (ADFG) through the joint Transboundary Technical Committee (TTC) of the Transboundary 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 (2011-2020), the annual terminal run size[6] has averaged approximately 18,500 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.

[6] 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 (2016-2020) escapement having dropped to 537 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 the 2014 salmon run, including the Little Tahltan River. As a result, the lowest Little Tahltan weir count occurred in 2014 (169 large fish). Remedial work was conducted at the Tahltan River landslide in March 2015 and March 2018 to improve fish passage and monitoring has been underway consistently since 2014 to evaluate migration passage and determine if further measures that may be required. In 2020 higher flows than those occurring since 2014 persisted in the spring and into the summer eroding the debris and mobilizing the large blasted rocks from 2018 passage conditions allowing salmon much better opportunity to navigate the site. As a result engineering investigations in 2020 and work planned to further improve passage conditions did not attempt to make further improvements on the conditions observed. Plans for 2021 will be to continue to monitor the site for passage concerns, the changes as a result of further erosion expected and to evaluate results to determine if further work is required (see Section 9.1).

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 27,000 fish during the 2015-2019 period. Prior to 1999, directed terminal gillnet fisheries of Stikine Chinook salmon had been curtailed for approximately 20 years to allow stocks to rebuild. Arrangements for directed harvest, if/when warranted by abundance, commenced in 2005 and were updated in 2019 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 (2011-2020), the annual total run size has averaged approximately 131,300 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 total 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 (2016-2020) count is approximately 22,300 Sockeye. 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 5-year cycle-average (2016-2020) is approximately 108,100 fish.

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 2014, 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 Central Government Fishery

Tahltan Central Government (formerly: Tahtlan First Nation) (TCG) members have been actively fishing on the Stikine River since well before European contact. TCG members are mainly centred around the communities of Telegraph Creek, B.C.and 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 (2011-2020), the FSC fishery has annually harvested an average of7,202 Sockeye (range since 1972 of approximately 2,000 to 10,600 Sockeye), 566 large Chinook (range: 100 to 1,400 fish); and 285 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 have 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 TCG 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 (2010-2019), recreational fishers retained an average of 34 large Chinook per year, ranging from 0 (2007, 2016-2019) 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 17) 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 (2011-2020) include: 32,238 Sockeye (range since

1979: 6,100 to 95,800 Sockeye salmon), 1,334 large Chinook (range of 0 to 19,100 Chinook salmon); 623 small Chinook salmon (range of 0 to 2,100), 5,486 Coho salmon (range of 0 to 15,900 Coho); 100 Pink salmon; and 200 Chum salmon.

Over the past decade (2011-2020), the upper Stikine commercial catch has averaged: 538Sockeye (range since 1975: 40 to 2,500 Sockeye); 3 large Chinook salmon; and 6 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 no returns are expected in 2021.

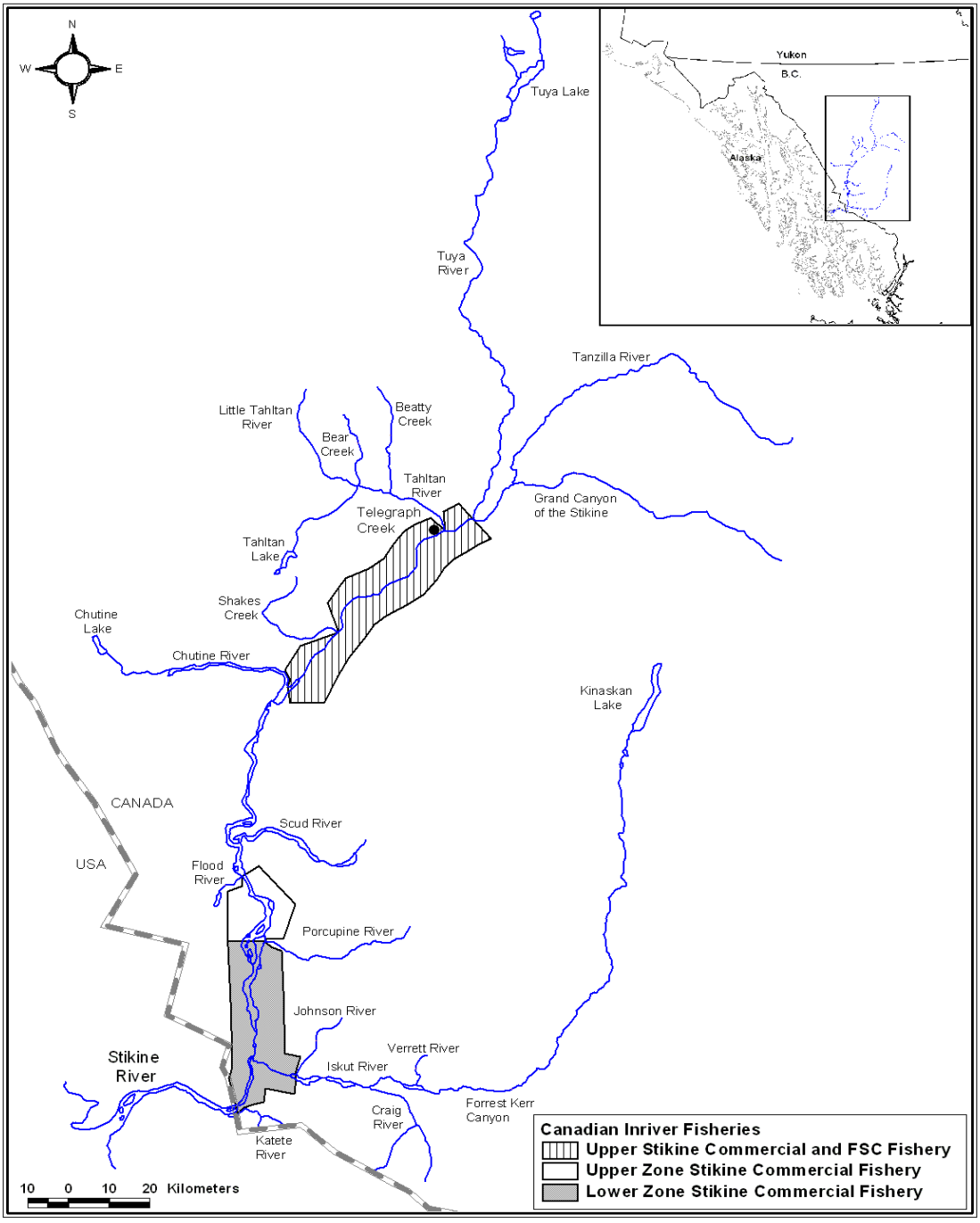

Figure 17. The Stikine River and Canadian fishing areas.

2 RUN OUTLOOKS FOR STIKINE SALMON IN 2021

2.1 Chinook Salmon

The 2021 outlook for the terminal run of Stikine River Chinook salmon is 9,900 large fish, which is 46% below the recent ten-year average run size of approximately 18,500 large Chinook salmon, and 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 2021 terminal Stikine River Sockeye run outlook is approximately 56,000 fish which is below the recent ten-year average (2011-2020) run size of approximately 108,000 fish. The components of this forecast are summarized below.

Tahltan Lake Sockeye

The total run outlook for Tahltan Lake Sockeye is approximately 28,000 fish of which 19,000 are expected from the enhancement project and 9,000 are expected from natural spawners. For comparison, the ten year average (2011-2020) run size of Tahltan Lake Sockeye salmon is approximately 67,000 fish. The outlook is based on a smolt model which uses the number of smolts emigrating from Tahltan Lake in 2018 (378,732 natural, 636,242 enhanced) and 2019 (479,340 natural, 1,120,354 enhanced) combined with the recent 3-year average survival rates.

Mainstem Sockeye

The outlook of 28,000 mainstem Sockeye salmon is based on a stock-recruitment forecast and below the ten year average (2011-2020) run size of approximately 41,000 fish. Typically a sibling model is used, in conjunction with a stock recruitment model, to generate forecasts. A sibling model uses returns from a given year to predict the following year's return. However, due to limited fishing of mainstem stocks in 2020, it was not possible to reliably determine abundance of specific age classes.

2.3 Coho Salmon

The lack of reliable escapement and marine survival data for Stikine River Coho salmon precludes the development of a reliable outlook for this stock in 2021. Aerial surveys are conducted once annually and are subject to various surveying and run timing variables. Work is underway to enable development of outlooks in the near future.

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 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 aggregate. 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 management 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/U.S. Sockeye enhancement program. Escapement goal ranges for the various management categories for the Tahltan stock are summarized in

Table 11 below.

Table 11. Tahltan Sockeye escapement goals for 2021.

	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 12 below.

Table 12. Mainstem Sockeye escapement goals for 2021.

	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 is fully acceptable; one that falls above the escapement range is acceptable but not desirable. A return that falls below the escapement range is undesirable. These scenarios translate to Management Categories employed by DFO with Green considered fully acceptable, Yellow considered acceptable but not desired and Red considered 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 Central Government. Recommendations of the Transboundary 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 Central Government: Aboriginal Fisheries Strategy Consultation

Consultations with the TCG relating to the Aboriginal Fisheries Strategy (AFS) occur throughout the year. Results of these consultations are contained within a multi-year DFO/TCG 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 TCG also participate actively in the Stikine River Salmon Management Advisory Committee and have representation on the Transboundary Panel.

4.2 Stikine River Salmon Management Advisory Committee (SRSMAC)

The SRSMAC is comprised of representatives of DFO, TCG, 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 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 U.S. agencies for the 2021 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 TCG. 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 9,900 large Chinook does not meet the threshold for implementing a directed Chinook commercial fishery based on the terminal run preseason 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 2021 this is not considered likely.

The pre-season forecast is expected to serve as the principal run size estimator for 2021. 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 (30 May - 05 June) but it is anticipated that very few tags will be applied in 2021 and recoveries in the Canadian fisheries (incidental interceptions in Sockeye fishery) will be minimal.

For 2021, in the unlikely event that in-season run size projections allow for a directed large Chinook salmon harvest, the fishery will 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 recreational fisheries; catch and effort from the Kakwan tagging site; and escapement requirements. The in-river run timing model for 2021 (which is used to expand the mark-recapture estimates to give projections of the total inriver run size) will be based on the average run timing of large Chinook salmon observed in the Canadian commercial/assessment fisheries . 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 2,000 fish and a 47% harvest share for Canadian fisheries of 940 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:

- *Miller, S.E. and J.A. Bednarski. 2017. Stikine Sockeye salmon management model: improving management uncertainty. Pacific Salmon Comm. Tech. Rep. No. 38: 31 p.*

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 2021 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 3) and perhaps as late as SW28.

2) The forecasts for SW28-32 (July 4 through August 7) will be based on the SMM and the SFMM produced forecasts or other approved methodology.

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 24 (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 13. 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 13 and

Table 14 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 14.

Table 14. 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 catch limit. In 2021, Canadian Coho salmon management will commence in SW35 (August 22 – 28).

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 2021

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 2021. Although additional restrictions in FSC fisheries are not anticipated, TCG 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 for Chinook and Sockeye salmon. An engineering evaluation of the Tahltan landslide in 2020 for remedial planning revealed conditions to be much improved over recent years and passage is not expected to be a concern however further slide site debris changes and erosion will be monitored annually to ensure concerns are identified for management considerations. 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 TCG.

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 TCG 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 *2021-2023 B.C. Freshwater Fishing Regulations Synopsis* at: https://www2.gov.bc.ca/assets/gov/sports-recreation-arts-and-culture/outdoor-recreation/fishing-and-hunting/freshwater-fishing/region_6_skeena.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 2021, the retention of Chinook salmon is prohibited (effective April 1 to March 31). In addition, the Tahltan River will be closed to recreational salmon fishing from June 1 to August 31.

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 2021, recreational angling for Chinook salmon is not permitted and the daily limit 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, for 2021, the Tahltan River will be closed to salmon fishing from June 1 until August 31.**
  - The remainder of the Stikine River drainage is open to salmon fishing from April 1, 2021 to March 31, 2022.

Additional restrictions may be implemented in 2021 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 TCG 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 2021 pre-season Chinook salmon forecast is not sufficient to proceed with a directed commercial fishery for Stikine Chinook salmon and an assessment fishery will not be conducted as the run outlook projects abundance will not meet the minimum escapement target. Restrictions in the commercial, recreational, and FSC fisheries are required for the 2021 season.

In the unlikely event that a directed Sockeye salmon commercial fishery should occur, the implementation of Chinook conservation measures would include the following: delay of the Sockeye salmon fishery until the week of June 20 - 26 (SW26) or later; the retention of incidentally caught Chinook salmon would be prohibited; the use of set nets would be permitted in the commercial Sockeye salmon fishery during SW26-27, but limited to 30 minute soak times; for the duration of the Sockeye salmon management period (SW26-34), the maximum mesh size would be 14.0 cm (~5.5"). Subject to in-season information, the lower Stikine River commercial

Sockeye salmon fishery would be managed on a weekly basis according to abundance. The upper Stikine commercial fishery would typically be open for Sockeye salmon on or about June 30 (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 22-28).

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. In addition, the run size has been deemed insufficient for a mortality based assessment fishery, so in-season projections are not anticipated.
- 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. Due Chinook salmon conservation concerns in 2021, a maximum mesh size restriction of 140 mm (5.5 in) will be implemented as in previous years to conserve Chinook salmon during Sockeye salmon 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 2021.

6.3.2 Stikine Commercial Sockeye Fishery Controls

The commercial fishery is typically 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 are:

- Adjusting fishing time: Fishing time periods in the lower Stikine Sockeye salmon fishery depend upon stock assessment and international and domestic catch allocation considerations. The pre-season expectation is for a run size not capable of providing commercial fishing opportunities, in the unlikely event that in-season information suggests the run has improved enough to support commercial fishing, initial fishing periods for Sockeye salmon will likely be of shorter duration due to uncertainty over the pre-season run outlook. Should in-season projections become available, caution will be exercised in providing fishing time. In the upper Stikine commercial fishery, weekly fishing times would generally follow those of the lower river lagged by one week;

- Adjusting the fishing area: Initially, the fishing area will be defined as 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 would 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 would 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. In order to address Chinook salmon conservation concerns, there will be a maximum mesh size restriction of 140 mm (5.5”) through August 21 (SW34) to conserve Chinook salmon while permitting harvest opportunities on Sockeye salmon.

- Release of bycatch: Release of incidentally caught Chinook salmon would be required during the course of a directed Sockeye fishery.

Note: Opportunities for directed commercial harvest of Sockeye salmon are unlikely in 2021.

6.3.3 Stikine Commercial Coho Fishery Controls

For the directed Coho fishery, weekly harvest strategies commencing SW35 (August 22-28) 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 2021, 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 may to be gathered over the course of the Sockeye salmon fishing season, which typically extends from late June through to mid-August. If there is a Coho salmon 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 salmon 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 may 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 2021, 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 fishery opening announcements will list the species for which retention is permitted. 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 TCG Fisheries Program Technicians stationed at the lower Stikine Field Office. The upper Stikine fishery will be monitored by a TCG 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 or 2021 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 $208.49 regular fee and $26.06 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 Central Government to harvest excess Sockeye at the weir at Tahltan Lake, or in the Tahltan River. In accordance with Departmental policy, the Tahltan Central Government will be given the right of first of refusal for the 2021 ESSR for Tahltan Lake Sockeye. If the Tahltan Central Government 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 Central Government 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 2021. 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 2021

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 Transboundary Panel. 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, last fry release occurring Spring of 2014.

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 2021 is summarized in Table 15.

Table 15. Stikine Enhancement Production Plan (SEPP) 2021

Enhancement Project	Activities	Expected Production	Technique to document production
Tahltan Lake	Egg Take: target of 5.0 million eggs. Guideline for last adult broodstock collection day is September 25 Outplant: All fry to be "direct release" into Tahltan Lake	65,000 adults resulting from direct release in Tahltan Lake.	Thermal mark
Expected Total Production		65,000	

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 TCG, 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 provides all references utilized and provide clarity on fish production, harvest, terminal escapement, opportunities and challenges and recommendations for consideration. Further 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. 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 2021

8.1 Chinook Salmon

Stikine Chinook salmon in-river stock assessment programs planned for 2021 include:

- The joint Canada/U.S. 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 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 2021) 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 Figure 18 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 2021).
- Aerial surveys of key Chinook salmon spawning areas located throughout the Stikine River.
- A pilot study to test the feasibility of using SONAR technology to enumerate Chinook salmon on the Tahltan River (pending public safety restrictions associated with COVID-19).

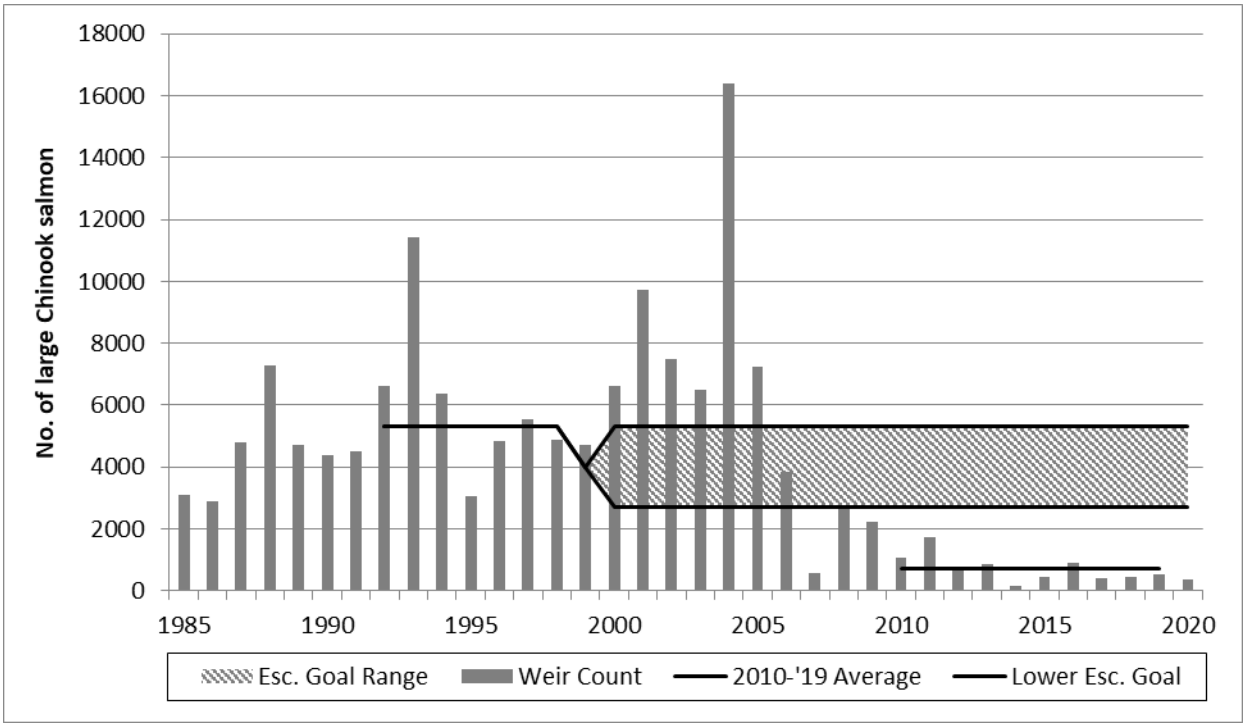

Figure 18. Weir counts of Little Tahltan River Chinook, 1985 to 2020 (does not include jacks). A landslide impeded access to the Tahltan R. drainage Chinook salmon spawning grounds in 2014.

8.2 Sockeye Salmon

The expected assessment program for Stikine Sockeye salmon in 2021 will include the following:

- Should a commercial fishery occur in 2021, 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. In the absence of a directed Sockeye salmon commercial fishery, a non-lethal (live release) assessment fishery will be required to provide in-season run abundance, stock composition, and biological information.

- 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 19).
- 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 20); 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 estimated based om total in-river run from the sampling programs in the lower river; 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.

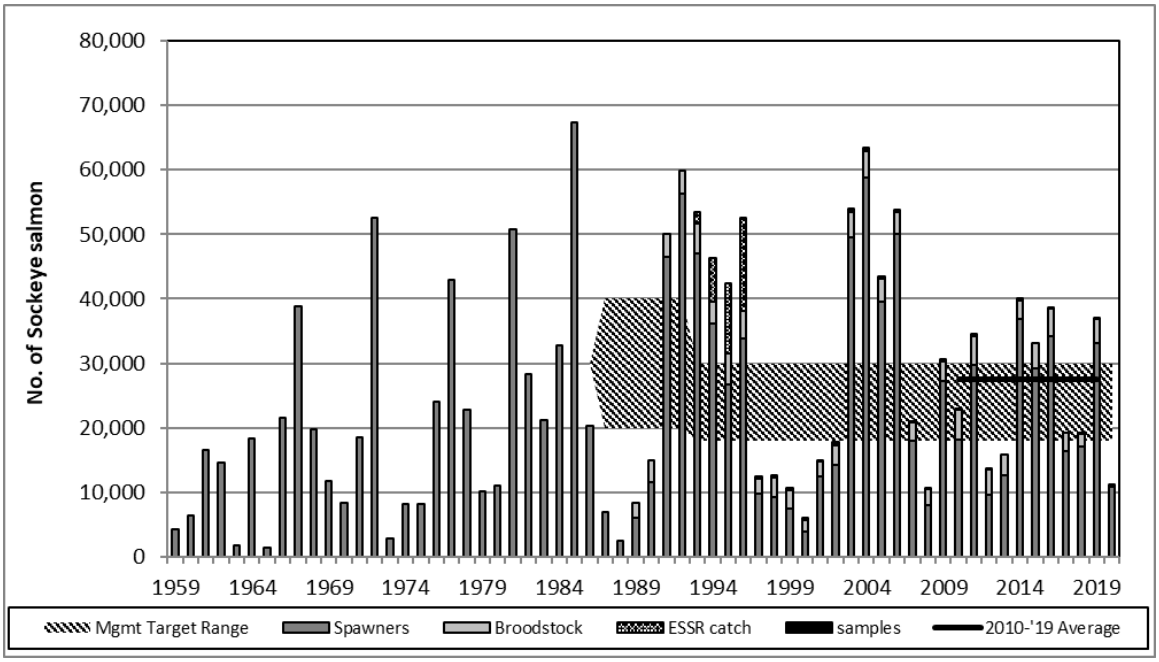

Figure 19. Weir counts of Tahltan Lake Sockeye, 1959 to 2020. Note that annual weir count equals the sum of spawners + broodstock + ESSR catch + samples.

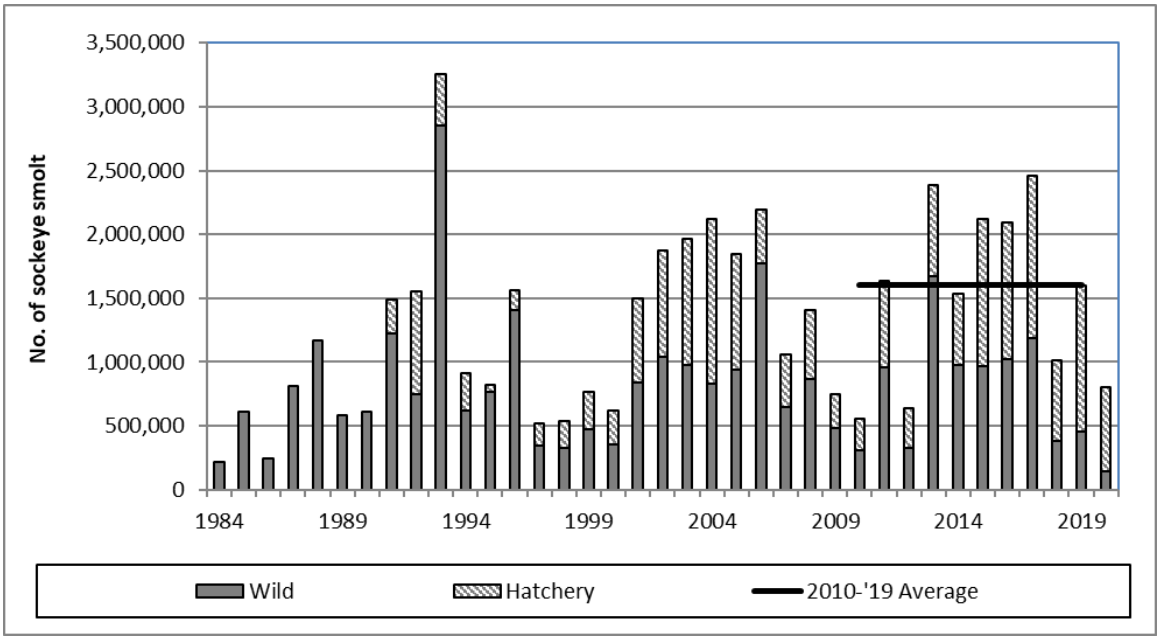

Figure 20. Weir counts of Sockeye salmon smolt emigrating from Tahltan Lake, 1984 to 2020.

8.3 Coho Salmon

The expected stock assessment program for Stikine Coho salmon in 2021 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 21).
- Pilot studies to determine the potential for enumerating specific components Stikine River Coho salmon run will be continued on the Iskut and the Katete rivers. The Iskut River will be the focus of a mark-recapture feasibility study; the Katete River study will test the use of sonar technology.
- Development of a genetic stock identification baseline.

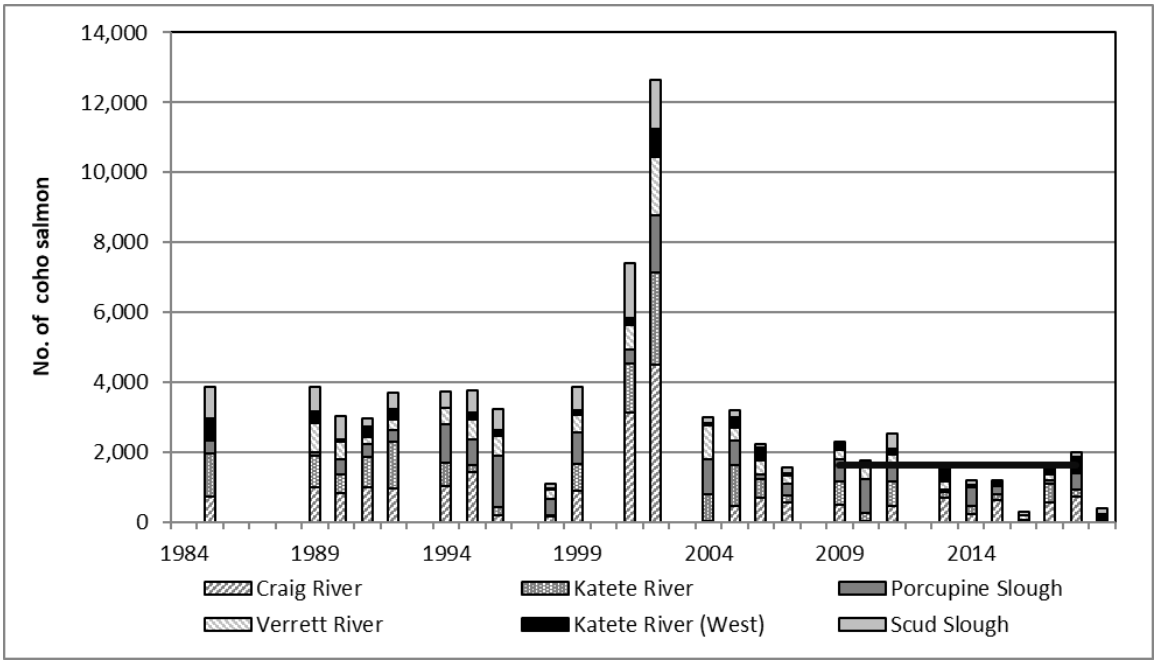

Figure 21. Aerial counts of Coho salmon in Stikine R. spawning index areas: 1984-2019 (2020 survey incomplete). Surveys are flown once annually the end of October or early November. Only years when all six index areas were surveyed are displayed. A program to estimate total system-wide Coho salmon escapement was discontinued in 2012.

8.4 Pink and Chum Salmon

The assessment program for Stikine Pink and Chum in 2020 will involve monitoring catch and effort in the lower Stikine River commercial fisheries.

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 2020 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 2020*. Pacific Salmon Commission.

The following sections summarizing the 2020 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 16. The estimated escapement of Stikine River large Chinook salmon was 9,753 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. The Little Tahltan River Chinook count of 347 large Chinook salmon was well below historical levels.

The Tahltan Lake Sockeye salmon escapement goal range of 18,000 to 30,000 fish was not achieved in 2020 (Table 16) with 11,158 fish passing through the enumeration weir. The spawning escapement for the mainstem Stikine Sockeye stock aggregate was estimated at approximately 5,039 fish, which was not within the escapement goal range for this group.

The Coho salmon escapement could not be quantified in 2020; aerial surveys of primary index streams (Table 16) were not incomplete as a result of poor conditions, and CPUE from the lower Stikine River commercial fishery was generally below average.

Table 16. Escapement goals vs. observed escapement of Stikine River salmon, 2020.

Species/Stock	Escapement Goal		Escapement in 2020	Escapement Goal Met?
Little Tahltan Chinook (large)	2,700	5,300	347	No
Total Stikine Chinook (large)	14,000	28,000	9,753[a]	No
Tahltan Sockeye	18,000	30,000	11,158	No
Mainstem Sockeye	20,000	40,000	5,039	No
Coho	30,000	50,000	?	?

[a] based on tag recoveries from Chinook bycatch in directed Sockeye commercial fisheries, the First Nation fishery, and the Little Tahltan video weir observations.

9.2 First Nation Fishery

The First Nation FSC harvest was below average for both Chinook and Sockeye salmon in 2020. The BNA was not achieved for Chinook, Sockeye, or Coho salmon (Table 17). The Sockeye catch was 27% below the previous 10-year average.

Table 17. First Nation harvest of Stikine River salmon, 2020.

Species	BNA	Harvested	Restrictions
Chinook (large)	2,000	389	No
(small)		642	
Sockeye	10,000	5,423	No
Coho	200	0	No

9.3 Recreational Fishery

Participation in the Stikine recreational fishery has declined over the past ten years. In 2020, 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 of any size in waters of the Stikine River drainage, as well as, access restrictions imposed through Tahltan Central Government lands by the Tahltan Central Government. 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 18).

9.4 Commercial Fishery

The total Chinook commercial incidental catch (and subsequently released) included 749 large and 695 small Chinook salmon in 2020. There was no directed Chinook fishery in 2020 and all Chinook catches occurred during the Sockeye and Coho fisheries between SW 26-32 and 35-37 (

Table 18). 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 10,142 large Chinook.

As presented in

Table 18, the total commercial Sockeye salmon harvest of 6,449 fish was above the post-season estimated allocation of 817.

The Coho salmon allocation target for the commercial fishery was achieved in 2020 with a total catch of 5,103 fish, all of which but two were taken in the directed Coho fishery (

Table 18). This was slightly above the directed Coho fishery allocation of 5,000 Coho salmon.

Table 18. Commercial salmon allocation and harvest on the Stikine River, 2020.

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	0	above	No	Yes	6,449
Coho	4,998[a] - directed	5,101 - directed	Yes	Yes	5,101

Pink	NA		NA	Yes	167
Chum	NA		NA	Yes	7

[a] based on 5,000 PST allocation minus FN catch of 2.

9.5 PST Harvest Sharing Performance.

Chinook salmon

The post-season estimated run size of Stikine Chinook salmon is 13,400 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 2020.

Canada's BLC amounted to 389 large Chinook salmon taken in the First Nation fishery (all incidentally caught Chinook salmon in the directed Sockeye fishery were released); this was below the Treaty entitlement of 2,300 large fish. Typically a Sockeye assessment fishery in Canada conducted concurrently with the commercial fishery and catches some Chinook salmon. However, this did not take place in 2020. Similarly, there was no assessment fishery for Chinook salmon in 2020.

Sockeye salmon

Under the PST, the Parties agreed that Canada/US would manage its fisheries to achieve a 47% and 53% share respectively 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.

The most recent post season estimate of the terminal run size of Stikine River Sockeye salmon is 35,497 fish which includes: 26,742 Tahltan Lake Sockeye (wild plus enhanced), 8,755 mainstem Sockeye.

Canada exceeded its overall Treaty allocation for Stikine Sockeye salmon in 2020. The Canadian total catch of 11,872Sockeye salmon was well above its AC of 817 Fish . For the Tahltan stock component, the estimated combined Canada/U.S. TAC was 1,739 Sockeye salmon (total run minus the escapement goal minus the test fishery catch) shared between the Parties (i.e., 817 Tahltan Sockeye for Canada and 912 for the U.S.). Canada's catch was 10,360 Tahltan Sockeye salmon. For the mainstem stock, the combined Canada/U.S. TAC was zero. Canada's estimated catch was 1,512 mainstem Sockeye.

Coho salmon

The Canadian catch of Stikine Coho salmon in directed fisheries was 5,101 fish; just above the PST allocation of 5,000 Coho salmon (Table 19).

Table 19. Harvest sharing report card for Stikine River salmon, 2020.

Sp.	Component	2020 Treaty-based allocation		2020 Actual		Obligations Met?	
		Canada		Canada		Canada	
CN	**Directed AC catch**	**0**		**0**		**yes**	
	BLC- traditional fisheries	2,300		389		yes	
	BLC – assessment fishery	0		0		yes	
SO	**%TAC (all Stikine)**	**47%**		**>100%**		**no**	
	Catch (all Stikine)	**817**		**11,872**		**no**	
	%TAC (Tahltan stock)	47%		>100%		no	
	Catch (Tahltan)	817		10,360		no	
	%TAC (mainstem)	47%		>100%		no	
	Catch (mainstem)	0		1,512		no	
CO	**Directed catch**	**5,000**		**5,103**		**yes**	

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

9.6 PST Sockeye Enhancement Performance

In January 2021, the Transboundary Rivers Panel reviewed performance relative to the 2019 Sockeye Enhancement Production Plan for the Stikine River (SEPP). This included an evaluation of activities that had been conducted in the fall of 2019 (egg takes), and the 2020 outcomes of those activities (fry outplants). Through this review it was deemed that the objectives of the 2019 SEPP were not achieved in full, and as a result harvest shares are to be adjusted to 57.5% U.S./42.5% Canada in 2024.

The primary elements of the review are summarized as follows:

Objectives:

- A bilateral collection target of 5.0 million Sockeye eggs in the fall of 2019;
- Spring 2020 release of unfed fry into Tahltan Lake from the 2019 egg collection.

Activities/Outcomes:

- The Enhancement Subcommittee revised the egg-take target inseason to 4.5 million eggs due to low escapement (treaty stocking guidelines preclude exceeding a 1:1 ratio of enhanced to wild smolt out-migrating from the lake);
- 4,401,000 eggs were collected and delivered to the Port Snettisham hatchery by September 25, 2019;
- Two incubators (404,297 fry) were identified to have IHN and were destroyed as per protocol;

- All fry were thermally-marked;
- 2.7 million fry were released into Tahltan Lake;
- Green-egg to out-planted survival for the Tahltan Lake bound fry was 76.2%.

APPENDIX 3: TAKU RIVER INTEGRATED SALMON FISHERIES MANAGEMENT PLAN, 2021.

1 INTRODUCTION

The Taku River drains an area of approximately 19,000 km^2 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 climes 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).

Notably, a large landslide occurred within the Taku River watershed approximately 20 kilometres upstream of the international border in late December 2020. Although the magnitude of the landslide was significant, resulting in a rock/snow/vegetation debris field which covered the 2.0 kilometer width of the river valley, the width of the river channel and fine particle size of the debris field is not anticipated to result in significant challenges to water flow or barriers to salmon migration. The landslide did not occur in close proximity to any Fisheries and Oceans Canada or private infrastructure sites with in the Taku River valley. Fisheries and Oceans Canada will actively monitor the Taku River landslide site during the 2021 season.

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 managed by DFO in cooperation with the Taku River Tlingit First Nation (TRTFN) and the Alaska Department of Fish and Game (ADFG).

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 (2011-2020), 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 17,400 fish. The historical range since 1995 is 7,328 (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 (2015-2020) average terminal run size of 13,700 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. From 2011-2020, terminal run size averaged approximately 153,000 Sockeye salmon. Since 1984 when estimates commenced, the run size has ranged from 81,366 (1988) to 336,935 (2001). Cycle (5-year) average escapements have been relatively stable undulating within 25% of the long term average total spawning escapement of 63,170 fish. These numbers reflect a recent review of the assessment program which has resulted in a downwards adjustment to each in-river abundance estimate dating back to program inception (see Section 2.2). The Taku River Sockeye salmon run generally enters the river mouth in early June, peaks mid-late July and has transited 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 118,584 Coho over the 2011-2020 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 (2016-2019) cycle average of 60,767 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 2019-2028 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, 2011-2020 FSC catches have averaged 74 Chinook, 147 Sockeye and 117 Coho salmon. Fishing generally commences in May and continues into 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. Prior to 2016, it is estimated the annual recreational catch of Chinook salmon averaged approximately 105 fish; after this time annual catches have been zero or close to zero. 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. However, in recent years the lack of harvest has been due to conservation measures associated with low run sizes.

The number of anglers varies year to year; based on information gathered through a recreational creel survey conducted in 2000 it is estimated that at that time approximately 60 anglers per year took 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 22). 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 (2011-2020), annual catches in the Taku River commercial fishery have averaged approximately 751 large and 281 small Chinook (retention zero for the past three years), 24,433 Sockeye and 9,842 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, Y.T.. Marketed products include fresh frozen, fresh and smoked salmon.

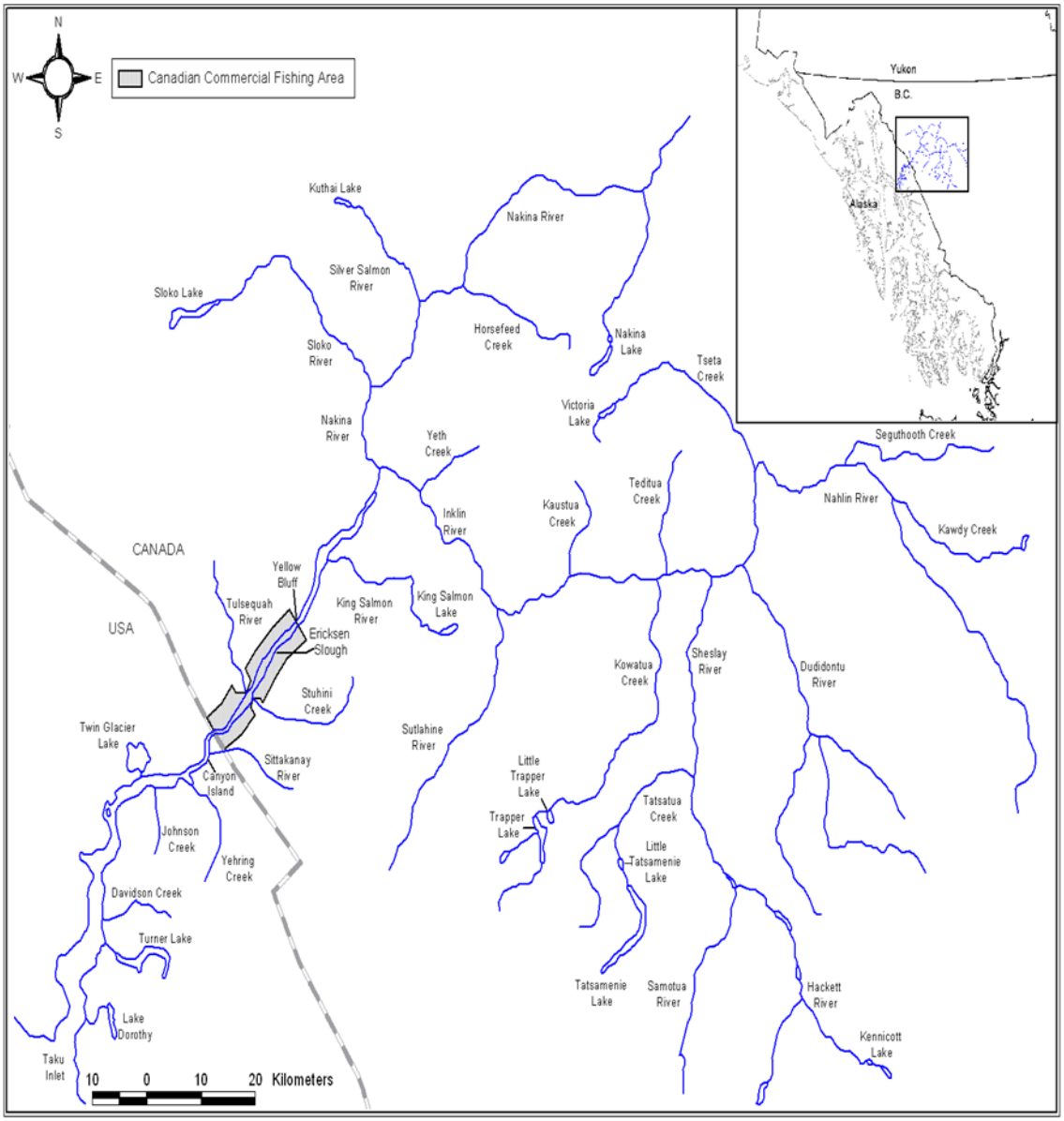

Figure 22. The Taku River watershed and the Canadian commercial fishing area.

2 RUN OUTLOOKS FOR TAKU SALMON IN 2021

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 estimation and projections.

2.1 Chinook Salmon

The 2021 pre-season terminal run forecast for large Taku River Chinook salmon (Chinook ≥660 mm mid-eye-to-fork length) is 10,300 fish, which is well below the ten-year average terminal run of approximately 17,400 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 (~16%) as the model has tended to overestimate the run size in recent years. The sibling return data indicates that current productivity is well below average and what would otherwise be expected based on historical spawner-recruitment relationships.

2.2 Sockeye Salmon

The 2021 pre-season forecast for the terminal run of wild Taku River Sockeye salmon (composite of all stocks) is approximately 140,000 fish. This forecast is based on a new approach to Taku Sockeye salmon forecasting that uses combination of sibling models for the four major age classes, the primary 1.3 age class was adjusted downwards based on the recent 5-year model error (49%) for that age class (other age class were not adjusted). The forecast run size is near the recent ten-year average (2011-2020) of 144,000 wild fish. Note that as a result of a recent review of the assessment program, adjustments have been made to in-river run (and by extension, terminal run) size estimates. These were made to address bias in mark-recapture estimates and have resulted a lower estimate for each year dating back to the beginning of the assessment program. Consequently, the estimated 1984-2018 average terminal run size changed from 213,000 to approximately 171,000 fish.

Enhanced Sockeye Salmon

The forecast for the terminal Taku River Sockeye salmon run is 6,300 fish which is well below the ten-year average (2011-2020) terminal run size of 8,000 enhanced fish. Most of the enhanced run (6,000 fish) is expected from Tatsamenie Lake, and is forecasted using a smolt model based on estimates of out-migrating enhanced smolt in 2018 (329,000) and 2019 (575,000) with a 3-year average smolt to adult survival rate of 1.4%. The remaining 300 enhanced fish are forecasted for the Trapper Lake fish are forecasted for the Trapper Lake feasibility studies, based on the recent years returns for similar sized outplants.

2.3 Coho Salmon

The forecast for the terminal run of Taku River Coho salmon in 2021 is approximately 94,000 fish, slightly above the ten-year average (2011-2020) terminal run of 97,000 fish. The forecast uses a smolt model which applies the five-year average smolt to adult marine survival rate (6.7%) to the 2020 estimated Taku River smolt emigration (~1.8 million) which is reduced by the average non-terminal marine harvest rate of (24%).

2.4 Pink Salmon

Pink salmon returning in 2021 will be the product of the 2019 escapement. Based on the 2019 Canyon Island traditional fish wheel catches of 971 Pink salmon, which near previous ten odd-year (2011-2020) average catch of 16,436 fish, the return in 2021 is expected to be average.

2.5 Chum Salmon

Based on the 2021 primary brood year catches of Chum salmon in the Canyon Island traditional fish wheels, 2016 (66) and 2017 (236), which were below and above the ten-year (-2011-2020) average Canyon Island fish wheel catch of 158 fish, the 2021 fall Chum salmon run is expected to be 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 and have been endorsed by the Transboundary Panel. 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.

Goals in effect for the 2021 season are summarized in Table 20 below:

Table 20. Escapement goals for Taku River salmon in effect for 2021.

Species	Year established	Escapement goal ranges		
		from	Mgmt. Objective	to
Sockeye	2020	40,000	58,000	75,000
Coho	2015	50,000	70,000	90,000
Chinook	2009	19,000	25,500	36,000

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 was reviewed and accepted by the Chinook Technical Committee and the Canadian Science Advisory Secretariat (CSAS). The Transboundary Technical Committee (TTC) and Panel have since endorsed the revised goal.

3.2 Sockeye Salmon

As with Taku Chinook, Annex IV, Chapter 1 of the PST tasked the Parties with reviewing the escapement goal for Taku Sockeye salmon, prior to the 2020 fishing season. In conjunction with this, the Parties were directed to review the Taku River Sockeye salmon assessment program. A working group was established in 2018 comprising DFO, ADF&G, TRTFN and mark-recapture specialists from both Canada and the U.S. The stock assessment review was completed on time and resulted in the revision of in-river abundance estimates dating back to program inception (1984), and a number of recommendations to improve stock assessment (all of which were implemented over 2018-2020 seasons). The revised abundance estimates were used in developing a revised escapement goal, which was reviewed and accepted by both CSAS and the TTC in November 2019. The S_{MSY} point was identified as 43,857 Sockeye salmon, an escapement goal range of 40,000 to 75,000 was recommended. The Transboundary Panel could not reach agreement on endorsing the recommended goal, so the Pacific Salmon Commission received the recommendation and endorsed an escapement goal range of 40,000 to 75,000 with a management objective of 58,000 for the 2020 – 2028 fishing seasons.

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 an escapement goal range of 50,000 to 90,000 fish with a management objective of 70,000 Coho salmon to the Transboundary Panel which was endorsed 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 Panel 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 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 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 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 Transboundary Panel 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 2021 season.

5 TAKU RIVER DECISION GUIDELINES FOR 2021

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 Taku 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 Taku 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' Taku 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 Taku 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 Taku 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 Taku River Chinook salmon stocks, with a view to rebuilding the escapement.

Table 21 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 21. 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 2021. Additionally, as in previous years, the commercial fishery will not operate in an assessment mode to serve as the assessment fishery identified in the PST agreement; the primary purpose of the assessment 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 will not be generated.

In most years when there is no directed harvest but there is 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 Transboundary Panel.

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:

$$\mathbf{TR = [(P_t + Cus_{(t-1)})/p_t)]}$$

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";

$\mathbf{Cus_{(t-1)}}$ = the cumulative US Chinook salmon catch to week "t-1", i.e. US catch lagged one week to account for migration timing;

$\boldsymbol{p_t}$ = 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' intent is to achieve the agreed management objective of 58,000 Sockeye salmon plus broodstock needs as defined in the annual management plan. The following will apply for the 2020-2028 fishing seasons:
    - The escapement goal range will be 40,000 to 75,000 Sockeye salmon.
    - TAC and resulting harvest allocations will be based on estimates of the Taku River wild Sockeye salmon terminal run size minus the management objective.
    - Canada may, in addition to its share of the TAC, harvest any projected Sockeye salmon in excess of the management objective and broodstock needs apportioned by run timing.
    - If either Party identifies it will be unlikely to harvest all or a portion of its AC, the other party may, in addition to its share of the TAC, harvest any projected Sockeye salmon in excess of the management objective and broodstock needs apportioned by run timing.
- 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 22 below.

Table 22. 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 2021, the enhanced production is expected to fall in the 5,001-15,000 range based on the pre-season forecast of 6,300 enhanced Taku River Sockeye salmon (Appendix 3, Section 2.2). Hence, Canada's share of the Sockeye TAC is expected to be 23%. In-season projections of the run size of enhanced fish may result in this share changing as per Table 22.

In-season management relies on projections of the TAC of wild Taku Sockeye salmon and is determined as follows:

$$\mathbf{TAC_{(w)} = [(E_{w(t)} + C_{w(t)} + A_{w(t-1)}) / \rho_{w(t)}] - E_w}$$

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 management objective for wild stocks. (A value of 58,000 will be used which is the midpoint in the escapement goal range of 40,000 to 75,000 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 23 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. In addition to its share of the TAC, Canada may harvest any projected Sockeye salmon in excess of the management objective (58,000) and broodstock needs apportioned by run timing.

Table 23. Key Decision Points for Taku River Sockeye salmon.

Zone	Escapement Projection	Fishery	Guideline Harvest	Anticipated Management Action
Red	<40,000	Aboriginal Commercial	0 0	Restrictions considered – consultation with TRT. Closed
Yellow	40,000 – 58,000	Aboriginal Commercial	0 - 2,000 0	Restrictions not anticipated. No directed harvest.
Green	>58,000	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 Transboundary Panel 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 were 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 management objective 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 management objective 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 management objective 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 management objective, 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 24 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 Transboundary Panel.

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 24. Key Decision Points for Taku River Coho salmon, commencing statistical week 34.

Zone	Escapement Projection	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 incidentally 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 2021

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 2021, 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:

https://www2.gov.bc.ca/assets/gov/sports-recreation-arts-and-culture/outdoor-recreation/fishing-and-hunting/freshwater-fishing/region_6_skeena.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 2021 include the following:

- **Retention of Chinook salmon is prohibited in 2021 (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 (over 50cm) salmon in non-tidal waters is 10 from all fresh waters combined;
- 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 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 2021 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 27 to July 3 (SW 27) 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 2021.

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 PST Coho salmon harvest provisions for Canada 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 the commercial opening in SW 27 (June 27 – July 3) may be limited to augment the escapement of the Kuthai Lake stock. During SW 31-33 (July 25 - August 14), 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 17) to reduce likelihood of Chinook salmon interception. 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 2021.**

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 Ericksen 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 208.49 (regular fee) and $26.06 First Nation (reduced fee). In addition, three 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 2021. 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 2021

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 uniquely marked and reared for short period trial 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 adult production evaluation; and the feasibility of broodstock capture, smolt production and adult survival in King Salmon Lake. Broodstock collections were conducted in 2012 and 2014; egg collection is planned for 2021 and will be referenced in-season using adult escapement thresholds to determine whether egg collection activities would proceed or not (see Table 25).

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 2021 TEPP is presented in Table 25.

Table 25. Taku Enhancement Production Plan (TEPP), 2021.

Enhancement Project	Activities	Expected Production	Technique to document production
Tatsamenie Lake	Egg take: target of 30% of available adult brood stock (up to 2.5 million eggs) 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.	10,000 adults from direct release 4,000 adults from extended rearing	Thermal mark
Trapper Lake	Egg take: target of 1,000,000 eggs from Little Trapper Lake. Outplant: All fry to be "direct release" into Trapper Lake. Future program continuation/expansion contingent on adult Sockeye passage remediation.	1,000 adults	Thermal mark
King Salmon Lake	Egg Take: target of 250,000. (In-lake adult sockeye salmon abundance egg take threshold 600 (minimum) and 4,000 (maximum)) Outplant: All fry to be "direct released" into King Salmon Lake	4,000 adults	Thermal Mark
Expected Total Production		19,000 adults	

8 TAKU SALMON STOCK ASSESSMENT PLAN FOR 2021

8.1 Chinook Salmon

The Taku River Chinook in-river stock assessment program planned for 2021 includes:

- A mark-recapture program with marking occurring in the lower Taku River (Canyon Island and Wright River). Incidental mark recoveries from live released Chinook salmon in Canadian fisheries as well as mark recoveries in select spawning streams to determine 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 23);
- A scaled down radio telemetry project (last 2 years) to determine Chinook salmon dropout rates. Limited incidental information will be available for final fates and spawning locations of tagged fish;
- 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 (will not be conducted in 2021 due to poor preseason forecast upon direction from the panel);
- Sampling in the U.S. gill net fisheries to determine age and size composition of catches and contributions of enhanced stocks 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 (video camera and carcass weir), Nahlin, Tatsatua (in Tatsatua Lake area), Kowatua (below Little Trapper Lake), Tseta and Dudidontu.
- Enumeration of large Chinook salmon in the lower Nahlin River using sonar.
- Creel survey of Nakina River recreational anglers (unlikely in 2021 due to Chinook salmon retention prohibition).

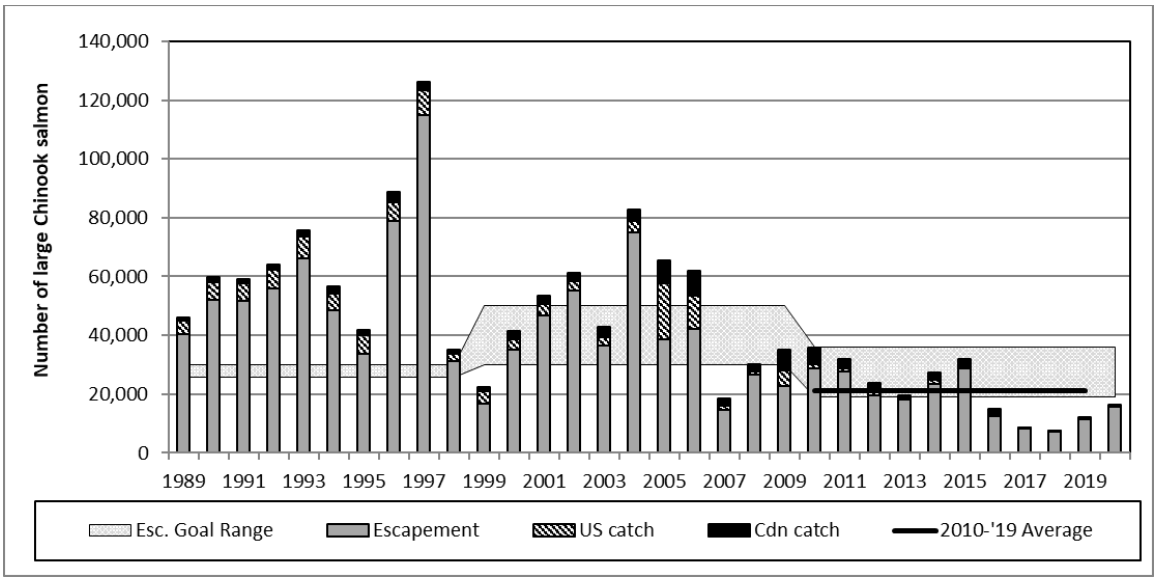

Figure 23. Terminal run of large Taku Chinook (≥660 mm mid-eye to fork length), 1989 to 2020. [Note: estimates of US catch prior to 1995 are derived from an assumed harvest rate of 10% (based on 1995-1999 average). Catches for 1995-2020 based on data from CWT (troll) and GSI (sport and net)]

8.2 Sockeye Salmon

The assessment program for Taku Sockeye salmon in 2021 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 24;
- A radio telemetry project to assess Sockeye salmon 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 harvest 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 25), Tatsamenie (Figure 26), Kuthai (Figure 27) and King Salmon (Figure 28) 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.

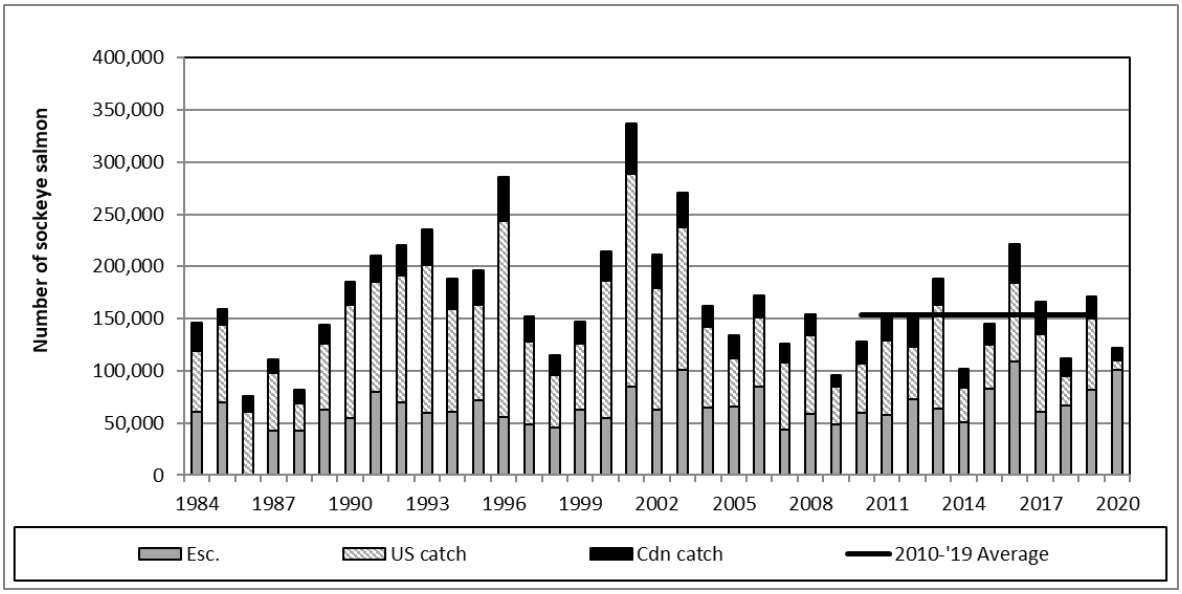

Figure 24. Terminal Run Size of Taku River Sockeye salmon, 1984 to 2020.
[Escapement is determined from the mark-recapture program; US catch is based on scale pattern analyses and thermal marks; Canadian catch from inriver catch slips and monitoring. Note, the 2019 escapement estimate was adjusted downwards by approximately 25% due to a change in methodology and is not comparable with previous years' estimates.]

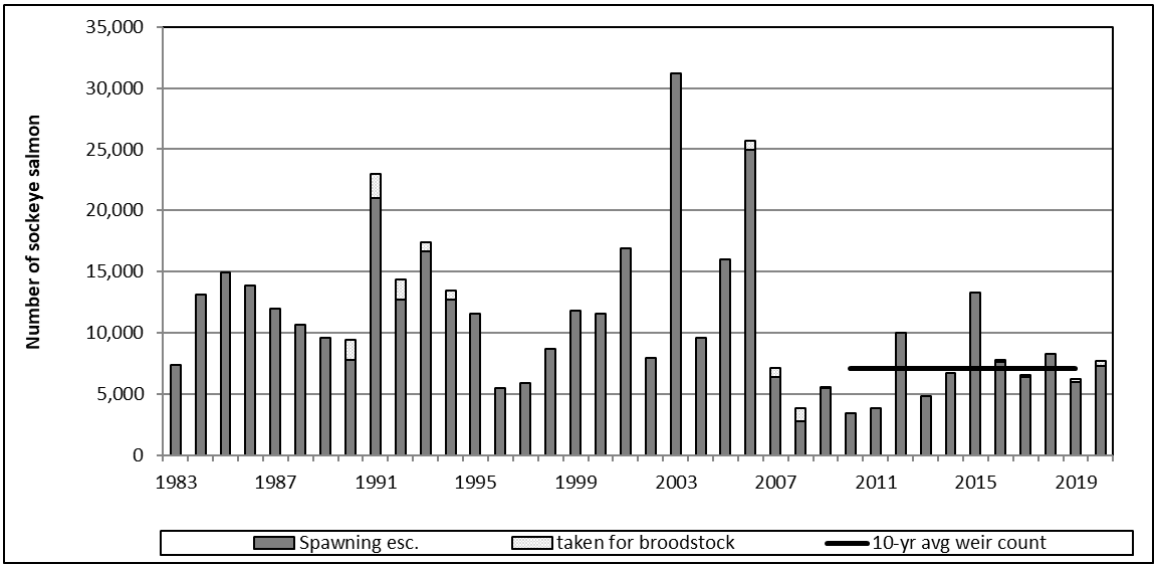

Figure 25. Weir counts of Little Trapper Lake Sockeye 1983 to 2020.
[Note: Annual weir count is sum of spawning escapement and fish taken for broodstock].

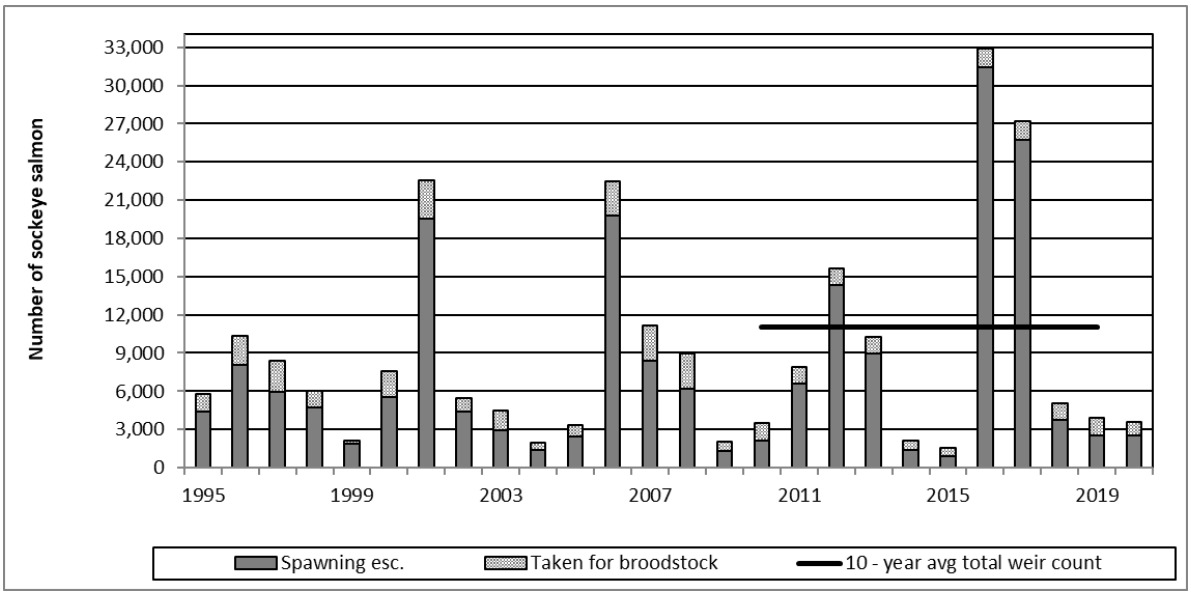

Figure 26. Weir counts of Tatsamenie Lake Sockeye: 1985 to 2020.
[Note. Annual weir count is sum of spawning escapement and fish taken for broodstock].

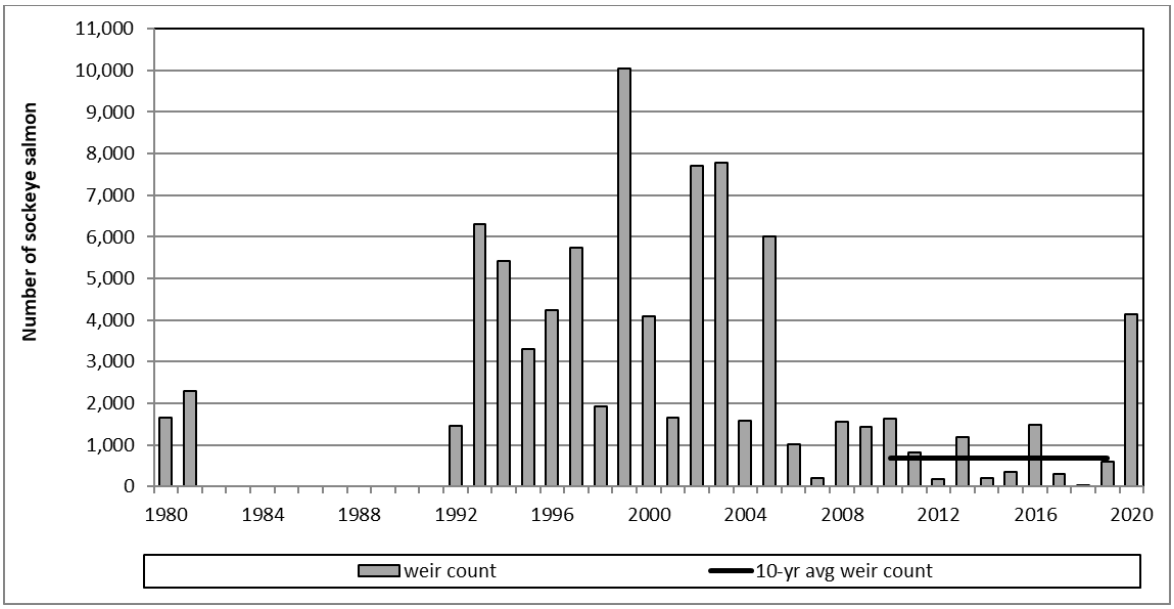

Figure 27. Weir counts of Kuthai Lake Sockeye, 1985 to 2020.

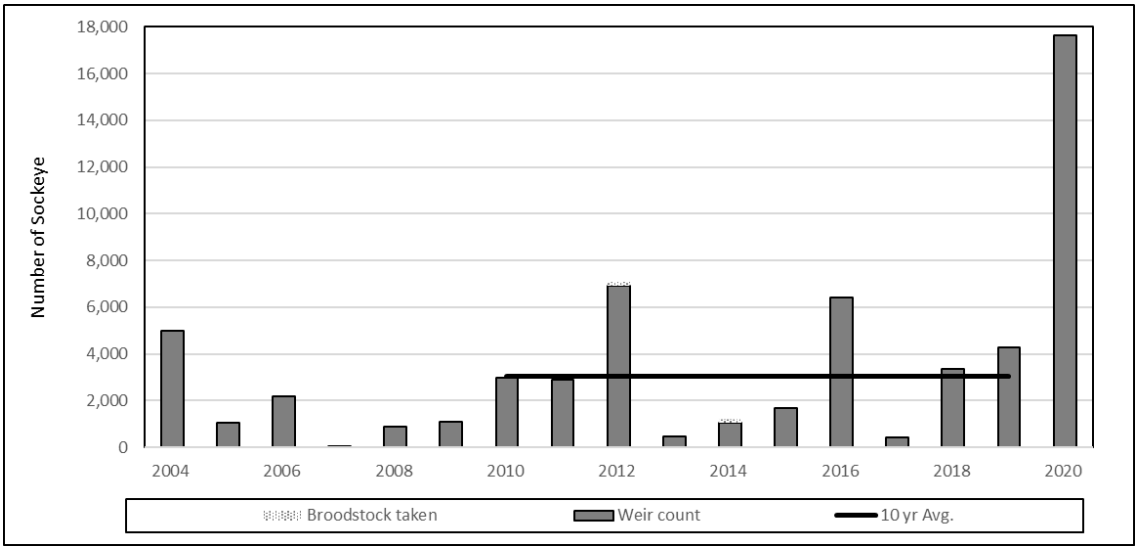

Figure 28. Weir counts of King Salmon Lake Sockeye, 2004 to 2020.

8.3 Coho Salmon

The assessment program for Taku Coho salmon in 2021 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 in-river run size, escapement, 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 terminal and total run size of Taku Coho salmon (Figure 29);
- A radio telemetry project (year 3) to determine Coho salmon dropout rates. Limited and incidental information will be available for final fates and spawning locations of tagged fish;
- Sampling in Canadian and US gillnet fisheries to determine age and size composition of harvest and contributions of enhanced stocks (US fisheries only) and to recover CWTs;
- A possible Coho live release assessment fishery to recover tags to allow continuation of run size estimates if Canadian commercial fishing ceases prior to end of mark recapture program;
- 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;
- Spawning ground sampling to continue development of a genetic stock identification baseline.

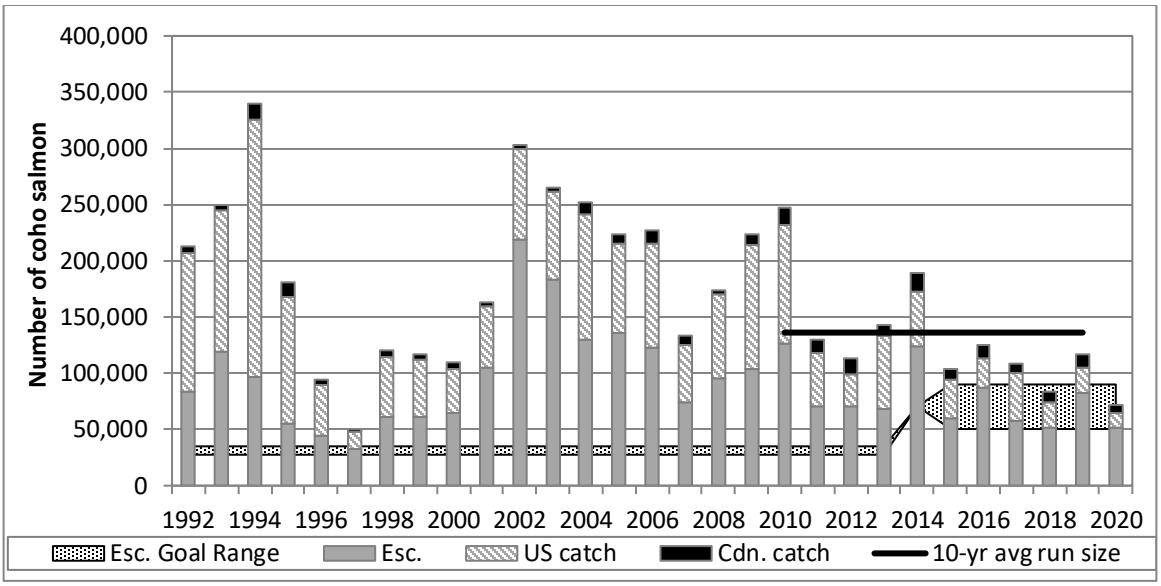

Figure 29. Estimated total run size of Taku River Coho salmon, 1992 to 2020.

8.4 Pink and Chum Salmon

The assessment program for Taku River Pink and Chum salmon in 2021 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 30 and Figure 31). 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.

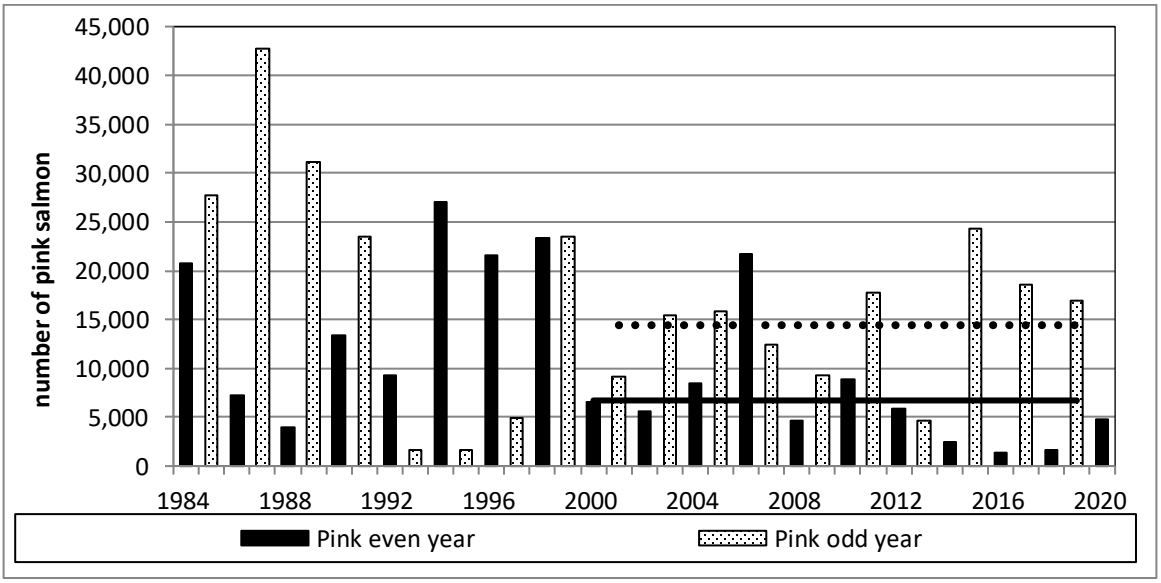

Figure 30. Pink salmon captures in the Canyon Island fish wheels, 1984 to 2020.

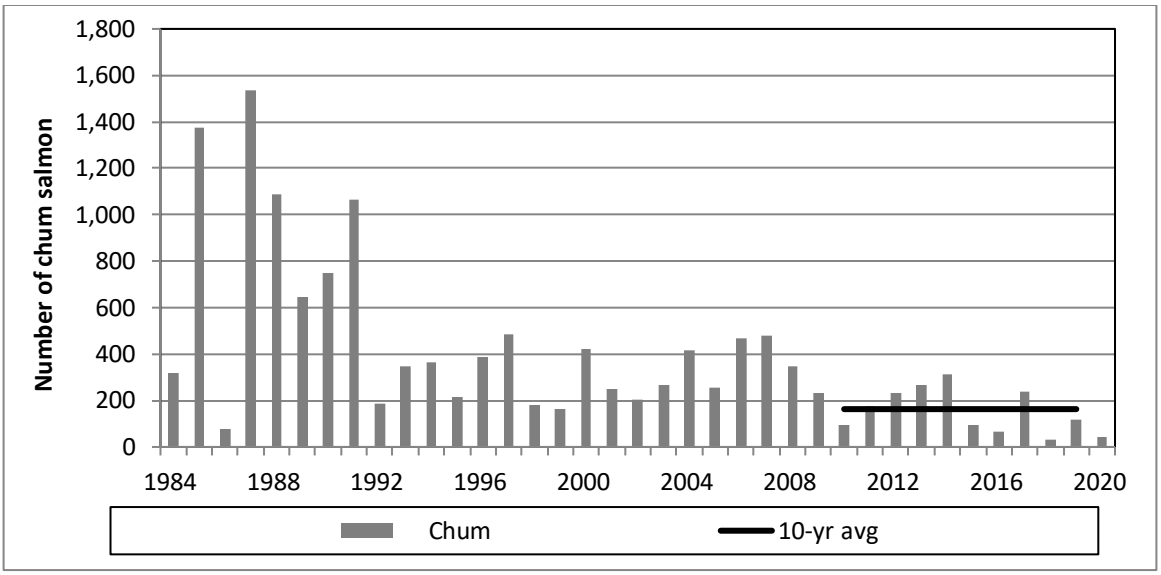

Figure 31. Yearly Chum salmon captures in the Canyon Island fish wheels, 1984 to 2020.

9 TAKU RIVER POST SEASON REVIEW

A comprehensive post season review is conducted annually by the Transboundary Technical Committee (TTC) for the Transboundary Panel and the Pacific Salmon Commission (PSC). An initial document with preliminary estimates is prepared for the Transboundary Panel and PSC in the fall. Once analyses have been finalized, final reports are submitted to the PSC for general distribution. Results of the 2020 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 2020*. Pacific Salmon Commission.

The following sections summarizing the 2020 season are based substantially on the results of the TTC post season review and any recent updates.

9.1 Conservation

As summarised in

Table 26, Sockeye salmon escapement exceeded the spawning escapement objective range for 2020 (Figure 24). Coho salmon escapement just exceeded the lower bound of the escapement goal range of 50,000 but was within the overall escapement goal range established for this species (Figure 29). For Chinook salmon, the escapement estimate of 15,593 large fish was well below the escapement goal range (Figure 23). 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 the even-year average while that of Chum salmon was below average.

Table 26. Escapement goals vs. estimated escapement for Taku River salmon in 2020.

Species	2020 Escapement Goal Ranges		2020 Escapement	Escapement Goals Met?
	from	to		
Sockeye	40,000	75,000	99,058	Exceeded
Coho	50,000	90,000	52,063	Met
Chinook (large)	19,000	36,000	15,593	Not Met
Pink			4,739[a]	Unknown
Chum			44[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 2020 and the TRT First Nation had first priority to harvest fish for FSC purposes as presented in Table 27. However, BNA allocations were not achieved for Chinook, Sockeye and Coho salmon.

Table 27. Taku First Nation FSC Harvest vs. Basic Needs Allocation, 2020.

Species	BNA	Actual FSC Harvest	Priority Fishery
Chinook	500	94 large, 11 small	Yes
Sockeye	2,000	237	Yes
Coho	750	66	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 2020 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 2020. Additionally, the directed commercial Chinook fishery was not opened. The targeted Sockeye commercial fishing season opened on Tuesday, June 30 (SW 27) and continued through to mid-August (SW33). The use of set nets was prohibited until stat week 28 maximum mesh size restriction of 14 0 cms 5 5 to stat week 30. The targeted Coho salmon fishery took place from Sunday, August 16 (SW 34) through Friday, October 10 (SW 41). As commercial effort diminished in SW 40 and 41 there was a limited DFO-TRTFN catch and release assessment fishery for Coho salmon to support the abundance assessment program.

The commercial harvest of 11,556 Sockeye salmon was below the previous decade (2010-2019) average of 22,610 fish. The total commercial Chinook salmon incidentally caught and released during the Sockeye fishery consisted of 93 large fish, 24 small fish, and 18 fish of unknown size. The catch of 6,970 Coho salmon was above the previous ten year average (2010-2019) of 10,180 fish.

9.5 PST Harvest Sharing Performance

In 2020, 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 28 below.

Table 28. Harvest sharing report card for Taku River salmon, 2020.
[Note: obligations in bold].

Species	Component	2020 PST-based allocation - Canada	2020 Actual - Canada	Harvest within Catch Allocation?
Chinook	**Directed catch**	**0**	**0**	**yes**
	BLC- traditional fisheries	1,500	105	yes
	BLC – assessment fishery	0	0	yes
Sockeye	**%TAC (Taku wild)**	**23%**		
	Catch (wild)	**18,600**	**11,373**	**yes**
	Catch (enhanced)		407	
Coho	**Catch**	**17,200**	**7,036**	**yes**

Chinook Salmon

The pre-season forecast of 12,400 large Chinook salmon did not meet the threshold for allowing directed Chinook salmon fisheries early in the season. In past years, when the preseason forecast or inseason projections have indicated no AC, the commercial fishery has operated in an assessment mode and served as the test fishery identified in the PST agreement. In 2020, as in the previous years, the preseason forecast did not warrant an assessment fishery and the Panel did not recommend it as a result. As such, the preseason forecast was used to make necessary adjustments in the other fisheries with the intention of eliminating the harvest of Chinook salmon. 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 259 large Chinook salmon. The BLC included the following: 0 large Chinook salmon taken as bycatch during the commercial Sockeye fishery; 94 large Chinook 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 15,593 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 120,586 fish comprised of 118,824 wild, and 1,762 enhanced Sockeye salmon. Based on the 2020 escapement target of 58,500 wild Sockeye, the TAC of wild fish was 6 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 22). An additional 407 enhanced Sockeye contributed to the overall Canadian catch.

Overall, the harvests of Taku Sockeye salmon left a spawning escapement of 99,508 fish which was above the upper end of the 2020 escapement target range (40,000 to 75,000 fish).

Coho Salmon

For 2020, as in 2018 and 2019, 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 early October, in-season inriver run projections ranged from 46,000 (SW34) to 65,000 (SW39) Coho salmon which meant that Canada was restricted to the 5,000 fish assessment AC early in the Coho management period but as the season progressed could harvest in excess of this in a directed fishery. The Canadian fishery was managed throughout the Coho season based on agreed to in-season run projections and PST provisions. As the commercial fishery effort diminished in early October, a limited catch and release assessment fishery was conducted for stock assessment purposes.

The 2020 post season estimate of Coho salmon returning to the Canadian portion of the drainage was 59,099 fish. This translated into an allowable harvest of 5,000 Coho for Canadian fishers. The actual harvest of 7,036 Coho salmon included: 1,792 Coho taken in the directed commercial fishery; 5,178 Coho taken during the Sockeye assessment fishery; 66 taken in the First Nation fishery. This left a spawning escapement of 52,063 Coho salmon which was within the target range of 50,000-90,000 and below the point target of 70,000 Coho.

9.6 PST Enhancement Performance

In January 2021 the Transboundary Rivers Panel reviewed performance relative to the 2019 Taku Enhancement Production Plan (TEPP). The review included an evaluation of activities that had been conducted in the summer and fall of 2019 (egg takes and extended rearing trials) and the 2020outcomes of those activities (fry outplants). Through this review, the 2019 TEPP was deemed complete. The primary elements of the review are as follows:

Tatsamenie Lake

Objectives:

- Collection target of 50% of available adult Sockeye salmon broodstock (up to 3.0 million eggs) in the fall of 2019;
- 2020 release of fry from 2019 brood year collections (majority to be released as unfed fry in spring; 500,000 fry to be held for extended rearing and released in summer).

Activities/Outcomes:

- 2.3 million Sockeye salmon eggs were collected and delivered to the Port Snettisham Hatchery in September 2019;
- Fry were thermally marked and there were no losses to IHNV;
- Green-egg to fry survival was 69.7%;
- 1.6 million fry were delivered from Port Snettisham to Tatsamenie Lake. Of these, 1.4 million were released unfed directly into lake in May, and 210,000 were reared in net pens from June 10-30, approximately 5 to 6 weeks less rearing time than previous rearing trials;

Trapper Lake

Objectives:

- Collection target of up to 500,000 Little Trapper Lake Sockeye eggs in the fall of 2019.
- Release subsequent fry to Trapper Lake for ongoing enhancement program evaluations.

Activities/Outcomes:

- 406,000 Sockeye salmon eggs were collected and delivered to the Port Snettisham Hatchery in September 2019;
- Fry were thermally marked and there were no losses to IHNV;
- Green-egg to fry survival was 69.7%;
- 263,200 fry were direct released into Trapper Lake;

APPENDIX 4. CONSERVATION AND PROTECTION 2021 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.

APPENDIX 5: OVERVIEW FISHING VESSEL SAFETY

Vessel owners and masters have a duty to ensure the safety of their crew and 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, responsibility for shipping, navigation, and vessel safety regulations and inspections lies with TC; emergency response with the Canadian Coast Guard (CCG) and DFO has responsibility for management of the fisheries resources. The Transportation Safety Board is an independent agency that advances transportation safety by investigating selected occurrences in the air, marine, pipeline and rail modes of transportation including fishing vessel occurrences. In BC, WorkSafeBC exercises jurisdiction over workplace health and safety and conducts inspections on commercial fishing vessels in order to ascertain compliance with the *Workers Compensation Act* (WCA) and the *Occupational Health and Safety Regulation* (OHSR).

Before departing on a voyage the owner, master or operator must ensure that the fishing vessel is capable of and safe for the intended voyage and fishing operations. Critical factors for a safe voyage include the seaworthiness of the vessel, having the required personal protective and life-saving equipment in good working order, adequate number of properly trained crew , and knowledge of current and forecasted weather conditions. As safety requirements and guidelines may change, the vessel owner, crew, and other 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 training
- Fish Safe – Stability Education Program & 1 Day Stability Workshop
- Fish Safe – SVOP (Subsidized rate for BC commercial fishers provided)
- Fish Safe – Safest Catch program – **FREE** for BC commercial fishers
- Fish Safe *Safe At Sea* DVD Series – Fish Safe
- Fish Safe Stability Handbook – *Safe at Sea* and *Safest Catch* – DVD Series
- Fish Safe *Safest Catch* Log Book
- Fish Safe Safety Quiz
- First Aid training
- Radio Operators Course (Subsidized rate for BC commercial fishers provided)

- Fishing Masters Certificate training
- Small Vessel Operators Certificate training

Publications:

- Gearing Up for Safety – WorkSafeBC
- 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
- Amendments to the *Small Fishing Vessel Inspection Regulations* (can be obtained from: http://www.gazette.gc.ca/rp-pr/p2/2016/2016-07-13/html/sor-dors163-eng.php
- Safety Issues Investigation into Fishing Safety in Canada report can be accessed: https://www.tsb.gc.ca/eng/rapports-reports/marine/etudes-studies/M09Z0001/M09Z0001.html

For further information see: https://tc.canada.ca/en/marine-transportation
http://www.fishsafebc.com
http://www.worksafebc.com
www.tsb.gc.ca/eng/rapports-reports/marine/index.html;

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 to correct ballasting. Fish harvesters must be familiar with their vessel's centre of gravity, the effect of liquid free surfaces on stability (e.g. loose water or fish on deck), loading and unloading operations, watertight integrity and the vessel's freeboard. Know the limitations of your vessel; if you are unsure, contact a 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. These instructions must include detailed safe operation documentation kept on board the vessel.

In 2017, Transport Canada Marine Safety (TC) issued Ship Safety Bulletin (SSB) No. 03/2017 announcing the coming into force of the *New Fishing Vessel Safety Regulations*. The initial regulations were published in the Canada Gazette Part II on July 13, 2016 and came into force on

July 13, 2017. The bulletin includes important information on changes to requirements for Written Safety Procedures, Safety Equipment and Vessel Stability.

As of July 13, 2017, new regulations pertaining to stability assessments to be performed by a competent person came into effect, as follows:

- A new fishing vessel that has a hull length of more than 9 m where the vessel construction was started or that a contract was signed for the construction after July 13, 2018;
- A fishing vessel more than 9 m and that has undergone a major modification or a change in activity that is likely to adversely affect its stability;
- A fishing vessel that is fitted with an anti-roll tank at any time;
- A fishing vessel more than 15 gross tonnage and used for catching herring or capelin during the period beginning on July 6, 1977 and ending on July 13, 2017.
- For an existing fishing vessel that is not required to undergo a stability assessment, the owner shall be capable of demonstrating that their vessel has adequate stability to safely carry out the vessel's intended operations. Guidelines have been developed and are available online to help small fishing vessel owners and operators meet their regulatory requirements
- Two good resources can be found here: TP 15393 - Adequate stability and safety guidelines for fishing vessels (2018) and TP 15392 – Guidelines for fishing vessel major modification or a change in activity (2018)

Further, the new Regulation requires a "Stability Notice" to be developed after a stability assessment. This notice includes a simple diagrammatic of the vessel, its tanks and fish holds, or deck storage as the case may be. It is intended to assist fishing vessel crews in quickly determining the safe carriage limits of the vessel without having to reference a complicated Trim and Stability Book.

Additionally, Transport Canada published a Stability Questionnaire (SSB No. 04/2006) and Fishing Vessel Modifications Form (SSB No. 01/2008) which enable operators to identify the criteria which will trigger a stability assessment. Please contact the nearest Transport Canada office if you need to determine whether your vessel requires a stability assessment or to receive guidance on obtaining competent assessor.

In 2019, TC provided an updated SSB 03/2019, 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 2005 and found a variety of factors that effected the vessel's stability were identified as contributing factors in vessels capsizing, such as with: M05W0110 - *Morning Sunrise*, M07M0088 - *Big Sisters*, M08W0189 - *Love and Anarchy,* M09L0074 – *Le Marsouin I,* M10M0014 - *Craig and Justin,* M12W0054 – *Jessie G,* M12W0062 - *Pacific Siren,* M14P0121 – *Five Star,* M15P0286 – *Caledonian,* M16A0140 – *C19496NB*, M17C0061 – *Emma Joan, M*17P0052 – *Miss Cory and M18P0073 – Western Commander*, and M18A0425 – *Charlene A.*

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, naval architect or the local Transport Canada Marine Safety office.

WorkSafeBC's *Occupational Health and Safety Regulations* (OHSR) require owners of fishing vessels to provide documentation on board, readily accessible to crew members, which describes vessel characteristics, including stability.

Fish Safe has developed a code of best practices for the food and bait/roe herring fisheries and the prawn fishery: These Best Practices are available on Fish Safe's website for convenient download here: https://www.fishsafebc.com/best-practices. Please contact Ryan Ford at Fish Safe for a copy of the program materials they developed to address safety and vessel stability in these fisheries. Ryan Ford – Office: (604) 261-9700 - Email: ryan@fishsafebc.com.

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.

To assist fishers in meeting their crew training requirements, Fish Safe has created a downloadable '*New Crew Orientation Form and How To Guide'* available on Fish Safe's website here: https://www.fishsafebc.com/downloadable-tools

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.

WorkSafeBC's *Occupational Health and Safety Regulation* (OHSR) requires written rescue and evacuation procedures for work on or over water. Additionally, fishing vessel masters must establish procedures and assign responsibilities to each crew member to cover all emergencies, including the following: crew member overboard, fire on board, flooding of the vessel, abandoning ship, and calling for help. Fishing vessel masters are also required to conduct emergency drills at the start of each fishing season, when there is a change of crew, and at periodic intervals to ensure that crewmembers are familiar with emergency procedures.

Between 2011 and 2015 the TSB investigated 17 fishing vessel accidents which resulted in 17 fatalities. The report's findings highlighted the lack of safety drills and safety procedures and practices.

The *Safest Catch* program, delivered by Fish Safe and free to BC commercial fishers, includes comprehensive practice of drills such as abandon ship, man overboard and firefighting drills.

1.3 Cold Water Immersion

Drowning is the number one cause of death in BC's fishing industry. Cold water is defined as water below 25 degrees Celsius, but the greatest effects occur below 15 degrees C. BC waters are usually below 15 degrees C. Normal body temperature is around 37 degrees Celsius; cold water rapidly draws heat away from the body. 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 WorkSafeBC Bulletin *Cold Water Immersion* (available from the WorkSafeBC website at www.worksafebc.com)

Under the recently amended (June 2019) *OHS Regulation*, section 24.96.1, a crewmember must wear a PFD or lifejacket when on board a fishing vessel that has no deck or deck structure or when on the deck of a fishing vessel that has a deck or deck structure. The use of a PFD will prepare a crewmember to remain afloat, to survive the effects of cold shock, reduce the need to swim and give rescuers time to respond.

Section 8.26, which requires workers to wear a PFD or lifejacket when working "under conditions which involve a risk of drowning", would continue to apply to fishing crewmembers and other workers (e.g. when they are working on shore, docks and other vessels).

The specific requirements can be found on WorkSafeBC's PFD Primer provided on Fish Safe's website here: https://www.fishsafebc.com/cold-water-survival.
It has been demonstrated time and again that, when worn, PFD's save lives - and the chance of surviving a mishap increases significantly when these devices are worn while working on deck.

Resulting from the TSB investigations into the *Diane Louise* - M14P0110 and the *Caledonian* – M15P0286 fishing vessel accidents, the Board recommended that both TC and WorkSafeBC require that persons wear a suitable personal flotation devices (PFDs) at all times when: on the deck of a commercial fishing vessel; or, when on board a commercial fishing vessel without a deck or deck structure, and ensure that programs are developed to confirm compliance.

Other Issues

1.3.1 Weather

Vessel owners and masters are reminded of the importance of paying close attention to current weather treads 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.

1.3.2 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 co-ordinate rescue resources. The TSB notes that there have been several recent occurrences on board vessels not equipped with an EPIRB, and that were either unable or did not use any other means of emergency signaling distress (e.g. M14P0121, M14A0289, M15A0189, M16A0327, M18A0076, M18A0303, M18A0078, M18P0184, M19A0082, M19P0242, M20A0258, M20A0160) which resulted in 24 fatalities.

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. Further information is available at Radio Aids to Marine Navigation General

Since August 1, 2003, all commercial vessels greater than 8 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/eng/CCG/Home or go directly to the Industry Canada web page: www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf01032.html

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 DSC can be found here: TC DSC

Safety Bulletin. Questions regarding Coast Guard DSC capabilities can be obtained by contacting your local MCTS centre (Prince Rupert MCTS (250) 627-3070 or Victoria MCTS (250)363-6333).

1.3.3 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 (either Prince Rupert MCTS (250)627-3070 or Victoria MCTS (250)363-6333 or from the Coast Guard website:

https://www.ccg-gcc.gc.ca/publications/mcts-sctm/ramn-arnm/part3-eng.html

1.3.4 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 fishers in this goal. The Fish Safe Stability Education Program and 1 Day Stability Workshop are available to all fishers who want to improve their understanding of stability and find practical application to their vessel's operation. The SVOP (Small Vessel Operator Proficiency) Course is designed to equip crew with the skills they need to safely navigate during their wheel watch. The Safest Catch Program, along with fisher-trained Safety Advisors, is designed to give fishers the tools they need to create a vessel specific safety management system.

As referenced throughout the above documentation, Fish Safe provides a broad range of courses, programs and services that are either free for BC commercial fishers or highly subsidized.

Fish Safe is managed by Ryan Ford, Program Manager and support staff including John Krgovich, Program Coordinator, Stephanie Nguyen, Program Assistant, Rhoda Huey, Bookkeeper/Administrative Assistant and an experienced team of fisher 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 fishing vessels). The Advisory Committee meets two to three times annually 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 WorkSafeBC to improve the fishing injury claims process. For further information contact:

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3 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 2014 the TSB pacific region released three investigation reports:

- the collision between trawl fishing vessel *Viking Storm* and US long line fishing vessel *Maverick* and the subsequent fatality,

- the person over board off the prawn fishing vessel *Diane Louise* and the subsequent fatality, and
- the capsizing of the crab fishing vessel *Five Star* and subsequent fatality.

In 2016 the TSB pacific region released one investigation report:

- the capsizing of the trawl *Caledonian* and subsequent fatalities.

In 2018 the TSB pacific region released two investigation reports:

- the capsizing and sinking of the Miss Cory and subsequent fatality.
- the sinking of the Western Commander and loss of life.

In 2020 the TSB pacific region is currently investigating the fatal accident involving the *Arctic Fox II* on August 11.

The TSB issued five recommendations following the *Caledonian* report. Three recommendations issued are aimed at ensuring all crews have access to adequate stability information that meets their needs. That means:

- All commercial fishing vessels should have a stability assessment appropriate for their size and operation.
- The information from that assessment must then be kept current, and it must be used to determine safe operating limits.

Moreover, these operating limits must be easily measurable, and relevant to the vessel's operation. For example, that could mean marking the sides of a vessel's hull to indicate the maximum operating waterline, or maximum permitted loads can be specified in the most relevant unit of measure—total catch weight for instance, or the safe number of traps. Regardless, for it to be of real, practical use, the information must be presented in a format that is clearly understood and easily accessible to crew.

The other two recommendations address the most basic step that harvesters can take: wearing a personal flotation device. Here in British Columbia, roughly 70 percent of all fishing-related fatalities in the past decade came while not wearing a PFD. Yet many harvesters still do not wear them. TC regulations currently require that PFDs be worn only if harvesters identify a risk, however; you never know when you could end up in the water. So the TSB is recommending to TC to require persons to wear suitable personal flotation devices at all times when on the deck of a commercial fishing vessel or when on board a commercial fishing vessel without a deck or deck structure and that programs are developed to confirm compliance. In June 2019, WorksafeBC amended its fishing regulation related to the use of PFDs. Under the amendments, crewmembers must wear a PFD or lifejacket when on board a fishing vessel that has no deck or deck structure, or when on the deck of a fishing vessel that has a deck or deck structure. Crewmembers are not required to wear lifejackets or PFDs below deck or when inside a deck structure where there is risk of entrapment. This amendment removes the need for a risk of drowning to be present before a PFD must be worn.

For more information about the TSB, visit the 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 information on the TSB's recent safety Watchlist, visit: http://www.bst-tsb.gc.ca/eng/surveillance-watchlist/marine/2018/marine.html

Reporting an Occurrence: www.tsb.gc.ca/eng/incidents-occurrence/marine/
After a reportable occurrence happens; you can fill out the TSB 1808 form or call the TSB at the contact information below.

Recently the TSB produced a Safe at Sea: Activity book on fishing safety intended for the next generation of fish harvesters (ages 4-7). Download a copy.

www.tsb.gc.ca › eng › medias-media › prudence-safe › safe-at-sea

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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-especes/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 (CO_2) from the atmosphere. Increasing atmospheric CO_2 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
TCG: Tahltan Central Government
TRP: Transboundary 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